

The October 7, 2023 War: The Environment in Wartime

Maya Sadeh and Rakefet Shafran-Nathan

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Taub Center for Social Policy Studies in Israel

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The Taub Center Research and Policy Initiative for Environment and Health is a joint project of the Forum for Health and the Environment, and the Taub Center for Social Policy Studies in Israel, made possible through the generous support of Yad Hanadiv. The Initiative focuses on applied research and the promotion of policies related to an array of environmental issues, among them climate change and the built environment, air and water quality, exposure to chemicals and waste management, with a special emphasis on the impact on the health of the population of Israel.

The goals of the Initiative are to assist in the advancement of public policy in the field of the environment and health through making applied knowledge accessible to policy and decision makers. The activities of the Initiative are accompanied by a Steering Committee composed of leading academics who are committed to promoting effective policies in the fields of the environment and health in Israel. The Steering Committee is comprised of the Founding Committee of the Forum for Health and the Environment and representatives of Yad Hanadiv and the Taub Center.

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War may lead to sudden and rapid changes in the environment and in essential infrastructures. In emergency situations, the overall system must solve problems of electricity and water supplies if they sustain damage to their infrastructure, problems in the energy supply chain for electricity production, as well as issues of transport and storage of hazardous material. In addition, environmental and climatic problems are not limited to a particular region, and therefore, war has local as well as potential geopolitical effects in the immediate and long term. In the immediate term, the functioning of essential infrastructure and the system for handling and storing hazardous materials must be maintained. As part of the recovery from the war, there are opportunities for optimized spatial planning, the creation of high-quality community spaces, and the preservation of nature and open spaces. All of these have major importance for the preservation of societal resilience and health, both now and in the future.

This document briefly reviews seven environmental issues affected by Israel's most recent war, on the local and policy level, with the aim of raising these issues on the public agenda and bringing them to the attention of policy makers. These are the seven issues:

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1. Drinking water supply and the release of sewage into the sea
2. Storage of fuel and hazardous materials
3. The energy sector
4. The deferral of environmental and public health legislation, regulation, and enforcement
5. Nutritional security and volunteerism in agriculture
6. Air pollution from vehicles
7. Harm to nature and wildlife and land pollution

The drinking water supply and the release of sewage into the sea

Drinking water

Drinking water is a strategic resource in wartime. The State Comptroller Report (2022c) found that there are about 2.4 million residents in local authorities that are not able to supply them with clean water during an emergency and that the Water Authority is able to provide a solution for only about 400,000 residents. Moreover, in 18 of 59 hospitals in Israel (about 30%), which account for 13,161 beds, there is no water storage for use in an emergency.

The dependence on desalinated water in Israel is growing, even though the desalination process is highly energy-intensive. According to the State Comptroller (2022c), wells in which the Ministry of Health has found pollutants, such as fuel, fertilizer, and sewage, have been closed and are not being rehabilitated. Currently, more than one-quarter of the wells in Israel — about 500 in number — are not in use or are usable with limitations. In an emergency, when water desalination may not be possible, the pumping of groundwater becomes critically important, and, therefore, polluted wells should be rehabilitated (State Comptroller, 2022c).

With the outbreak of the War on October 7th, there was concern about a shortage of chlorine to purify drinking water. In order to ensure the quality of the drinking water, Israel imports chlorine from neighboring countries for the purpose of water purification, for swimming pools and agriculture.

In the past, the Ministry of Health has warned that there is a need to establish a store of chlorine for emergencies or to issue a permit for an Israeli producer of chlorine, with the goal of ensuring a non-interrupted flow of pure water. However, none of these steps has been taken so far.

Water also has importance for Israel's relations with its neighbors. As part of the efforts to halt climate change, Israel took on the obligation to reduce greenhouse gas emissions and to shift to renewable energy as part of the 2015 Paris Agreement. After signing the Abraham Accords, an agreement was signed between the UAE, Israel, and Jordan, under the auspices of the US, according to which the UAE would establish solar energy fields in Jordan whose output would be sold to Israel and the Palestinians. In exchange, Israel would establish a desalination facility to supply water in greater volume to Jordan.¹ Since the signing of the agreement in November 2021, the project has been stalled and the increasing regional instability is reducing chances of this happening. Given the delay in agreements to encourage the shift to renewable energy, such as this one, Israel continues to be dependent on polluting energy and the chances of it reaching its greenhouse gas emission target for 2030 — 7.7 thousand tons of CO₂ per capita per year — are diminishing.

Release of sewage into the sea

When there is a breakdown in the sewage treatment facility in Gaza, the non-treated sewage flows into the Mediterranean Sea and from there to the coast of Israel, and in particular, to the beaches of Ashkelon and Zikim. In general, the movement of sewage toward the beaches is influenced by two main currents in the Eastern Mediterranean — the western current from the Straits of Gibraltar and the eastern current which moves counterclockwise from North Africa to Cyprus.

The flow of untreated sewage to the beaches may lead to an infestation of flies and mosquitoes and to diseases that spread through physical contact or bathing in water that is polluted with pathogens. Excess biological material in the water also adversely affects the quality of water or the consumption of energy by the desalination facilities along the coast (EcoPeace Middle East, 2019). Even in normal times, the authorities in Gaza dump sewage in the

1 See the Ministry of Energy and Infrastructure site, [UAE, Jordan and Israel collaborate to mitigate climate change with sustainability project](#).

Hanoun River, which also passes through Israel. The sewage is collected by the authorities in Israel near the Erez Crossing and sent for purification to the facility in Sderot.² When the sewage treatment facility in Gaza is not working due to, for example, a shortage of electricity or it is simply not operating, the Israeli Ministry of Health increases the frequency with which it tests the quality of water in the Ashkelon area in order to prevent any damage to the desalination plant located there.

Storage of fuel and hazardous materials

Israel's fuel is stored primarily in the Ashkelon and Haifa Bay areas. During Operation Guardian of the Walls in May 2021, a rocket hit the storage tank of the Energy Infrastructure Company, causing a fire to break out. The fire burned for several days and was accompanied by heavy air pollution and complaints by residents of noxious odors, itchy eyes, and difficulty in breathing.

In recent years, the company has sought to expand the storage of fuel in the Ashkelon area, and in addition, the Eilat Ashkelon Pipeline Company (EAPC) is seeking to expand the transport of oil and its byproducts from the UAE and from other Asian markets to the Mediterranean Basin and Europe. At the request of the Ministry of Environmental Protection, the EAPC conducted a risk survey. However, according to a report by the Israel Society for Ecology and Environmental Science (2021), the survey ignores a number of issues, such as national security and public health. Also in normal times, the team of experts at the Israel Society for Ecology and Environmental Science found that expanding the activity of EAPC is expected to increase the fugitive emissions of volatile organic compounds, including diesel fuel, which is a known carcinogen (Israel Society for Ecology and Environmental Science, 2021).

As a result of the proximity of the fuel facilities in Haifa Bay to populated areas, in March 2022, the government of Israel decided to close the refineries and the associated petrochemical industry located in Haifa. The target for completing the closure is 2029.³ The petrochemical facilities make widespread use of a firefighting foam that contains per- and polyfluoroalkyl substances (PFAS), which are toxic and non-degradable substances. These chemicals seep

2 See the site [Drainage and Streams Authority](#).

3 See Government Decision 1231 from March 6, 2022, [A Strategy for the Development and Advancement of Haifa Bay and Revisions to the Government Decisions](#).

into the groundwater and, as a result, the use of a number of water wells has been banned due to health concerns. As a result of a rocket explosion during Operation Guardian of the Walls, these chemicals led to local pollution of the groundwater.

There are thousands of facilities throughout Israel that store hazardous materials, some of which are near population centers. About 3.2 million residents of Israel live in areas where there is a danger to the health of unprotected individuals in open areas during a hazardous materials event. There are 3,700 stores of hazardous materials in Israel; the Home Front Command is responsible for limiting any undesirable effects at those facilities during wartime. The Ministry of Environmental Protection is identified as the national professional agency for hazardous materials and is responsible for regulation, licensing, coordination, and enforcement of poisonous materials. When an emergency situation is declared on the home front, the Center for Hazardous Materials within the Home Front Command is responsible for the safety of hazardous materials that constitute an immediate risk to public health. In wartime, the factories that store hazardous materials are meant to reinforce the protection of their stock of hazardous material or to dispose of them. The Home Front Command has the authority to issue directives to reduce hazardous material stocks, to conduct frequent inspections, and to approve any transport of hazardous materials by land or by sea.⁴

In view of the security risks in Israel, the stocks of liquefied petroleum gas (cooking gas; LPG) are stored underground. It is important to mention that inflammable or chemical materials that do not represent an immediate risk upon exposure are not subject to the same level of supervision and oversight as hazardous materials that constitute an immediate health risk. Nonetheless, the stocks of fuel are reinforced due to their strategic importance and in order to prevent fires that could emit poisonous gases into the environment.

After the Second Lebanon War, a public advisory committee, headed by Herzl Shafir, was appointed to examine the handling of hazardous materials during peacetime and wartime. The committee examined protective measures taken by factories that manufacture and store hazardous materials in the Haifa Bay area, which are also earthquake-proof. It submitted its findings in 2007.

4 See the Home Front Command site, [Home Front Command Responsibility for Hazardous Materials Event](#).

The committee concluded that protective measures should be installed regardless of the statistical probability of a leak or explosion. Furthermore, it concluded that multiple protection measures should be put in place at the factories, such as burying LPG vessels at the gas facility in Kiryat Ata, the fortification of pipelines carrying hazardous materials, and the fortification of storage tanks from above. The committee recommended the creation of a financial assistance fund to help factories implement these protective measures (Shafir Committee Report, 2007).

According to the State Comptroller Report (2022a), the Ministry of Environmental Protection began to establish a national hazardous materials system following the Shafir Committee Report, but it is still under construction. Furthermore, six out of nine firefighting stations with hazardous material units do not meet the firefighter training standards for dealing with hazardous materials events. In addition, their response time to a hazardous materials event is 15 minutes, which is longer than the accepted global standard of 7 minutes, and is conditional on the establishment of additional firefighting stations. The report found shortcomings in the preparations for hazardous material events and in their handling. A hazardous materials event is liable to endanger human life, destroy buildings and infrastructure, pollute the atmosphere, ground and water, harm agriculture, cause economic damage, and more.

The energy sector

The War and the fear that it will expand to additional arenas emphasize the need to produce electricity from renewable sources and to advance the reform of the electricity sector. The goal of the reform is the dispersion of electricity production over a larger number of producers, including the decentralized production of solar energy. This is in contrast to the current situation in the electricity sector which is highly concentrated and based primarily on natural gas. Furthermore, the emergency situation emphasizes the need to create facilities for the storage of energy and to develop new technologies for this purpose. There is also a need to establish land-based storage for natural gas in order to operate essential systems. It is of primary importance to maintain a functioning energy sector, while also adhering to environmental regulations.

The unloading of oil tankers at the EAPC terminal in Eilat

As a result of the War, the Ministry of Environmental Protection has approved an increase in the quantity of oil passing through the Gulf of Eilat during the war and for two weeks following the cessation of hostilities, with the understanding that the oil is intended only to meet Israel's needs. This measure increases the existing environmental risk of an oil spill. An oil spill will harm the unique marine environment in the Gulf of Eilat and the economy of Eilat, which is based primarily on tourism. Although the marine ecological system in the Gulf of Eilat appears able to withstand a disaster, changes in the water temperature, and in carbon dioxide concentration, an oil spill is likely to cause widespread damage to the coral reef and its surroundings. It is also liable to shut down the desalination plant in Eilat, which provides drinking water to the city, for a period of several months (Israel Society for Ecology and Environmental Science, 2021). This risk also exists in peacetime, but is intensified by the firing of rockets and the penetration of unmanned aerial vehicles from Yemen.

The unloading of oil in the port of Eilat requires the use of the Eilat-Ashkelon oil pipeline operated by the EAPC. In December 2014, Israel experienced one of its largest environmental disasters, during which 5 million liters of oil leaked from the pipeline into the Avrona Nature Reserve. The oil spill harmed plant life and wildlife, including protected species, the structure of the land, microhabitats, the ground cover, the soil crust, and the availability of water in the area. Legislation intended to protect the environment from such harm is relatively thin and is not suited to deal with environmental disasters of this magnitude.⁵ In August 2021, there was another oil spill from the pipeline in the area of Moshav Mishan in the Hof Ashkelon local authority, but its effect on the environment was of a lesser magnitude (Roeh, 2021).

The massive tar pollution event that occurred on the coast of Israel in the winter of 2021, in which 160 kilometers of Israel's coastline was polluted with fresh tar as a result of — according to the Ministry of Environmental Protection — an oil leak from a ship that originated from the Persian Gulf, revealed major gaps in the country's preparations to deal with oil pollution on its coast (Ashkenazi, 2022). Following the incident that year, the proposed law for the National Program for Preparedness and Response to Maritime Oil Pollution Events was

5 The Maintenance of Cleanliness Law 1984 and regulation based on it.

tabled in the Knesset.⁶ The law is an organizational framework that brings together all of the offices that are meant to respond to an oil spill event which is liable to pollute Israel's marine environment in the Mediterranean or the Gulf of Eilat. It is the view of the Ministry of Environmental Protection that in order to pass the law, create an emergency station to deal with marine pollution and to equip it as needed, and to add at least 20 additional staff and create the ability to protect the sea against the risk of large-scale pollution, a budget of NIS 100 million is needed over the next five years.⁷ The law has yet to be passed in the Knesset.

Notwithstanding the War, the increase in the quantity of oil transported by sea is an issue on the public agenda following recent opposition from the Ministry of Environmental Protection, environmental organizations, health organizations, and others. Following the signing of the peace agreement with the UAE in 2020, and with the goal of competing with the Suez Canal in the transport of oil, an agreement was signed for cooperation in the transport of oil between the EAPC and a private company from Abu Dhabi, a company from Gibraltar, and an Israeli company. As part of the agreement, oil produced by the UAE would be transported by way of Israel to markets in Europe and the Far East. Most of the transported oil would be for export. The implementation of this agreement will increase by ten-fold the amount of oil transported via the Gulf of Eilat, which is currently limited to two million tons per year, greatly increasing the risk of an oil spill. Therefore, there is concern that in exchange for a relatively minor economic benefit for the State of Israel, there will be significant potential risk to the city of Eilat and the risk of widespread health, environmental, and economic consequences. The fear is that "temporary will become permanent" and the approval given by the Ministry of Environmental Protection to increase the quota for the transport of oil will not be rescinded when the threat to the supply of oil by way of the Mediterranean is removed.

6 See the Ministry of Justice site, [memorandum of the Law on Preparedness and Response to incidents of Marine Oil Pollution 2021](#).

7 See the Ministry of Environmental Protection site, Recommendations of the Ministerial Committee — Government Decision 832 regarding tar (oil spills) along Israel's coastline.

The purchase of diesel fuel and coal by the Israel Electricity Company (IEC)

In peacetime, the electricity sector seldom uses diesel fuel to produce electricity given that it is highly polluting and expensive. However, during wartime, the government may be forced to shut down the gas rigs and to produce electricity from diesel. In order to prepare for such an eventuality, the Ministry of Energy and Infrastructure and the Electricity Authority have instructed the IEC to acquire sufficient coal and diesel and to lease additional tanks for the storage of diesel fuel. On November 5th, the IEC announced that it intended to buy diesel fuel at a cost of NIS 600 million. The burning of diesel, coal, or mazut (heavy oil), produces higher quantities of particulate matter and nitrogen oxide relative to the burning of natural gas. It also produces sulfur dioxide, a pollutant that poses a danger to the cardiorespiratory system and is not a byproduct of burning natural gas. About 2,500 individuals die each year as a result of particulate air pollution.

The production of electricity from highly polluting facilities

On October 11, 2023, Noga (The Israel Independent System Operator Ltd.) announced that in accordance with the authority of the system manager according to paragraph 25a of the Clean Air Law,⁸ a request was received for exceptional operation of polluting units during the war: a. Orot Rabin 1–4 with coal; b. Eshkol units 6–9 with natural gas or mazut; c. Rothenberg 1 with coal.⁹ It is important to note that the most recent Economic Arrangements Law gave Noga the right to operate polluting units without the approval of the Ministry of Environmental Protection or an air emission permit.

The operation of wind turbines in the Golan

On October 12th, 2023, Minister Yisrael Katz signed a production license submitted by the Electricity Authority for the commercial operation of the Bereshit wind turbine farm in the Golan, which is the largest wind turbine farm in Israel. The farm includes 39 turbines, of which 34 have already been connected to the electricity network.¹⁰

8 The Clear Air Law 2008 and the regulations based on it, Ministry of Environmental Protection.

9 See Noga's site, [Notification of unusual operation, October 11, 2023](#).

10 See the Ministry of Energy and Infrastructure site, [At the conclusion of the fighting, Israel's largest wind farm will receive authorization from the Minister of Energy and Infrastructure and will be able to immediately strengthen electricity production in Israel!](#)

Deferral of legislation, regulation, and enforcement in the areas of the environment and health

Cancellation of the budget addition: The regular budget of the Ministry of Environmental Protection was NIS 384 million in 2023. In addition, it was allocated NIS 510 million for additional projects. The additional budget includes, NIS 200 million for climate issues, which has yet to be allocated. These additional budgets, some of which have not actually been allocated funding by the Ministry of Finance, were cancelled as a result of the War. The Ministry of Finance has yet to publish the updated budget for 2023 and 2024.

International environmental activity: The State of Israel has not participated in important environmental conferences, including one on plastic pollution, which took place in Kenya in November 2023. A large delegation from Israel had planned on attending the Climate Change Conference in Dubai in late November, but, due to the War, only a few representatives attended.

Automatic renewal of regulatory approvals: The business licensing and environmental permit system, together with inspections, make it possible to supervise industrial activity that is liable to pollute the environment. The government has decided to extend business licenses by 3–4 months and the Prime Minister has the power to extend them for up to 9 months. The extension also applies to environmental permits: toxic materials permits, air emission permits, water discharge permits, and permits for the handling of hazardous materials, not including permits for the import and export of hazardous waste, emergency permits for dumping waste into the sea, and permits regarding radioactive elements and radiation.¹¹

The Bottle Deposit Law: At the beginning of the War, the Ministry of Environmental Protection announced that it is immediately granting the request of the Federation of Chambers of Commerce to freeze the Bottle Deposit Law for a period of three weeks. According to the Law, supermarket chains must accept empty bottles and reimburse the deposit paid for them. On October 30th, the Ministry of Environmental Protection announced that it would not extend the freeze since it resulted in the complete halting of all bottle collection.

11 See the site of the Ministry of Justice, [Period Extension Law \(regulatory licenses, financial sanctions, gas facility inspections\)](#), 2023, as well as Infospot site, [Due to the War: Automatic extensions of licenses to businesses with environmental permits](#).

Waste segregation: There are some local and regional authorities that do not collect garbage separately in recycling bins: a bin for packaging (orange), a bin for paper (blue), and a bin for glass (purple), due to the shortage of manpower among the subcontractors of the recycling corporations. Residents are asked to throw all of their waste into the green bins which are destined for landfill.

Burning of waste: The burning of household waste that includes plastic and electronic components has been a criminal offense in Israel since 2018 and constitutes a major environmental challenge. According to the Ministry of Environmental Protection, 74% of the carcinogenic material emitted into the air in Israel comes from the burning of waste (Ministry of Environmental Protection, 2023). In order to eliminate this, a special unit of the Green Police was established, called the Owl Unit, which consists of 15 inspectors who are responsible for monitoring the illegal disposal and burning of garbage. Currently, some of the inspectors have been called up for reserve duty and the Citizens' Association for Clear Air, which monitors the burning of waste by means of citizen reports, has noted an increase in waste burning in certain areas.

Amendment to the Maintenance of Cleanliness Law: The Maintenance of Cleanliness Law was expanded by means of a temporary order to allow local and regional authorities with a socioeconomic ranking of 1–5 to organize the handling of waste in both peacetime and wartime. The measure was introduced before the War, but in view of the higher cost of transportation and the accumulation of waste, partly due to damage caused by the War, the process was accelerated to provide financial assistance to local governments in handling waste, the provision of garbage bins where there are concentrations of soldiers, and for residents who do not have a garbage disposal solution due to the War, among other things.

The transfer of funds from the Fund for the Maintenance of Cleanliness to the war budget: About 80% of all waste in Israel goes to landfill. The amount of waste per capita in Israel was about 691 kg in 2020 while the OECD average was 534 kg (OECD, 2023). In March 2023, Minister Idit Silman and Guy Samet, the Director General of the Ministry of Environmental Protection, announced that the Fund for the Maintenance of Cleanliness would be allocated money to build facilities for waste sorting, energy recovery, the recovery of waste in landfills, and the maintenance of existing facilities. The goal of this measure is to meet Israel's strategic plan for the handling of waste and to support progress toward a circular economy.

On November 3rd, 2023, the government decided to borrow NIS 820 million from the Fund for the Maintenance of Cleanliness to finance increased compensation for reserve soldiers.¹² According to the State Comptroller Report (2022b), NIS 1.66 billion had already been transferred from the Fund for the ongoing needs of the government, which was not in accordance with the designation of the Fund nor with the Maintenance of Cleanliness Law. The land reserves for landfill in Israel are almost completely used up and the transfer of half of the money that had been accumulated in the Fund is likely to defer the implementation of the Waste Disposal Strategic Plan as well as other planned activities.

Food security and volunteerism for agriculture

As shown in Figure 1, the Gaza border area accounts for a significant proportion of Israel's agricultural output: 47% of the land used to grow tomatoes, which accounts for 70% of Israel's tomato output; 60% of the land used for growing potatoes, which accounts for 35% of Israel's potato output; and 59% of land used to grow lemons. The damage caused to the Gaza border area settlements by the War, during which foreign agricultural workers were killed or wounded and farmers were evacuated from the area of fighting, in addition to the evacuation of residents from settlements in the North, is highly likely to hinder the provision of fresh produce in Israel and to reduce farmers' income. In the current missile attacks and those that have taken place in the past, farmers are more exposed to mortar and rocket fire because the Iron Dome system does not intercept missiles aimed at farmland, which is considered to be open and unpopulated areas. The damage to agriculture is liable to continue into the next planting season and may lead to higher prices for fruit and vegetables over time, thus raising the cost of living. In order to fill the gap, civilian organizations have begun to recruit individuals to harvest the produce that can still be marketed, such as tomatoes, peppers, and eggplant.

Apart from the cultivation of fruits and vegetables, the War has had an adverse effect on other agricultural sectors:

- The growing of cotton in the Gaza border area (5.7% of the land on which cotton is grown; Figure 1a) has been damaged by dirt and dust from the military staging areas and from fires.

12 See the site of the Prime Minister's Office, [Appreciation, Assistance, and Compensation for Soldiers Serving in the October 7th War](#).

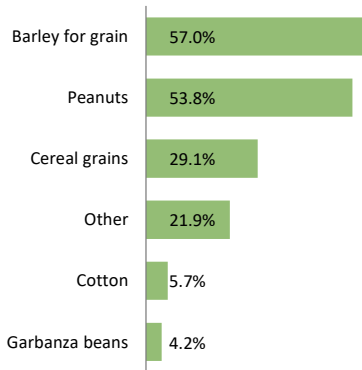
- 15% of the dairy farming is located in the Gaza border area (Figure 1c). This sector needs large areas that are distant from crowded population centers, in view of the pollution produced by animals. The war caused significant economic damage to dairy farms in the Gaza border area, which in peacetime produce milk for all of the dairy manufacturers in Israel, in addition to damage to livestock and the physical infrastructure. The organizations Achim LaNeshek, Achim LaMeshek, and Achim LaRefet¹³ have devoted themselves to help in the milking.
- About 70% of the chicken coops in Israel, which provide about 73% of the national output, are located in the Galilee and Golan.
- 26% of the production of deciduous and subtropical fruit, such as avocados, wine grapes, mangos, peaches, bananas, and citrus fruits, are grown in the regional authorities along the northern border.

Many livestock farmers in Israel have remained on their farms, despite the risk. The expansion of the War to additional areas is liable to harm farmers and exacerbate the shortfalls.

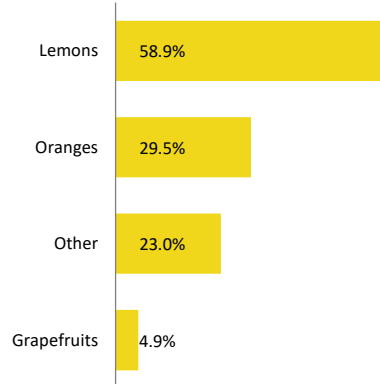
13 These are all a play on words: Achim LaNeshek — Brothers in Arms; Achim LaMeshek — Brothers on the Farm; Achim LaRefet — Brothers in the Cowshed.

Figure 1. Share of arable land in the Gaza border area settlements out of all arable land in Israel, 2023

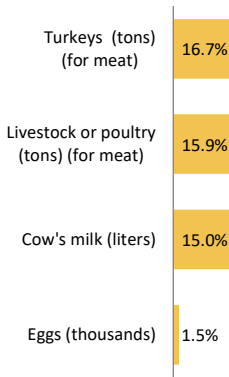
a. Crops



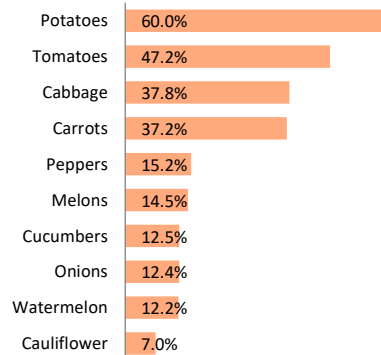
b. Citrus fruit



c. Livestock and byproducts



d. Vegetables

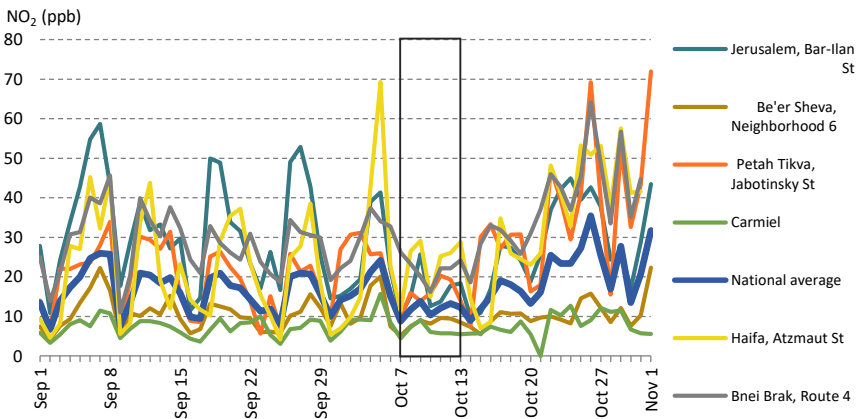


Source: Maya Sadeh and Rakefet Shafran-Nathan, Taub Center | Data: CBS, October 2023

Vehicular air pollution

The decrease in air pollution from vehicles is an indicator of the decline in economic and human activity. Most of the monitoring stations monitor NO₂ (nitrogen dioxide) which is emitted from vehicles and therefore it was chosen as a proxy for vehicular activity at a daily resolution. Figure 2 shows the daily average of NO₂ levels between September 1st, 2023 and November 1st, 2023 in various locations in Israel: Carmiel, Jerusalem, Be'er Sheva, Bnei Brak (Route 4), Haifa (the lower city), and Petah Tikva. During the first week of the War (October 7–13, 2023), vehicular activity declined in the cities and as a result there was a reduction in air pollution. The national average for NO₂ is in the vicinity of 20 ppb while during the first week of the war it fell to 11 ppb. Following the first week, vehicular activity picked up, even in areas that were the target of rocket attacks, such as Be'er Sheva and cities in the Center.

Figure 2. Vehicular air pollution in selected Israeli cities (daily average), September–October 2023



Note: NO₂ levels are parts per billion (ppb). The rectangle marks the first week of the War, October 7-13, 2023.

Source: Maya Sadeh and Rakefet Shafran-Nathan, Taub Center | Data: Ministry of Environmental Protection

Damage to nature and to wildlife and land pollution

The military operation in the Gaza border area and on the northern border are liable to cause harm to the natural habitats in these areas. The dunes of Netiv Ha'asara and Zikim, as well as the Maktesh Reserve in Be'eri, are the natural habitats of plants and animals that are unique to dune environments. The large-scale activity of bulldozers and armored vehicles endangers these habitats by harming the biological soil crust which fulfills an important role in the ecological systems in arid and semi-arid areas (Zaady, 1999; Rinat, 2023). Furthermore, the military activity is liable to pollute the land with poisonous metals, such as lead, arsenic, mercury, and copper, as well as organic materials. This pollution may also harm agricultural produce, into which the poisons are liable to penetrate (see, for example, Dzombak, 2022). Prior to the rehabilitation of the settlements in the Gaza border area and their repopulation, a survey should be done of pollutants in the ground, and, if necessary, the soil should be rehabilitated and purified.

In order to protect wildlife from harm, the Ministry of Environmental Protection and the Nature and Parks Authority have evacuated wildlife and livestock, including birds, farm animals, turtles, lemurs, meerkats and nasua, from petting zoos in the Gaza border area and in Kibbutz Kfar Giladi in the North (Maanit, 2023).

Overall, 48.5% of the area of the nature reserves and national parks and 15% of the forested area under the management of the Keren Kayemet also serve as firing ranges (Ben Moshe & Ranan, 2022). While these areas are protected from anthropogenic effects, such as construction, they are exposed to fires resulting from military activity. In the summer of 2020, a series of fires from military activity damaged about 8,000 dunams near Majdal Shams and Har Dov. Ecologists believe that the ability to recover from these fires is limited and the rehabilitation of the area will take decades (Rinat, 2021). A group of researchers published an assessment in November 2023 that, in 2011, wars affected 15% of the earth's land surface, not including the ice caps. In 2015, it was found that urban areas, apart from intercity roads, covered only about 2% of the earth's land surface and in 2030 that figure is expected to be 5% (Certini & Scalenghe, forthcoming).

Conclusion

In peacetime, and even more so in wartime, the country's defense needs sometimes overshadow social and environmental needs. The awareness of decision makers and the population to these issues is important so that an optimal balance can be found even in wartime. Thus, in order to prevent a potential environmental disaster, such as an oil spill, damage to a fuel store, or the emission of hazardous materials into the atmosphere during wartime, which will add environmental and health risks to the already-existing risk, the agencies that are meant to protect the environment need to be strengthened and they must be given the ability to recruit additional manpower, as well as additional powers and budget. In addition, relevant legislation needs to be passed and ongoing enforcement needs to be reinforced. During the rehabilitation and development of the Gaza border area, focus should also be placed on health and environmental considerations. Efforts should be made to preserve open spaces, which constitute the green lung of the area and are essential for the resilience of the residents on their return home. In recent years, a discourse has developed on the resilience of the population to withstand natural disasters, such as heat waves, droughts, and floods. This takes into consideration the measures of resilience on the level of physical planning, vulnerable populations, medical and mental health services, response during emergencies, etc. The current emergency situation can be an opportunity to study the strength of the population and to improve readiness. Finally, the rehabilitation of the settlements in the Gaza border area is an opportunity for physical and infrastructure planning that is socially and environmentally sustainable.

References

English

- Ben-Moshe, N., & Renan, I. (Eds.). *State of nature report 2022 – trends and threats*. Hamarag – Israel’s National Ecosystem Assessment Program.
- Certini, G., & Scalenghe, R. (forthcoming). *War is undermining soil health and availability more than urbanisation*. *Science of The Total Environment*, 908.
- Dzombak, R. (2022). *Russia’s invasion could cause long-term harm to Ukraine’s prized soil*. *Science News*.
- EcoPeace Middle East (2019). *Health risks assessment for the Israeli population following the sanitary crisis in Gaza*.
- Ministry of Environmental Protection (2022). *Annual PRTR (Pollutant Release and Transfer Register) Reports 2022*. Ministry of Environmental Protection. English summary.
- OECD (2023). *Environmental performance reviews: Israel 2023*.
- State Comptroller (2022b). *The Maintenance of Cleanliness Fund – financial aspects*. *State Comptroller Report May 2022 Abstracts*. Office of the State Comptroller.

Hebrew

- Ashkenazi, S. (February 2, 2022). *The plans remain in the drawer: A year to the largest oil spill, and Israel is again vulnerable to a serious hazard with no defense*. *Globes*.
- Aviram-Nitzan, D., Kenneth Portal, R. (2023). *Some 330,000 Israelis have been displaced from their homes following Iron Swords War*. Israel Democracy Institute.
- Gamss, N. (October 15, 2023). *“They have to be strong”: The farmers of settlements around the Gaza Strip are trying to save their life’s work – and warn of shortages*. *The Marker*.
- Gazit, A. (October 19, 2023). *Caravan sites, public housing, or help from contractors: Where will all the people displaced from settlements around the Gaza Strip live?* *Calcalist*.
- Horesh, H. (October 29, 2023). *“They didn’t know to be ready in case of war?” The plan to solve the temporary housing crisis for evacuees has run into unexpected problems*. *The Marker*.
- Israel Society of Ecology and Environmental Sciences (2021). *The Med-Red Agreement: Mapping the dangers to Israel and policy recommendations*. Israel Society of Economy and Environmental Sciences.

- Lavie, A. (October 28, 2023). *When the big guns thunder, there is no one to protect the environment. The Times of Israel.*
- Maanit, C. (October 16, 2023). *Nasua and other animals: Animals are evacuated from the Gaza border area to the North and Center. Haaretz.*
- Raviv, A. (October 20, 2020). *Agreement with the Emirates: The Eilat Ashkelon Pipeline Company (EAPC) has opened between the Persian Gulf and the Mediterranean, competing with the Suez Canal. Davar.*
- Raviv, A. (November 22, 2021). *Solar electricity in Israel, desalinated water to Jordan: This is how countries came to a historic accord. Davar.*
- Report of the Shafir Committee (2007). *The Public Advisory Committee to Examine Readiness and Ability Deal with Dangerous Materials in Emergencies.*
- Rinat, Z. (July 11, 2021). *Report: The fire was a result of IDF exercises in the Hermon Mountain reserve causing long-term damage. Haaretz.*
- Rinat, Z. (November 8, 2023). *The forgotten victims of the war: plant life, animal life, and the soil. Haaretz.*
- Roeh, A. (October 30, 2021). *A leak from the Eilat Ashkelon Pipeline near Ashkelon; The Ministry of Environmental Protection: "A serious incident, we will open a criminal investigation." Calcalist*
- Shmil, D. (October 28, 2023). *Because of the War: The tax on diesel for production of electricity will be reduced. The Marker.*
- Spolter, S. (October 24, 2023). *The Ministry of Agriculture is prepared for an operation in the North and promises there will not be a food shortage. The Marker.*
- State Comptroller (2022a). *Preparedness for damage to dangerous materials storage units during wartime. State Comptroller Report March 2022.* Office of the State Comptroller.
- State Comptroller (2022c). *Supply of drinking water in an emergency. State Comptroller Report November 2022.* Office of the State Comptroller.
- Zaady, E. (1999). *Biological soil crust and their role in the desert ecological system. Ecology and Environment, 5(2-3), 77-83.*