Environment and Conflict Alert

Gaza preliminary urban and environmental impacts

Peace. Are you in?

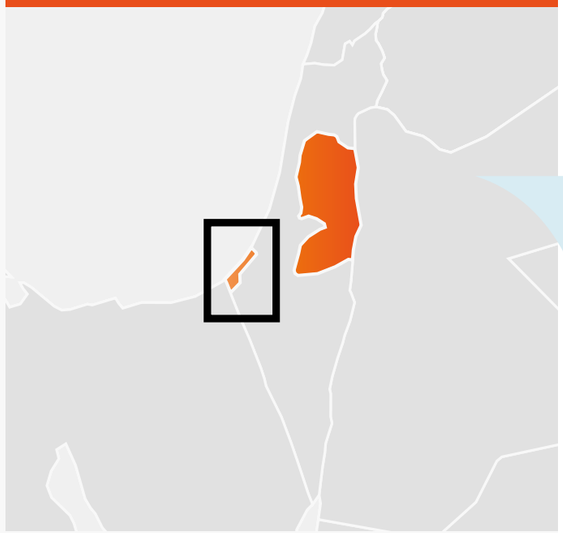
Introduction

The reverberating effects of the military campaign with heavy explosive weapons in Gaza will have long-term implications on the health and livelihoods of Palestinians and ecosystems they depend on. Prior conflicts and a debilitating economic blockade had already left Gaza's environment in a dire state. The 2014 conflict ravaged its agricultural industry, while the groundwater depletion and pollution damage to eco-systems since then has further severely affected the state of the environment. Gaza faces a perpetuating struggle dealing with solid waste management, water, and food security.

Damage in populated areas from explosive weapons

The Israeli Defense Forces (IDF) has deployed a wide range of weapon platforms and explosive weapons, including jet fighters, armed drones, and artillery firing missiles, rockets, loitering munitions and shells in the highly densely populated areas. Meanwhile, Hamas and PIJ have fired locally produced rockets, some of which misfired and landed in Gaza, while those that were not intercepted by the Iron Dome killed several civilians in Israel. According to statistics provided by the Palestinian Ministry of Public Works and Housing, 258 buildings were destroyed, including 1042 housing and commercial units, with an additional 769 units severely damaged and 14,536 units having minor damage. Fifty-four educational facilities, 4 schools, 6 hospitals and 29 health facilities were damaged, including a COVID19 testing centre.

Middle East



Legend

- Crossing pont
- Strikes
- Targeted industrial facility
- Main road
- Drainage network
- Water body
- Urban
- Cropland

Waste management

- Landfill
- Informal dump
- Sewage outlet

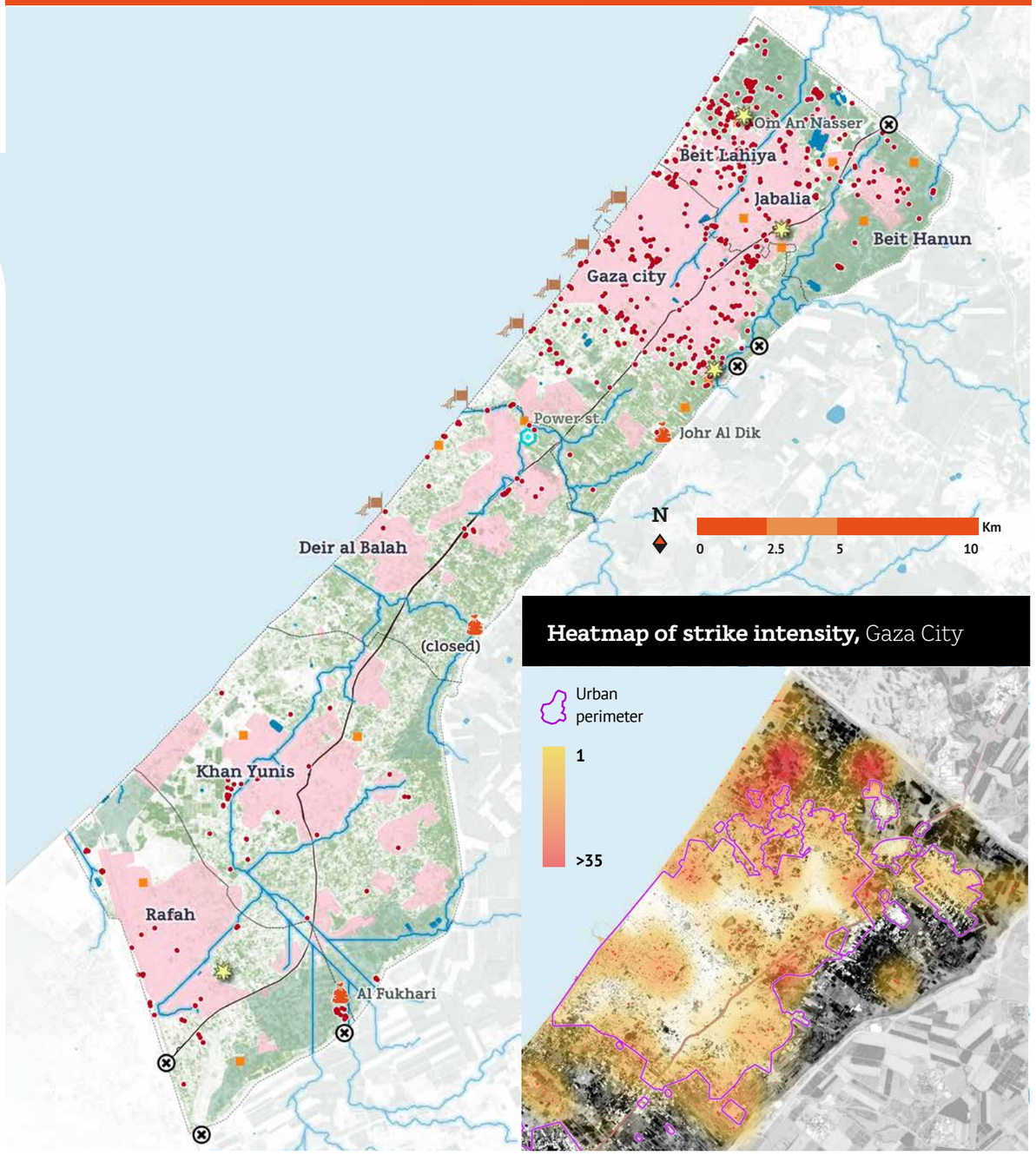
Sources:

Humanitarian Data Exchange, OpenStreetMaps, NASA SRTM DEM, Landsat.

High resolution 50cm imagery via Planet SkySat and European Space Imaging/MAXAR GeoEye-1

Strike data geolocation via @AuroraIntel. Icons via the Noun Project.

Gaza strip, occupied Palestinian territories



Heatmap of strike intensity, Gaza City

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Open-source analysis by Aurora Intel using optical imagery made available by European Space Imaging and Planet identified 762 impact points in Gaza, while other sources reported 1167 visual impacts. Of those, roughly 350 are in urban areas, and 450 are outside, though that distinction is also difficult to make in Gaza, with still many populated areas between the major cities and towns that are marked 'non-urban' in the study.

Public & Environmental health risks

Apart from the direct human suffering from explosions, the damage to infrastructure will cause many indirect and reverberating effects for civilians. UNICEF has noted 100 attacks against water, sanitation and hygiene infrastructure and damage topower supplies, which has compounded humanitarian response efforts for 2.1 million Palestinians. According to a Gaza official, over 7km of water pipelines and 10km of sewage pipes have been damaged. Wastewater and sewage flowed into the streets from damaged pipelines, and solid waste piled up, posing additional health risks from communicable diseases. More than 100,000m3 of untreated wastewater was directly discharged into the sea at the height of the bombings, with the current numbers being reduced to 20,000m3. This will further deteriorate the already dire situation of the marine and coastal environment in the area.

Furthermore, damage to pumping systems and desalinisation plants left 600,000 people without access to water, compounding the COVID-19 risks.

Damage to industrial sites and agriculture

Both airstrikes and artillery targeting resulted in the damage and/or destruction of over a dozen factories and warehouses storing hazardous chemical and toxic materials. Four of those targets are of particular concern, as assessed using the Flash Environmental Assessment Tool (FEAT) 2.0. The first one is the Khudair Agricultural facility in Beit Hadoun. Air strikes and subsequent artillery fire with 155m M-150 HexaChloroethane smoke shells resulted in a large fire in Gaza's large storage facility of pesticides, storing thousands of tons of organo-phosphates and pesticide. Exposure to smoke from the burning of substances and smouldering remnants could pose acute and chronic health risks and long-term environmental impacts. The second location targeted is the Foamco factory, also hit with 155mm HC smoke shells on May 17, causing a large fire and destroying the location. These production facilities generally use toxic chemicals such as formaldehyde, benzene and naphthalene in the production process, and the fire would have posed acute respiratory risks from the smoke, as well as additional environmental risks on the nearby soil from remnants and

Smoke rising from Al Khudair Agriculture Warehouse, May 16, 2021

Burning plastics at the Karni Industrial zone, May 17, 2021

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Bomb craters in orchards of Sheik Za'id, May 16 2021

wastewater. The third risk area is in east Gaza at the Karni industrial areas, damaging or destroying 9 warehouses and factories , with some storing large quantities of plastics, solvents, and cleaning materials. A large fire broke out after shelling with artillery on May 20, visible on satellite imagery. Exposure to some of the chemicals or smoke from burning materials can be toxic, as some are known muta-and carcinogens, affecting the respiratory system and skin. The last potential environmental area of concern is a paint and plastic warehouse in Rafah, hit by an airstrike on May 19, which released a dark plume of burning hazardous materials. Paint production uses organic and inorganic materials, including heavy metals and solvents, and the fire likely resulted in air pollution and exposure of firefighters and civilians living near the noxious smoke.

Numerous impacts on agricultural land, livestock, fish farms and orchards were also visible on satellite imagery, damaging crops and fruit trees, amassing to over $27 million dollars, according to the Ministry of Agriculture. Further damage to irrigation canals, water pumping systems and greenhouses will likely also set back food production, while unexploded ordnance poses direct risks and prevents the use of the land. Formally, over 20% of the Palestinian in Gaza work in the agricultural sector, with other sectors depending on it.

Need for impact assessment

The military campaign in Gaza will pose acute and long-term human health and environmental risks to the civilian population from exposure to hazardous substances from bombed factories, large amount of rubble from bombed buildings mixed with waste and other toxic materials, lack of access to clean water, public health risks from sewage and wider pollution of coastal shores, soil and groundwater from leaking chemicals and sewage. A comprehensive environmental impacts assessment and subsequent clean-up and remediation efforts are needed to prevent and mitigate risks to civilians and ecosystems.

Disclaimer: Damage assessment is based on open-source analysis and visual interpretation of satellite imagery. Ground verification is needed to confirm.

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