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Beyond the blast radius: climate harm and IHL's "widespread, long-term and severe" threshold for absolutely prohibited environmental damage

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Armed conflict can aggravate climate change through consequences that lie beyond an attack's immediate physical footprint. Yet international humanitarian law's prohibition of methods or means of warfare expected to cause widespread, long-term and severe damage to the natural environment is too often assessed through a temporally short and geographically bounded account of harm.

In this post, part of our series on Emerging Voices, Climate change, conflict and humanitarian action, and War, Law and the Environment, Giorgia Pane argues that foreseeable climate-related effects should enter that assessment, through a climate-informed approach to the existing cumulative test. It suggests that "long-term" should account for persistence and reversibility, "widespread" for broader spatial effects through climate-regulating systems, and "severe" for the impairment of ecological functions necessary for mitigation and adaptation. Drawing on the ICRC Guidelines' recognition of cumulative and reverberating effects, the author proposes an evidence-based approach to planning and precautionary assessments, arguing for the application of the prohibition threshold compatibly with the climate knowledge now available.

International humanitarian law (IHL) has long recognized that war can damage the natural environment. The prohibition of the use of methods or means of warfare expected to cause "widespread, long-term and severe damage" to the natural environment remains the clearest expression of this concern (*Customary IHL – Rule 45. Causing Serious Damage to the Natural Environment*). IHL also protects the natural environment through the general rules governing the conduct of hostilities. These include the principle of distinction, under which parts of the natural environment are protected as civilian objects unless they become military objectives (*ICRC Guidelines*, Rule 5); the rule of proportionality, which prohibits attacks expected to cause incidental harm excessive in relation to the concrete and direct military advantage anticipated (Rule 7); and the obligation to take feasible precautions to avoid, and in any event minimize, incidental harm to the natural environment (Rule 8).

But even in cases where objects forming part of the natural environment could otherwise be targeted lawfully as military objectives, or could otherwise incur damage arising from a lawful application of the principle of proportionality, the high-threshold prohibition articulated in Articles 35(3) and 55 of Additional Protocol I establishes an "absolute ceiling of permissible destruction" that prohibits all widespread, long-term and severe damage to the natural environment regardless of considerations of military necessity or proportionality (*ICRC Guidelines*, para. 49).

It is for this reason that a high threshold of damage is required to trigger this prohibition. Yet the climate crisis invites us to ask whether the way this threshold is understood is still adequate to the forms of environmental harm we are now able to identify.

While immediate destruction is usually perceptible and evident, other environmental consequences – including many climate-related ones – unfold in more complex ways across time and space. Indeed, climate-related harm may be indirect, cumulative and delayed: attacks or military operations can increase emissions, weaken carbon sinks, or reduce adaptation capacities long after hostilities have ended. A localized act of destruction may therefore produce broader effects, both temporally – when apparently short-term damage becomes persistent or irreversible – and spatially, when harm spreads beyond the immediate site of attack through climate-regulating systems.

This post argues that foreseeable climate-related effects should not be excluded from the assessment merely because they are indirect, cumulative, reverberating or not immediately visible. While it is not suggested that the threshold of "widespread, long-term and severe" damage (Rule 2 of the *ICRC Guidelines*) should be automatically reached when attacks have climate implications, the knowledge through which it is applied should not remain frozen in time. If contemporary environmental and climate *science* allows us to understand how certain forms of wartime destruction contribute to long-term and potentially irreversible harm, then that knowledge should inform the interpretation and application of the existing IHL rules protecting the natural environment.

The threshold is high, but not static

This requires a more precise engagement with the structure of the prohibition itself. The rule on "widespread, long-term and severe damage" identifies a particularly serious category of harm through a cumulative and demanding threshold. Precisely for this reason, the inclusion of climate-related effects must operate within, and not outside, the existing elements of the rule.

This interpretive move is also consistent with the broader development of the law on environmental protection in armed conflict. The *ILC Principles*, for instance, frame the protection of the natural environment in relation to armed conflict by referring to applicable international law, rather than isolating IHL from other relevant legal regimes (Principle 13; see also *ICJ Legality of the Threat or Use of Nuclear Weapons*; *Rio Declaration*, Principle 24). Similarly, the ICRC Guidelines recognize the importance of assessing not only direct damage, but also indirect and reverberating effects (para. 66). In this way, the climate dimension becomes legally relevant, as a part of the factual and scientific context in which environmental damage must be assessed.

"Long-term": duration, reversibility and delayed effects

The first element that climate-related harm unsettles is the meaning of "long-term". "Long-term" is generally understood to cover damage that is not short-term or temporary but lasts for several years, potentially a decade or more. In the context of armed conflict, environmental damage is often assessed through the temporal

frame of the attack itself or its immediate consequences. Yet this kind of assessment may prove insufficient in the context of climate harm when the damage caused or triggered by the attack contributes to processes that persist, accumulate, or become difficult to reverse.

As mentioned, the ICRC Commentary to the Guidelines already opens the door to this broader understanding. It recognizes that damage not initially considered to fall under the "long-term" test could today be assessed differently in light of contemporary knowledge, particularly where cumulative, indirect or reverberating effects are concerned (*ICRC Guidelines*, paras. 64-66). This approach is echoed by the International Criminal Court (ICC) Office of the Prosecutor, which has indicated that the assessment of whether environmental damage is "widespread, long-term and severe" should rely on the best available scientific knowledge and take account of the fragile state of the environment (*Office of the Prosecutor Policy on Addressing Environmental Damage Through the Rome Statute*, para. 36).

When the climate dimension is taken into account, if restoration is delayed and emissions from conflict-related destruction are not addressed, or if reconstruction fails to take climate resilience into account, environmental degradation can compound over time. What initially appears reparable – deforestation, soil degradation, contamination, damage to water systems – may reach a point where natural recovery is no longer possible or where restoring the *status quo ante* becomes unrealistic (*Shelton, 2006*).

This risk may be heightened during armed conflict, *when environmental governance, monitoring and conservation mechanisms are weakened or disrupted*, allowing damage to persist or expand beyond its initial effects. In that sense, inaction does not merely postpone repair; it can contribute to transforming damage into permanent loss. Contemporary climate science reinforces this concern: the *IPCC has recognized* that some climate-related losses are already irreversible and that the likelihood of irreversible ecosystem change increases with further warming.

A climate-informed reading of "long-term" would therefore focus on duration, persistence and reversibility. It would ask whether the foreseeable consequences of an attack are likely to endure beyond the immediate moment of hostilities, whether they may accumulate with existing climate vulnerabilities, and whether delayed restoration may make the harm harder or impossible to undo.

"Widespread": local destruction, broader climate effects

Climate-related harm also complicates the meaning of "widespread". "Widespread" should be understood to denote damage extending to several hundred square kilometers (*ICRC Guidelines*, para. 60). Although particular operations and their effects may cross borders, armed conflicts usually take place within more or less identifiable territorial boundaries. For this reason, their environmental consequences are often approached as *local* damage. However, climate change unsettles the assumption that environmental damage can always be contained within the place where it first occurs.

A geographically *localized* attack may produce consequences that extend beyond the immediate site of destruction and participate in a broader pattern of climatic harm. This does not mean that the global nature of climate change automatically transforms every conflict-related environmental harm into "widespread" damage. Such a conclusion would be too broad and would risk emptying the threshold of meaning. The assessment must still consider scale, foreseeability, causal connection and the actual contribution of the damage to wider environmental effects.

Rather, the climate dimension requires a more careful understanding of spatial scale. In this sense, instruments such as the *UNFCCC* and the *Paris Agreement* – including the recognition of climate change as a "common concern of humankind" – provide useful context when assessing the broader implications of supposedly 'local' environmental harm. The *2025 ICJ Advisory Opinion* confirms that climate change is inherently cumulative and diffuse: cumulative GHG emissions are the primary source of climate risk, all states are affected by their cumulative effects, and climate change constitutes a "quintessentially universal risk to all States" (para. 137).

This supports a reading of "widespread" that does not look only at the surface area directly affected by an attack, but also at whether its foreseeable consequences extend through broader climate-regulating systems. The climate dimension therefore does not erase the geographical threshold; it informs how the spatial reach of environmental harm is assessed.

"Severe": the impairment of climate-regulating functions

The third element, "severe", raises a further question: what exactly makes environmental damage serious in climate terms? "Severe" is generally understood to refer to the disruption of an ecosystem or damage to it, or harm to the health or survival of the population, on a large scale (*ICRC Guidelines*, para. 72). Climate-related harm can fit within this existing understanding where wartime environmental damage seriously impairs *ecological functions* that are essential to climate regulation, resilience and human well-being.

Recent scholarship has already begun to examine *how climate change may inform this threshold* (also, *Pantazopoulos, 2024*) and, more broadly, the *conduct of hostilities*. Building on this emerging line of analysis, the focus here is more specifically on how the impairment of climate-regulating functions may be relevant to the existing understanding of "severe" damage.

In this sense, severity should not be measured only by the immediate alteration of a natural object or area. It should also take into account whether the damage seriously affects the capacity of ecosystems to perform climate-regulating functions. Forests, wetlands, fertile soils and other ecosystems are not only objects that may be physically damaged during hostilities. They are also part of the natural systems through which carbon is stored, biodiversity is sustained, and communities

adapt to climate stress. Where those functions are seriously impaired, the resulting consequences may contribute to precisely the forms of ecosystem disruption and harm to human health or survival encompassed by the existing understanding of "severe". This connection is particularly significant in light of the *2025 ICJ Advisory Opinion*, which described the consequences of climate change as "severe and far-reaching", affecting both natural ecosystems and human populations and underscoring its urgent and existential character (para. 73).

This is where the notion of reverberating effects becomes important. The environmental consequences of armed conflict may move from an initial act of destruction to a chain of secondary impacts. In climate terms, the damage is not only what is "destroyed" in a kinetic sense, but also what the environment can no longer do.

This approach is consistent with the recognition that "the environment is not an abstraction, but represents the living space, the quality of life and the very health of human beings, including generations unborn" (*ICJ Legality of the Threat or Use of Nuclear Weapons*, para. 29). It also reflects the broader affirmation that the distinction between the "natural" and the "human" environment is increasingly difficult to maintain in the face of climate change (*van Steenberghe, 2022*). More fundamentally, climate change illustrates the close interdependence between ecosystem integrity and human health, livelihoods and survival (*IPCC 2022 Summary for Policymakers*, p. 12).

Severity should not be confined to immediate kinetic destruction alone: in climate terms, serious harm may lie in what the environment can no longer sustain, regulate or repair.

What follows: precaution, planning and evidence

A climate-informed reading of the threshold has practical implications. If foreseeable climate-related effects may contribute to "widespread, long-term and severe" damage, they should be considered before the harm occurs, not only after it has become measurable.

In this sense, a precautionary approach becomes central. Principle 14 of the ILC Principles recalls that the rules of armed conflict, including distinction, proportionality and precautions, apply to the protection of the environment. Yet, in practice, these principles may remain insufficient if environmental harm is assessed mainly through military necessity or through the minimum damage considered acceptable in light of the advantage pursued (*Roscini, 2008*). This concern is already reflected in customary IHL: *Rule 44* provides that lack of scientific certainty as to the environmental effects of military operations does not absolve a party from taking feasible precautions.

A comparable concern with scientific uncertainty is reflected in the precautionary approach in international environmental law, enshrined in Principle 15 of the *Rio Declaration*, which provides that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". The *2025 ICJ Advisory Opinion* has further recognized the precautionary approach as a guiding principle for the interpretation and application of relevant environmental rules and, where applicable, as informing the standard of conduct required under the customary duty to prevent significant environmental harm (paras. 158, 161, 293-294). In the context of armed conflict, these approaches should not be understood as belonging to two separate worlds (*UNEP, 2020*). They point towards a common requirement: foreseeable climate-related consequences must be assessed as early and as seriously as possible.

Legal advisers and military planners are not expected to predict every remote climatic consequence of an attack. Climate-related harm can be difficult to trace, especially when it is cumulative or when it interacts with pre-existing environmental stress. But difficulty of proof should not lead to conceptual exclusion. Instead, it points to the need for better environmental data, stronger monitoring, and more systematic integration of climate expertise into legal and operational assessments. And where contemporary science and available environmental data make certain effects reasonably foreseeable, they must not be treated as legally invisible.

This also points to the need for a more integrated reading of IHL and international environmental law, in order to interpret the existing rules coherently, taking seriously the fact that environmental obligations do not disappear in wartime. Ultimately, this is not only a question of legal compliance, but also a question of whether the law can recognize forms of harm that unfold *slowly*, accumulate silently and are *inherited* by those who had no role in producing them. The threshold remains demanding; what changes is the factual and scientific lens through which its elements are assessed.

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