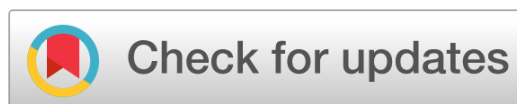




Impacts of the 2026 US-Iran War on Environmental Security in the Middle East

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Graphical Abstract

Modern warfare not only causes human casualties but also degrades the environmental systems essential for daily life; the 2026 US-Iran conflict has severely threatened regional ecosystems through attacks on critical infrastructure, oil and gas facilities, and natural resources. These impacts extend into urban areas, endangering civilian populations and ecological stability while creating long-term environmental insecurities that may persist far beyond the end of hostilities.



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Abstract: Modern warfare does not merely inflict human casualties; it also degrades the environmental systems vital for daily life. The 2026 US-Iran conflict poses a severe threat to regional ecosystems, as belligerents deliberately target critical infrastructure and weaponize natural resources to secure military advantages or compel concessions. Oil and gas tankers in the Strait of Hormuz, alongside refineries and energy installations throughout Iran and the Arab Gulf states, have emerged as primary targets. This destruction extends rapidly into urban areas, presenting catastrophic risks to both civilian populations and ecological stability. Wartime environmental destruction triggers long-term insecurities that far outlast any formal peace agreement.

Keywords: 2026 US-Iran war, Environmental security, Insecurities, Iran, Arab Gulf states.

Introduction

On February 28, 2026, the United States and Israel launched a major, widespread offensive against Iran. They targeted military and non-military infrastructure, including air defence bases, missile launch pads, buildings suspected of housing regime figures, oil facilities, and civilian infrastructure. The US codenamed its offensive ‘Operation Epic Fury,’ and Israel designated its campaign ‘Operation Roaring Lion.’ Iran responded by firing missiles at US and Israeli military bases while also targeting non-military infrastructure across the region, including within the Arab Gulf states. Following more than five weeks of hostilities, the parties agreed to a temporary ceasefire. Later, on June 17, they remotely signed a diplomatic agreement called the Islamabad Memorandum—negotiated by Pakistan to end the war and reopen the Strait of Hormuz. But, hostilities resumed on July 8, driven by a lack of progress in negotiations and mutual accusations regarding attacks on ships in the Persian Gulf [1-3].

Like many conflicts that endanger ecosystems through the use of destructive, chemically loaded weapons—such as the war in Ukraine, where new findings suggest 20 per cent of the land suffers from chemical contamination—the US-Iran conflict has targeted environmental infrastructure from its very outset [4]. The warring parties use these tactics to undermine their opponents' combat capabilities while simultaneously weaponizing the environment itself, as demonstrated in the Strait of Hormuz. This war raises heightened environmental concerns because it unfolds in a region that supplies 20% of global oil consumption, represents over 13% of the global natural gas export market, and contributes significantly to the global fertilizer supply. The area is densely packed with dozens of oil rigs, refineries, gas-related installations, power plants, and commercial transport hubs. Furthermore, because both the Arab Gulf states and Iranian coastal cities rely heavily on seawater desalination for domestic fresh water, these critical facilities have increasingly become military targets.

Donald Trump has repeatedly threatened to strike civilian infrastructure, which would cause catastrophic consequences for both people and the environment. During a Fox News Radio interview with Brian Kilmeade on March 13, 2026, he threatened to destroy power and water desalination plants, stating, ‘I could take out things within the next hour—power plants that create the electricity, that create the water. They have desalinisation all over the place. We could do things that would be so bad they could literally never rebuild as a nation again.’ He then escalated his rhetoric; in April 2026, he threatened to wipe out the entire Iranian civilisation. Stating that strikes would send the country back to the ‘Stone Ages’ (sic) and that it would ‘never be brought back again,’ he warned that these actions would follow if an agreement was not reached and his terms were not accepted. His terms have not been accepted. The war he launched drags on. The United

States has become trapped in a situation like the Vietnam War. For its part, Iran promised ‘irreversible destruction’ if the US carried out its threats [5-9].

The US and Israeli militaries have previously struck nuclear power plants, energy installations, industrial complexes, transport networks, and water infrastructure. Iran claims that these attacks destroyed ‘dozens of water transmission and treatment facilities and parts of critical water supply networks.’ Meanwhile, Iran has targeted desalination plants, power stations, commercial ships, energy facilities, and digital infrastructure across Gulf states aligned or cooperating with the US. These attacks are likely to intensify whenever the conflict resumes, further undermining regional environmental security [10-15].

This paper highlights the environmental dimensions of the 2026 US-Iran conflict by examining it through a security lens. It provides a detailed review of environmental infrastructure targets and their implications for water security, air quality, and soil health in Iran and the Arab Gulf states. By addressing environmental security directly, the paper argues that the conflict poses an immediate threat to—and has severely undermined—the region's ecological stability. Furthermore, it posits that environmental insecurity carries long-term consequences for human well-being and planetary health that will persist far beyond any immediate truce or formal end to hostilities. The paper concludes that profound ecological damage has already occurred, and the longer the war continues, the more compromised regional environmental security will become.

Examining the environmental dimensions of military conflict offers a new perspective in which to see the reality of human aggression. This approach by no means diminishes the significance of human casualties or the destruction of homes; rather, it highlights the profound damage inflicted upon the ecosystems that support the life and prosperity of all species. Hence, within the context of this paper, environmental security refers to safeguarding three primary environmental components—water (including the Persian Gulf), air, and soil—to protect both the environment itself and the populations whose lives and well-being rely on its health.

Water security

Water infrastructure is highly vulnerable to attacks during military conflicts. Critical assets—including waterways, natural water sources, storage facilities, lakes, reservoirs, pumping stations, distribution networks, treatment plants, and desalination facilities—face significant threats. International law prohibits damage to the environment and essential civilian systems, but enforcing these rules remains a challenge. Legally, states are obligated to protect the environment from harm and ensure that weapons and tactics do not target natural ecosystems or critical infrastructure, as human survival and planetary health depend entirely on these protections. In an anarchical

international system, conflicting parties often operate with perceived impunity [16,17]. Consequently, environmental infrastructure across Iran and the Arab Gulf states faces a severe threat of destruction, with the desalination plants along the Arabian Gulf coastline being particularly at risk.

The Arab Gulf states are the world's most dependent consumers of desalinated seawater, which serves as the region's civilian and economic lifeline. Nations like Kuwait, Qatar, Bahrain, and the UAE rely almost entirely on processed seawater to meet domestic needs; by constructing over 400 advanced plants along their coastlines, they have made themselves easy targets for an Iranian attack. These facilities convert seawater into freshwater by removing salt and minerals—a process critical for the survival of Arab Gulf nations, which (except for Oman) possess virtually no other natural water sources. Collectively, the Persian Gulf states produce nearly 40 per cent of the world's desalinated water. These facilities, which process billions of litres of water daily to sustain millions of people, create a false sense of water security [14,18-24].

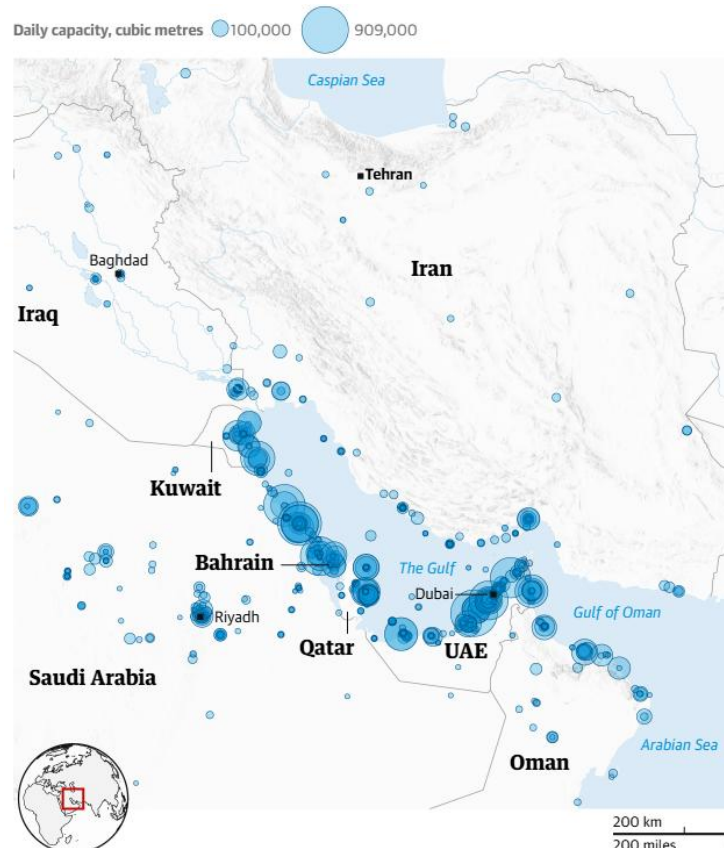


Figure 1. Numerous desalination plants across the Persian Gulf region could become military targets for belligerent parties. Desalination plants and water infrastructure are protected under international law, but the current state of international relations allows states to violate these laws and evade accountability for their actions.¹

¹ Source: *The Guardian*, March 11, 2026. Available online at: <https://www.theguardian.com/world/2026/mar/11/severe-water-stress-why-desalination-plants-are-gulf-greatest-weakness> (accessed 8 August 2026).

Desalination plants are easy military targets because their large, fixed, and complex footprints leave them virtually defenceless against modern electronic and conventional warfare. They are highly vulnerable to drone strikes, missile attacks, cyber warfare, and other advanced weapon systems. A leaked document from the US State Department in 2009 stated that ‘an attack on Saudi Arabia's desalination plant in Jubail would force the entire population of Riyadh to evacuate 'within a week', as the plant delivers over 90% of the city's drinking water.’ The desalination plant in Jubail is called Ras al-Khair, which is the world's largest plant of its kind. It has a daily production capacity of over one million cubic metres. Military attacks on civilian infrastructure are highly likely given that the US has already targeted bridges, food factories, and schools in Iran. Furthermore, the US has threatened to destroy desalination plants in Iran if a deal is not reached. In response, Iran has promised mirrored retaliation and has already targeted several civilian infrastructure sites across the Arab Gulf states. Israel, which initiated the war and drew the US into it, has an undeniable record of striking civilian infrastructure in Gaza and elsewhere, has executed similar attacks in Iran, and may intensify these actions [25].

Recent events have highlighted the fragility of the seawater desalination system, demonstrating how rapidly cities like Dubai and Doha could run out of water; indeed, many Arab Gulf cities hold strategic reserves lasting just about one week. Because this infrastructure lies within easy reach of enemy missiles, it faces the dual threats of direct destruction and severe environmental contamination. Furthermore, many of these facilities are adjacent to power plants. This proximity offers a reliable electricity supply and effectively uses waste heat for desalination while simultaneously using water to cool the power plants. Thus, these desalination facilities are highly vulnerable if the power plants are attacked. Additionally, strikes on desalination plants can release chemicals used in the water purification process—such as sodium hypochlorite, ferric chloride, and sulphuric acid—into Gulf waters. Furthermore, strikes on nearby oil tankers or the use of heavy ordnance can pollute water intake zones with toxic chemical residues, instantly threatening the region's primary water source [19-22,26].

Several water desalination plants on both sides of the Persian Gulf have come under attack: desalination plants on Qeshm Island and in Assaluyeh, for which the US and Israel are accused; the Muharraq facility in Bahrain; and two desalination plants in Kuwait. Additionally, the Fujairah F1 power and water plant in the UAE was attacked, for which Iran is accused. These strikes forced an immediate halt to operations at the affected sites. Tehran had previously warned that it would target regional desalination plants if its own fuel and energy infrastructure were attacked. These incidents raise grave concerns about the vulnerability of this vital resource—especially since these

states hold minimal strategic water reserves—and constitute a direct, existential threat to water security, particularly for the Arab Gulf states [22,23,27-29].

The security of many other sectors is tied to the stability of the freshwater supply. Any disruption to this flow would be catastrophic for households, hotels, agriculture, industries, businesses, public facilities, and recreational sectors. Such an event would cause massive economic losses with severe consequences for the country's future. Furthermore, attacks on desalination plants can directly affect power generation because national electricity grids are integrated into these facilities. Consequently, 'damage could cascade into city-wide power outages or necessitate complete evacuations [24]'.

Israel relies on desalinated water for 80 to 85 per cent of its domestic and drinking needs, as well as for replenishing depleted aquifers and maintaining water levels in the Galilee reservoir; meanwhile, its agriculture and industry sectors depend mainly on recycled wastewater. Largely arid or semiarid, the country operates five massive desalination plants along its Mediterranean coast that collectively generate 600 million cubic metres of freshwater annually. Through partnerships with private companies, Israel aims to increase annual production to 2.3 billion cubic metres by 2050 and 2.75 billion cubic metres by 2075 [30-32]. Surprisingly, these desalination plants remained undamaged during the first phase of the war (February 28 to April 7, 2026), which was the most intensive and devastating period. Given the highly unpredictable nature of warfare, this temporary safety does not guarantee the future security of Israel's water infrastructure [33].

Iran's reliance on seawater desalination is very low compared to its Arab neighbour states on the other side of the Persian Gulf. Desalinated water accounts for only 2 to 3 per cent of its supply, and this capacity is heavily concentrated in its southern provinces. Nevertheless, Iran's traditional water sources are under immense pressure, mainly because of decades of over-extraction and multi-year droughts. This escalating crisis was raised multiple times by Iranian President Masoud Pezeshkian, who suggested that the capital may need to be relocated to a southern coastal province where it can rely directly on desalinated seawater. Furthermore, Iran's water, electricity, and energy infrastructure have been targeted by the US and Israel during the recent conflict, and further attacks are highly likely to occur, severely undermining the nation's broader water security, and worsening social stability [34].

The demand for desalinated water in the Arab Gulf states is projected to rise significantly because of population growth, climate change, high water consumption, and expansions in agriculture, industry, and recreation. The Arab Gulf states' average per capita daily water consumption of 560 litres is among the highest globally. As the world's most water-scarce region, the Middle East faces an expanding population alongside growing water requirements for agriculture, industry,

commerce, and recreation—particularly in the UAE. This strain is compounded by accelerating climate change, which is warming the region at nearly twice the global average rate and severely impacting water availability. Consequently, Arab Gulf nations plan to invest billions of dollars in future desalination projects to increase significantly daily production from its current 20 million cubic metres to a much higher capacity by 2050. A portion of these funds will likely be allocated to defence mechanisms to protect these critical facilities from attacks [35-38].

The 2026 US-Iran war is not the first conflict to threaten regional water infrastructure. During the 1990 Iraqi invasion, Kuwait's desalination plants suffered severe attacks, and Iraqi forces contaminated the Persian Gulf by releasing an estimated 11 million barrels of oil. This environmental damage rendered desalination impossible in certain areas, including along the Saudi coastline. A study conducted 12 years after the war concluded that traces of oil residue still lingered along Saudi Arabia's coast [39]. More recently, in 2022, the Houthis in Yemen targeted several of Saudi Arabia's facilities. The current US-Iran war presents a uniquely severe challenge to regional water security because it risks escalating into a full-scale water war. The conflict involves advanced, precision-guided weaponry and places all Arab Gulf states in the crosshairs. Actual and potential attacks on desalination infrastructure on both sides of the Persian Gulf pose an existential threat to the water security that Arab states have long worked to achieve. Furthermore, potential oil leaks or spills into the Gulf from attacked tankers could clog membranes and pumps, leaving desalination plants completely unable to produce drinking water [17,18,40,41].

Desalination plants are massive facilities integrated with fossil-fuel power grids, making them highly flammable. Furthermore, their coastal locations leave them highly vulnerable as accessible targets for Iranian strikes. Desalination plants had previously guaranteed future water security for both the Arab Gulf states and coastal Iranian cities. Because seawater is an infinite resource, technology seamlessly facilitated its large-scale purification for all civilian and industrial needs. The war has shattered this conviction. Insecurity in the freshwater supply automatically translates to instability across all sectors of society, forcing states reliant on desalination to rethink their guarantees for future water availability [24].

Gulf water security and the closure of the Strait of Hormuz

The Persian Gulf is a semi-enclosed sea located in the Middle East, in Western Asia. As an extension of the Indian Ocean, it is bordered by Iran to the northeast and the Arabian Peninsula to the southwest. The Gulf is approximately 1,000 kilometres long, with a width that varies from 340 kilometres at its widest point to just 39 kilometres (24 miles) at the Strait of Hormuz. It is a very shallow body of water, averaging only 35 metres in depth. The nations of the Arabian Peninsula that border the Gulf include Iraq, Kuwait, Bahrain, Qatar, Saudi Arabia, the United Arab Emirates

(UAE), and Oman. The Gulf's narrow opening at the Strait of Hormuz limits the water exchange. The Gulf is therefore one of the saltiest bodies of water in the world; yet, it concurrently serves as a critical habitat for several endangered species. This restricted water exchange also makes the Gulf highly vulnerable to pollution and other ecological catastrophes [42].

The Strait of Hormuz is a narrow waterway connecting the Persian Gulf with the Gulf of Oman and the Arabian Sea. The strategic importance of the strait stems from the fact that it is the sole maritime exit for oil and gas exports from the Persian Gulf states. Including Iran, these nations account for roughly 35% of global crude oil exports and 20% of global liquefied natural gas (LNG) trade. Additionally, one-third of the world's fertilizers pass through this strait [43,44].



Figure 2. The 2026 US-Iran conflict has affected the Persian Gulf, with Iran occupying the eastern and southeastern shores, and US-allied Arab states occupying the western and southwestern regions. As a vital maritime corridor, the Persian Gulf remains critical for the global economy.²

The Strait of Hormuz has emerged as the epicentre of the 2026 US-Iran war. Following a Pakistani-mediated temporary truce, the conflict is now mainly referred to as the US-Iran war. Although

² Source: Australian National University. Available online at: <https://openresearch-repository.anu.edu.au/server/api/core/bitstreams/f8808efb-fc31-4a2f-aea1-e2152488e89e/content> (accessed 3 August 2026).

Israel remains involved, the second phase of the war has concentrated on the Persian Gulf, where Israeli forces lack a physical presence. Amid bilateral negotiations for a potential diplomatic deal, Iran closed the strait to international navigation. In response, the United States imposed a naval blockade to restrict Iranian control over the waterway. Although traffic has resumed during occasional, temporary openings for authorized vessels, the Strait of Hormuz remains largely closed [45,46].

The closure of the Strait of Hormuz could trigger a global ecological catastrophe in international seas and oceans. Marine organisms in the Persian Gulf—such as microorganisms, algae, plants, and invertebrates—can attach to idle ships in a process known as biofouling. When these vessels finally move, they transport these species into international waters. Ships are usually coated with protective anti-fouling paint to prevent marine growth; but, after prolonged idleness, like that experienced in the Persian Gulf since the war began in February 2026, these protective layers degrade. As a result, the species attaching to the hulls can no longer be easily removed [47,48].

Over 1,500 ships are currently idle in the Persian Gulf, with hundreds more in the Gulf of Oman as of late July 2026. These vessels are highly likely to transport marine organisms from the Persian Gulf to various ports around the world. Because the Persian Gulf is one of the saltiest and warmest bodies of water on Earth, its native marine species are exceptionally resilient. They routinely survive extreme salinity and temperatures, giving them a high probability of thriving and multiplying in more temperate climates. As these invasive species spread, they can alter ecosystems, disrupt commercial operations like aquaculture and fisheries, and cause economic damage costing millions of dollars [47].

The Persian Gulf is isolated from the rest of the world's seas and oceans, connected only through the narrow chokepoint of the Strait of Hormuz. This isolation has created a unique, self-contained environment with fragile ecosystems hosting over 700 species of fish and some of the planet's most resilient, yet sensitive, fauna and flora. Attacks on oil and gas tankers, as well as on the hundreds of maritime and coastal fossil fuel facilities, will significantly increase the risk of oil spills and marine pollution. Oil spills and the release of toxic substances can also destroy critical habitats like seagrass beds, mangroves, and nearshore reefs [49]. Early reports on the war indicated that at least 12 merchant ships were struck in ports or within the Persian Gulf [50]. Such events could lead to an environmental catastrophe—endangering the survival and reproduction of the ecosystem and causing biodiversity loss—with impacts that may last for decades [49,51].

Air and soil security

‘Modern warfare is a chemical event. Every missile, every bomb, every burning fuel depot releases its payload of toxic compounds into the air people breathe. The difference is whether we choose to count it,’ says Narges Bajoghli, Professor of Middle East Studies at the School of Advanced International Studies, Johns Hopkins University. Bajoghli added that just within the span of two weeks of the US-Iran war, 5 million tonnes of greenhouse gas emissions were released, something that would be equivalent to the combined emissions of 84 countries over a year [52,53].

Military operations typically generate massive amounts of greenhouse gas emissions. The deployment and maintenance of fighter jets, aircraft carriers, missile and drone launchers, naval fleets, and armoured vehicles—alongside military logistics transport—consume vast amounts of fossil fuel, releasing these gases directly into the atmosphere. These activities drive severe environmental degradation, most notably air pollution and desertification. In Iraq, accelerating desertification is tied closely to decades of continuous military conflict. The heavy movement of armoured vehicles and machinery erodes critical topsoil, a process that triggers dust storms and creates shifting sand dunes [54]. This destruction is compounded by the immense volume of fossil fuels burned by modern war machinery.

While the true number and types of weapons used in the 2026 US-Iran are not known, probably because of military intelligence restrictions, reports indicate that thousands of missiles, drones, and projectiles have been used by the warring parties: the US-Israel coalition versus Iran. These weapons have carried and released chemicals, toxic gases, and hazardous materials into the areas where they exploded. In addition, buildings, refineries, oil depots, ammunition stockpiles, factories, various facilities, and vehicles have been damaged, destroyed, or have caught fire as a result of the attacks. Trees, forests, and wild grass have also caught fire and burned because of the explosions. All of these factors combined have catastrophic consequences for millions of civilians, as well as for the quality of the air, water, and soil.

In the opening days of the war, airstrikes on Tehran caused severe oil leaks in the streets and sent massive plumes of smoke into the atmosphere, blanketing large sectors of the city. Because many modern oil facilities are situated within densely populated urban zones, military strikes against them inflict significantly more severe impacts on public health and community well-being. In the following days, toxic black rain fell across Tehran and its adjacent areas. Officials in the Iranian government's Department of Environment advised people to stay indoors as much as possible (even though this provides limited protection during severe pollution events), avoid using air conditioners, and refrain from going out immediately after the rainfall. Additionally, the country's Red Crescent warned that ‘toxic chemicals in the air could lead to acid rain, which can cause skin

burns and serious lung damage.’ This environmental crisis has detrimental effects on air quality, as well as food and water security [26,39].

Acid rain is a form of precipitation that has higher levels of nitric and sulphuric acids than normal rain. One major cause is explosions, which release sulphur dioxide and nitrogen oxides into the air. The environmental impacts of acid rain include washing away aluminium from the soil and stripping vital nutrients from it. This process leads to the acidification of surface water and groundwater, which is harmful to aquatic life, as well as to trees, crops, and vegetables. Additionally, acid rain can cause severe respiratory issues in humans. It can also cause eye and skin irritation, headaches, and an increased long-term risk of cardiovascular disease, cancer, and cognitive dysfunction [49,55]. Some of these health problems have already appeared and will become more apparent in the future. Following initial air strikes on Tehran by Israel and the US, many residents reported ‘difficulty breathing, burning eyes, sore throats, migraines, dizziness, and cardiac triggers,’ and they face ‘elevated risks of stroke, lung and other cancers... high blood pressure, and cognitive decline [56]’.

One major target in the US-Iran war has been fuel infrastructure, including production platforms, refineries, storage tanks, transfer centres, oil tankers, tanker trucks, and petrochemical plants. According to the UK-based Conflict and Environment Observatory (CEOBS), oil fires release ‘a complex mix of pollutants with varying degrees of toxicity, including particulate matter, nitrogen oxides, nitrous acid, carbon monoxide, sulphur dioxide, and volatile organic compounds like formaldehyde, dioxins, furans, hydrocarbons, and polycyclic aromatic hydrocarbons.’ These toxic substances pollute the air, soil, surface and groundwaters, travelling across borders to pose serious health risks to human beings, animals, and plants throughout the wider region. Oil fires also produce black carbon which ‘absorbs solar radiation and accelerates atmospheric warming’. Information gathered up until mid-April indicates that more than 37 oil and natural gas sites have been hit by US and Israeli bombardments since the war began. If oil facilities targeted across the broader Middle East are included, that number rises to 80 [36,56-58].

Tehran, the capital of the Islamic Republic of Iran and home to nearly 10 million residents and 17 million in the wider metropolitan region, has been hit hard by US and Israeli strikes. Hundreds of buildings and facilities were targeted with heavy bombs, obliterating or severely damaging a vast amount of military and civilian infrastructure. In addition to thousands of human casualties, the strikes have generated large plumes of black smoke, severely impacting air quality, soil safety, and the immediate health of the population. This is taking place in a city that already suffers from poor air quality and numerous environmental problems. Surrounded by the Alborz Mountain range, the metropolitan area traps pollution, and its many high-rise buildings hinder wind movement and the

dispersion of airborne pollutants. Satellite data indicates that these plumes contained benzene, formaldehyde, polycyclic aromatic hydrocarbons, and fine particulate matter. These substances can penetrate deep into the human respiratory tract, aggravating respiratory and cardiovascular diseases. Continuous bombing and prolonged exposure to black plumes increase the risk of cancer and certain neurological disorders [50,59].

The same argument applies to areas within the Arab Gulf states, Israel, Jordan, and Iraq, where Iranian missiles have caused significant damage to buildings and both military and civilian infrastructure. Although the targeted countries usually report minor damage, evidence suggests that Iran has fired between 1,500 and 2,000 missiles—including ballistic and cruise missiles, and thousands of cross-border rockets and drones. Additionally, its proxies have launched thousands of rockets toward adversaries across the Middle East. Many of these attacks were deflected and the missiles intercepted, but a large number reached their targets. Beyond the immense human cost, these strikes have severely harmed the environment—not only in the targeted countries, but also in Iran. The mere launching of attacks from missile and rocket pads releases massive amounts of toxic gases into the air [33,50].

Iran's nuclear sites present another major concern for airborne toxic contamination. In fact, nuclear facilities pose a severe threat to environmental security. Because Iran has always kept its nuclear programme top-secret—even while claiming its activities are strictly for peaceful purposes like electricity generation—little information is available regarding the true scale of its operations or whether active enrichment is currently underway at its primary facilities in Natanz, Fordow, and Isfahan. Nevertheless, during the 12-Day War (June 13–24, 2025), the US and Israel heavily bombarded these three main sites. The attacks are believed to have caused massive structural damage. This probably explains why no further major strikes on nuclear infrastructure have occurred during the current war that began in February 2026. Although no significant radioactive leaks have been reported so far, radioactive release from damaged plants remains the most dangerous form of environmental pollution [50,60,61].

The 2026 US-Iran conflict also worsens global air pollution in two distinct ways: the rerouting of aviation and maritime shipping. Because of the closure and inherent danger of navigating airspace within reach of missiles and drones, numerous airlines must use longer alternative routes, resulting in increased travel times, fuel consumption, and emissions. Similarly, the closure of the Strait of Hormuz and threat of Houthi attacks in the Red Sea have forced many vessels to detour around the Cape of Good Hope rather than transiting the Suez Canal. Consequently, this shift has increased the global carbon footprint of these voyages by nearly 50 per cent [39]. Reconstruction efforts following the destruction of infrastructure and residential areas represent another growing source

of carbon emissions; cement and steel production are among the most carbon-intensive industrial processes in the world [62,63].

Modern weaponry used in combat disperses countless pollutants into the environment, with soil being the main recipient. Soil in bombed areas absorbs chemicals released from exploded munitions and structural debris. A wide array of hazardous chemicals is used in the construction of modern buildings. Recent studies conducted in Ukraine and the Gaza Strip detected industrial chemicals such as lead, cadmium, nickel, and chromium. These toxic substances gradually contaminate the food supply and cause severe, long-term soil degradation. Consequently, this form of contamination persists well beyond the active conflict, leaving lasting impacts on both the environment and public health [59]. The Gaza Strip has experienced unprecedented, large-scale destruction across all sectors by the Israeli military in reprisal for a major coordinated assault by the Palestinian militant group Hamas on October 7, 2023.

Finally, this paper has certain limitations. The primary constraint is the scarcity of comprehensive literature on the exact environmental impacts of the conflict, largely because the war is recent and it continues. The full facts of environmental damage and their effects on human health will require deep and long-term studies; like the effects of the nuclear bombs against Hiroshima and Nagasaki, and the effects of Russia's invasion and occupation of Ukraine. This data deficit exists partly because the warring parties and directly affected states are reluctant to highlight the environmental costs of the conflict, fearing it might galvanize domestic opposition or signal vulnerability to the international community. Furthermore, a prolonged internet shutdown in Iran severely restricted the outward flow of information. Nevertheless, considering the sheer volume and types of ordnance—including bombs, missiles, projectiles, and drones—it is evident that regional environmental security has been severely compromised. Another limitation is the lack of verified data regarding the true extent of the mutual damage inflicted by the warring parties, as this information directly impacts national security. Lastly, gathering firsthand empirical material is impossible, as the continuing volatile situation precludes safe fieldwork.

Conclusion

Various forms of security are deeply interconnected, including state, human, economic, societal, and environmental security. Environmental security affects all the others. We participate in our environment, affecting it and being affected by it. The health of our air, water, and soil, as well as the protection of ecosystems and planetary systems determines our own health as a species. Threats to the environment are threats to all other forms of security; they pose severe, existential risks to

the short- and long-term survival and well-being of human beings, animals, and plants. Furthermore, harms inflicted upon the environment will not disappear quickly. Described as ‘slow violence’, ecological destruction can persist for generations, or even permanently alter ecosystems beyond recovery [64].

Since the Industrial Revolution, mankind has behaved recklessly toward the environment. In particular, modern conflict has become catastrophic for nature. Equipped with advanced warfare technologies and highly destructive weaponry, modern wars inflict unprecedented damage on a scale the planet has never experienced. Today's conflicts have essentially become total wars against the environment itself, as warring parties show little to no consideration for the planet—including its flora, fauna, water, air, and soil. When armies bomb and burn everything in the heat of conflict, it is the environment that ultimately bears the long-term consequences.

Modern wars push the environment toward critical tipping points across numerous areas, sometimes past the point of no return. Driven by conflict, opposing sides treat everything as a legitimate target, regardless of international law. Because the conflicting parties do not fear prosecution by an international court, they believe they can get away with these actions. The massive destruction of water, oil, energy, civilian, and transportation infrastructure leaves landscapes devastated. As fire, toxic gases, and debris scatter, they pollute the air, soil, and waterways. This severely impacts human and animal health while disrupting the normal growth of crops and vegetation. The 2026 US-Iran war stands as a stark example of violating environmental security, with long-term, widespread impacts on all species and ecosystems across the region. Environmental safety in Iran, the Arab Gulf states, and the wider Middle East has been significantly compromised. As responsible state actors and global community members, the warring parties must immediately halt actions and alleviate the damage caused. All non-combatants are powerless, but all combatants are vulnerable also.

Warring parties must pay compensation for the harm they cause. Just as the UN mandated Iraq to pay \$52.4 billion to Kuwait for environmental damage following its 1991 invasion, the US and Israel must be held liable for the environmental harm they have caused in Iran. Similarly, Iran must compensate for the damage it has inflicted on civilian and environmental infrastructure in the Arab Gulf states. This obligation to pay damages can serve as a powerful deterrent against future environmental aggression. The enforcement of law upholds ethics.

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