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Militaries, armed conflicts, nature and the climate crisis: Entry points for the IUCN

Authors:
Doug Weir,[a] Ellie Kinney,[a] Brendan Mackey,[b] Soroush Abolfathi.[c]

[a] Conflict and Environment Observatory, United Kingdom
[b] Griffith Climate Action Beacon, Griffith University, Queensland Australia
[c] University of Warwick, United Kingdom

For further information, please contact:
Prof Brendan Mackey
b.mackey@griffith.edu.au

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Conflict and Environment Observatory

Griffith UNIVERSITY CLIMATE ACTION BEACON

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THE WAR ON CLIMATE

Kenya 2021, military personnel look on as a massive wildfire sparked during a military exercise consumes 2,800 hectares of the Lolldaiga conservancy.

1. Key Insights

- GHG emissions from the military sector and armed conflicts are globally significant in aggregate, yet remain poorly quantified and understood contributors to the climate crisis. However, they are now attracting long-overdue attention as global military spending rises.

- Military training areas cover an estimated 1-6% of the Earth's surface. Increasingly, militaries are examining how these lands can be managed for climate adaptation and mitigation, creating opportunities for nature protection and ecosystem-based approaches.

- As with the broader civilian energy transition, military decarbonisation risks intensifying the social and environmental impacts posed by the rollout of clean energy infrastructure and the rapid expansion of critical mineral extraction, with implications for conservation and local communities.

- Conflict-related emissions sources arising from wildfires, land degradation, and deforestation can result from both direct and indirect pathways. These impacts often persist well beyond the cessation of hostilities and are closely linked to biodiversity loss.

- Efforts to map the GHG emissions from armed conflicts are in their infancy but will become increasingly important as the climate crisis deepens, the 1.5°C carbon budget shrinks, and pressure intensifies on all governments to increase their mitigation ambition.

- The legal framework protecting the environment in relation to armed conflicts remains inadequate. It does not sufficiently safeguard vital ecosystem carbon stocks nor provide clear pathways towards accountability for climate-related damage.

- There are numerous entry points for the IUCN, its Commissions, working groups, and members to engage on these themes and help address critical research, legal, and policy gaps.

2. Why this is important

All sectors of society must contribute to addressing the climate crisis, with fossil fuel-intensive and hard-to-abate sectors warranting particular attention. Militaries meet both criteria, yet their domestic activities and international operations have historically received far less scrutiny than other sectors, in part due to long-standing exemptions under UN Framework Convention on Climate Change (UNFCCC) reporting mechanisms. Today, with the world facing more armed conflicts than at any point since World War II, and with military expenditure spiralling,[1] there is growing scrutiny over the extent to which military activities and armed conflicts are contributing to the climate crisis through assets and activities that generate greenhouse gas (GHG) emissions.[2]

Since the early 2000s, many militaries have examined the security risks posed by the climate crisis, how these risks might affect their operations and how they may need to adapt in response.[3] Far less attention, however, has been given to mitigating their own climate impacts, contributing towards national net zero targets,[4] or exploring what forms of "low carbon warfare" might entail.[5] We have also seen the first ever attempt to comprehensively determine the emissions footprint of an active conflict.[6]

Conflicts, militarism, and insecurity impact nature, conservation, and climate in multiple and interconnected ways. This makes it imperative for the conservation sector to examine these linkages and, where possible, act to mitigate their adverse effects.[7] Efforts to understand and mitigate the GHG emissions from military activities and armed conflicts pose both opportunities and risks for biodiversity, and are increasingly intersecting with the objectives of the conservation movement. This briefing highlights key emerging developments relevant to nature protection, their salience for the International Union for Conservation of Nature (IUCN) and its membership; and provides recommendations for action.

3. Background

Based on data from 2019, it was estimated that militaries and their supply chains were responsible for 5.5% of annual global GHG emissions,[8] more than the combined emissions from international aviation and shipping. That year, global military spending stood at $1.9 trillion, by 2024 it had risen to $2.7 trillion,[9] and is projected to continue growing. Every $100 billion increase in military spending is thought to generate approximately 32 million tonnes of carbon dioxide equivalent (tCO_2e).[10]

However, there remain considerable uncertainties in these figures. One key reason for this is that military emissions reporting to the UNFCCC is voluntary, and as a result, incomplete.[11] Most militaries have done little to map their supply chain emissions, while the methodologies for tracking emissions during armed conflicts remain underdeveloped. These exemptions, exclusions, and omissions have consequences; they have historically slowed efforts to decarbonise the sector and risk creating gaps in both global climate predictions and policy responses.

In recent years, domestic climate targets, increasing military spending, and the prevalence of armed conflicts have brought attention to this "military emissions gap". Similarly, the carbon cost of conflicts is now of growing concern to climate advocates and researchers, while an emerging discourse around sustainable post-conflict recovery holds opportunities for both climate adaptation and mitigation.

Recent cuts in international development budgets in favour of military spending have had severe and immediate consequences for climate and conservation programmes in fragile and conflict-affected states.[12] In many of these settings, the often complex interplay between armed conflicts, biodiversity loss, and the climate crisis remains poorly understood and under-documented. Beyond conflict-affected areas, expanding military budgets and intensifying military training activities also risk significant impacts on ecosystems worldwide, as do the indirect consequences of military decarbonisation. In this time of growing global instability, it is vital that the conservation movement develops the capacity to understand and articulate these relationships and identify policies to address them.

4. Peacetime activities, GHG emissions, nature protection and the energy transition

For most militaries, the bulk of their annual GHG emissions, and broader ecological impacts, arise from routine peacetime activities. These include substantial fossil fuel consumption in the air, on land, and at sea, as well as emissions from their complex, extensive, and often carbon-intensive supply chains. Militaries also operate significant transportation infrastructure, including ports, airports, and rail, as well as storage and maintenance facilities and accommodation for personnel and their families, with some also playing an increasingly important role in disaster relief, requiring capacity for rapid deployment nationally and internationally.[13]

Equally important for both climate and biodiversity is the footprint of military land holdings and their significant impact on terrestrial and marine ecosystems. In 2014, military training areas were estimated to cover 1-6% of the Earth's surface, including 18 million hectares of the US and 15.4 million hectares of Australia.[14] As of 2024, military land holdings in the UK covered 1.4% of its landmass, or 342,000 hectares.[15] Many militaries also have access to, or operate, training areas overseas.

The nature and intensity of military land and maritime activities varies widely and is an important factor for nature protection and the generation of GHG emissions. Many militaries promote their role as biodiversity stewards, and many also manage lands of high ecological value. For example, Germany's military estate includes 228,000 hectares of training grounds, of which 135,000 hectares are designated Natura 2000 sites.[16] However, a 2023 review of European military "greening" policies found that public reporting on nature protection activities was inadequate, and frequently highly selective, favouring positive news stories while neglecting wider impacts.[17]

Military training activities are a frequent source of wildfires, which can be particularly complex to manage due to the presence of unexploded ordnance (UXO). In the UK, 1,178 wildfires have been linked to Ministry of Defence training sites between 2020 and 2025.[18] The frequency of landscape fires on military lands is increasing with climate change, and many militaries already use prescribed burns in UXO-contaminated areas to reduce risks. Wildfires can generate direct emissions through combustion, and contribute to carbon loss from soils; in northern

Europe, where many military training grounds are on peatlands, this impact is especially severe. Wildfires on military lands also damage local biodiversity and undermine the role of military lands as potential ecosystem carbon stores.

Military fire at the Lolldaiga conservancy, Kenya

In 2021, a fire sparked during a British Army exercise in Kenya's Lolldaiga conservancy, damaged 2,800 hectares of land, with fallout from the smoke plume reported 200 km away. Burning for three days, the fire is estimated to have generated 178,000 tonnes of GHG emissions, equivalent to 7% of the UK Ministry of Defence's annual reported emissions, or the annual emissions of half a million average Kenyans.[19] The extraterritorial emissions were not officially reported by the UK government.

The Lolldaiga Conservancy, covering 19,800 hectares, lies near the British Army Training Unit Kenya, which hosts thousands of troops for exercises annually. The conservancy forms part of the Laikipia plateau, itself the subject of long-standing land disputes rooted in colonial-era land seizures. In August 2025, the UK government agreed to pay £2.9 million to 7,723 claimants who had lost property and suffered health impacts because of the fire.[20]

Facing pressure to contribute to national climate targets, locked-in to fossil fuels and aware of the long lifespans of military equipment, some militaries are exploring the potential of their lands for climate adaptation and carbon sequestration. The US Department of Defense's 2024-27 Climate Adaptation Plan includes a range of land use and conservation initiatives, as well as terrestrial and marine Nature-based Solutions;[21] though implementation has been placed at risk by political shifts in the US federal administration.[22] The UK Ministry of Defence, which manages 24,500 hectares of woodland and forests, 21,000 hectares of peat soils, and 100,000 hectares of permanent grasslands with little history of cultivation, has argued that: 'work programmes on woodland creation and peatland restoration will contribute to net zero ambitions by balancing residual emissions from Defence activities'.[23]

While such initiatives may create opportunities for conservation and ecosystem enhancement, their credibility is often undermined by limited transparency and selective environmental reporting. Without transparency and opportunities for independent verification there is a greater risk of greenwashing. Moreover, the scale of military GHG emissions inevitably places limits on the degree of mitigation that can be achieved through landscape management practices alone, particularly without urgent emissions reductions at source. Furthermore, as recent data on wildfires suggests, there is likely to be tension between increasing training frequency, biodiversity protection and climate goals. Finally, and in another trend of relevance to nature protection, in an era of heightened insecurity, there may even be growing pressure to securitise components of the environment for defensive purposes. This includes ecosystem carbon sinks such as peatlands, which in Europe are already being mooted as potential barriers to land-based invasion.[24]

To date, military decarbonisation plans have focused largely on reducing emissions from facilities, including through sourcing clean energy for heating and cooling buildings, including homes for defence personnel, the electrification of smaller tactical and general transportation vehicles, and investing in research on alternative fuels.[25] Like all sectors, the military energy transition is both urgent and challenging, and it carries significant implications for biodiversity. Many major militaries are pursuing research into sustainable aviation fuel, mirroring civil aviation. One leading vision is fuel synthesised from atmospheric carbon using renewable energy. While early trials have been conducted, no production capacity exists at scale.[26] The land area required for renewable energy production for aviation fuel would be substantial and would divert energy and resources from decarbonising other sectors. India's military is exploring the use of biofuels, including but not limited to those generated from crop residues.[27] However, scaling biofuels to match current consumption levels would require extensive agricultural expansion and land conversion, with knock-on effects for soil health, pollution, and biodiversity.[28]

Other potentially problematic elements of the energy transition also apply to the military sector, including the strategic, social, and environmental concerns linked to the increased extraction of critical minerals. Recent experiences in the Democratic Republic of Congo (DRC), Serbia and Ukraine highlight how competition over critical mineral resources increasingly resembles earlier scrambles

for control over fossil fuel deposits.[29] Where perceived security imperatives add to and amplify economic imperatives for extraction, the weakening of environmental and social safeguards becomes more likely. These factors are particularly acute in fragile and conflict-affected areas, many of which are also global biodiversity hotspots. For example, in Myanmar, critical mineral extraction is firmly part of the war's political economy,[30] with their exploitation fueling deforestation and pollution into freshwater systems while exacerbating local insecurity.

5. Conflicts, GHG emissions and disruption to ecosystems and carbon sinks

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has identified armed conflicts as an indirect driver of biodiversity loss, intensifying some direct drivers of biodiversity loss and creating barriers to collaboration that can severely delay 'collective and transformative action in support of sustainable development'.[31] Armed conflicts are also emerging as a significant, yet poorly understood, source of GHG emissions, in which a number of emissions sources are closely connected to damage or degradation to ecosystems and their carbon stocks. Conflict-linked environmental harms can be divided into those stemming from the direct consequences of military actions, and the indirect impacts associated with the socio-economic, demographic, or security conditions that conflicts create or sustain, many of which persist long after the cessation of hostilities. Addressing these distinct sources requires differentiated policy responses.

Direct harms typically result from the deliberate or incidental use of force against the environment. This may include blast and fire damage from explosive or incendiary ordnance, damage from vehicle or equipment movements, disturbance from trenching and earthworks and, more rarely, disruption to hydrological regimes following attacks on water infrastructure. Physical damage typically affects vegetation and soils, contributing to GHG emissions while undermining ecosystem functions. These impacts are particularly severe in high-intensity or mechanised warfare and may combine immediate and reverberating effects. For example, as with firing ranges in peacetime, the presence of UXO can trigger wildfires, and prevent efforts to control them, often for decades after the conflict.[32]

Conflict and climate change drive landscape fires in Ukraine

The summer of 2024 in Ukraine was far drier than average. Analysis undertaken by the Initiative for GHG Accounting in War, as part of its ongoing efforts to map the emissions caused by Russia's war against Ukraine, found that these climatological conditions had combined with the war to drive emissions from landscape fires higher than in the two preceding years.[33] In 2024, burned areas linked to the war covered 92,100 hectares - more than double the annual average for the previous two years. The majority of fires occurred at or near the front lines or at border areas.

Not only did the war help trigger fires, which impacted ecosystems and generated emissions; the ongoing hostilities made it more dangerous for firefighters to tackle blazes or rendered them inaccessible. In this way, smaller fires grew in size and intensity, further amplifying the damage caused. The work of the Initiative has found that emissions from all landscape fires since the start of the full-scale invasion totalled 48.7 $MtCO_2e$ by the end of 2024.

Deforestation and land use changes are perhaps the most consequential indirect factor for the conflict-linked GHG emissions associated with the natural environment. Studies on conflict-affected countries consistently show that deforestation rates spike in the wake of conflicts,[34] often including within protected areas.[35] High deforestation rates are closely linked with impaired environmental governance and insecurity, although during conflicts they may also be the result of civilian coping strategies when fossil energy becomes unavailable.[36] Prolonged periods of military occupation can exacerbate some of the factors that generate emissions, while preventing adaptation and mitigation efforts.[37] Conversely, conflicts and their legacies can sometimes protect ecosystems and carbon stores through excluding people and economic activities. They can also lead to land use changes that may reduce emissions, for example, through the abandonment of intensive agriculture along a frontline area. However, such effects may be displaced elsewhere. The global ripple effects can be substantial; agricultural export losses from Ukraine, for instance, contributed to higher international commodity prices, potentially influencing agricultural expansion, deforestation and land conversion elsewhere.[38]

The practice of estimating the emissions from armed conflicts is in its infancy but of increasing international interest.[39] As the climate crisis accelerates, and the carbon budget for limiting global warming to 1·5°C above pre-industrial levels becomes more contracted, there will be growing pressure to account for the emissions from all sources, including those that are currently "off the radar". Therefore understanding the carbon cost of conflicts, alongside their wider environmental and humanitarian toll, will become increasingly urgent.

To date, reducing conflict-related emissions has received little legal or policy attention. International Humanitarian Law is silent on this specific question, although provisions intended to protect components of the environment such as forests from deliberate attacks, or to limit the effects of particular weapons, are of relevance, as is the wider understanding that the atmosphere, as a component of the environment, is a civilian object and thus afforded some protection.[40] However, this is an area that requires further examination, particularly with respect to its interactions with wider climate law. Notably, the International Law Commission's 2022 Principles on the Protection of the environment in relation to armed conflicts was initiated before this topic rose to prominence and so they do not include a principle dedicated to the climate.[41]

Calls for greater accountability for the environmental consequences of conflict have grown in recent years, buoyed by policy work by the International Criminal Court,[42] and the campaign for an international crime of ecocide. Of particular note is the International Court of Justice's 2025 advisory opinion that states have obligations to ensure the protection of the climate system and other parts of the environment from anthropogenic GHG emissions.[43] However, for the climate damage of conflicts to be part of accountability processes, it would first require a recognised international methodology and dedicated research capacity.

6. Opportunities for the IUCN

The IUCN plays a vital role in providing evidence-based policy guidance on conservation, establishing global standards and assessment frameworks, and developing knowledge products to support decision-makers. The Union already has a strong policy portfolio on climate change, with a clear mandate to address the impacts on nature of climate adaptation, and to mitigate GHG emissions from fossil fuels, deforestation, and land degradation. Both adaptation and mitigation actions can implicate nature, and this nexus between climate and biodiversity is increasingly recognised.

Given the foregoing, it is timely for the IUCN to consider how it can best advance dialogue, policy and evidence on the climate impacts of the military sector and armed conflicts, and their interplay with nature. There are a number of ways in which the Union can respond and focus activities in this area of concern. Notably, the IUCN has a Climate Crisis Commission whose mission includes mobilising and coordinating the Union's efforts by engaging with Regional and National IUCN Committees, Members, and Indigenous Peoples; and by promoting productive and constructive partnerships. Furthermore, all the remaining IUCN Commissions have vital contributions to make, including the World Commission on Environmental Law, the World Commission on Protected Areas, and and the Commission on Environmental, Economic and Social Policy.

In addition to the programmes of work undertaken by the Commissions, the IUCN Council has the authority to establish working groups and task forces to address cross-cutting issues. These mechanisms allow the Union to convene the necessary expertise, consult broadly with its membership, and engage external experts and practitioners.

Programmes of work for individual Commissions or working groups and task forces could include the following:

- Assessing the climate adaptation and mitigation potential of military lands and their implications for biodiversity conservation.
- Examining the climate and biodiversity implications of military decarbonisation.
- Understanding the emissions associated with ecosystem damage from armed conflicts.
- Identifying critical ecosystem carbon stocks most at risk from armed conflict and insecurity.
- Contributing to the IUCN's work on Nature-based Solutions, in particular helping to identify those that may help reduce emissions and restore ecosystems during post-conflict recovery.
- Highlighting the significance of addressing military and conflict-related GHG emissions for achieving the long term temperature goal of the Paris Agreement in its statements before relevant international bodies, especially the UNFCCC.
- Exploring the legal avenues that may afford greater protection to the atmosphere in relation to armed conflicts.
- Engaging with domestic and international initiatives that may contribute towards greater accountability for military and conflict emissions.

The IUCN Secretariat plays a critical role in the implementation of the Union's policies and programmes. However, contributions in new areas require that the supporting policy is in place and external resources have been mobilised to support targeted activities.

7. Conclusion

The GHG emissions from the military sector and armed conflicts are globally significant in aggregate, yet poorly understood contributors to the climate crisis. They are now attracting long overdue attention as global military spending increases. However, emissions from military activities and armed conflicts are not comprehensively and routinely reported in national GHG inventory reports, leaving a major source of global emissions absent from mitigation strategies and plans. Conflict-related emissions sources such as wildfires, land degradation, and deforestation arise through both direct and indirect pathways, and extend well beyond the cessation of hostilities; they are also closely linked with biodiversity loss.

The vast areas of land under military management provides potential opportunities for ecosystem-based mitigation and adaptation. However, at the same time, military decarbonisation will intensify the social and environmental risks posed by the roll out of clean energy infrastructure and rapid expansion in the extraction of critical minerals, with implications for conservation and communities.

The IUCN, through its Commissions, Secretariat and members, is well positioned to engage with issues arising from the relationship between militaries, armed conflicts, climate, and nature. By doing so, it can help close critical research, legal, and policy gaps, and strengthen international efforts to protect ecosystems and the climate system from the growing pressures of militarisation and conflict.

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