



Climate-Induced Water Insecurity and Its Implications for International Law

İklim Kaynaklı Su Güvensizliği ve Uluslararası Hukuk İçin Oluşturduğu Yapısal Zorluk

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Abstract

Climate-induced water insecurity has emerged as an increasingly significant yet under-theorised challenge for international law and international relations. Rather than arising through overt conflict or clearly attributable acts, water insecurity develops through the gradual erosion of water infrastructure, regulatory oversight, and public health capacity under sustained climate stress. In such contexts, indirect and delayed forms of harm, including biological risks, may emerge in ways that resist established legal categories of violence, attribution, and responsibility. This article conceptualises water insecurity not as a purely environmental or developmental issue, but as a legal stress multiplier that amplifies existing normative and institutional weaknesses within the international system. Drawing on international relations theory and core principles of international law, the analysis examines how climate-induced vulnerabilities place pressure on foundational assumptions embedded in the United Nations Charter and international humanitarian law, particularly regarding sovereignty, non-intervention, and the legal threshold of armed attack. By foregrounding vulnerability rather than weaponisation, the article contributes to debates on environmental security and the capacity of international law to respond to emerging forms of indirect harm under conditions of climate change. Methodologically, the study adopts a conceptual and normative analytical approach rather than an empirical case study.

Keywords: Water Insecurity, Climate Change, International Law, Biological Risk, Vulnerability, Sovereignty

Özet

İklim değişikliğinin derinleştirdiği su güvensizliği, uluslararası hukuk ve uluslararası ilişkiler açısından giderek daha görünür hâle gelen ancak yeterince kavramsallaştırılmamış bir sorun alanı oluşturmaktadır. Bu süreç, çoğu zaman açık bir çatışma ya da doğrudan atfedilebilir eylemler üzerinden değil; su altyapısının, düzenleyici denetimin ve halk sağlığı kapasitesinin zaman içinde aşınması yoluyla ortaya çıkmaktadır. Bu koşullar altında su sistemleri, biyolojik riskler dâhil olmak üzere dolaylı ve gecikmeli zarar biçimlerinin üretilebildiği yapısal kırılganlık alanlarına dönüşmektedir. Bu çerçevede makale, su güvensizliğini yalnızca çevresel ya da kalkınmaya ilişkin bir mesele olarak değil, mevcut normatif ve kurumsal zayıflıkları derinleştiren bir hukuki stres çarpanı olarak ele almaktadır. Uluslararası ilişkiler teorisi ile uluslararası hukukun temel ilkelerinden yararlanan analiz, iklim kaynaklı kırılganlıkların Birleşmiş Milletler Şartı ve uluslararası insancıl hukukta yer alan egemenlik, iç işlerine karışmama ve silahlı saldırı eşiği gibi kurucu varsayımlar üzerindeki etkisini tartışmaktadır. Makale, su güvensizliğini silahlaştırma söylemi yerine kırılganlık ekseninde ele alarak, iklim değişikliği koşullarında ortaya çıkan dolaylı zarar biçimlerine uluslararası hukukun olası yanıtlarını tartışmaya açmayı amaçlamaktadır. Çalışma, ampirik bir vaka incelemesi yerine kavramsal ve normatif analize dayanan bir yaklaşım benimsemektedir.

Anahtar Kelimeler: Su Güvensizliği, İklim Değişikliği, Uluslararası Hukuk, Biyolojik Risk, Kırılganlık, Egemenlik

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Introduction

Climate change is now widely recognised as a factor shaping contemporary international relations. Its legal and normative implications, however, remain insufficiently theorised. Among these vulnerabilities, water insecurity occupies a particularly critical and underexplored position.

Water systems function as essential life-support infrastructures that sustain public health, social stability, and state authority. The growing recognition of water insecurity as a multidimensional security concern has also been reflected in recent scholarship linking environmental change, governance capacity, and human security (IPCC, 2022: 118). Climate change alters the character of water insecurity by transforming scarcity, degradation, and infrastructural fragility from local governance challenges into systemic risks with transboundary implications. Rising temperatures, prolonged droughts, sea-level rise, and the increasing frequency of extreme weather events place sustained pressure on drinking water systems, sanitation networks, and wastewater treatment facilities. These processes do not simply diminish access to water.

This transformation raises a central question for international law. How should legal frameworks designed to regulate overt, intentional, and temporally discrete forms of violence respond to harm that is indirect, delayed, and structurally enabled? Climate-induced water insecurity creates environments in which biological risks may spread through compromised infrastructure, whether as a consequence of deliberate interference, opportunistic exploitation, or systemic failure. Such harm challenges established legal categories by lacking clear attribution, temporal immediacy, and identifiable perpetrators, despite its potentially severe consequences for civilian populations.

The difficulty does not lie solely in the nature of the harm itself. It also stems from the assumptions embedded within dominant legal and theoretical frameworks. International law has historically been constructed around principles of territorial sovereignty, identifiable actors, and discrete moments of violence. Similarly, prevailing strands of international relations theory tend to conceptualise security primarily in terms of external threats to the state. Climate-induced water insecurity disrupts these assumptions by producing risks that emerge from global processes, operate across borders, and disproportionately affect societies with limited adaptive capacity.

This article treats climate-induced water insecurity as a critical test case for both international law and international relations theory. Within this context, the preventive dimension of the Responsibility to Protect framework acquires renewed relevance, as it emphasises early warning, capacity-building, and international assistance rather than coercive intervention when addressing large-scale risks to civilian populations (United Nations General Assembly, 2005: 30). By examining the ways in which climate stress renders water systems vulnerable to biological risk, it demonstrates that existing legal frameworks remain poorly equipped to address forms of harm that are indirect and resistant to attribution. Rather than approaching water insecurity as a peripheral environmental concern, the analysis situates it at the intersection of sovereignty, legal responsibility, and security governance.

The article proceeds as follows. Section two develops a theoretical framework that links international relations theory and international law, with particular attention to the limitations of state-centric approaches to security and responsibility. Section three conceptualises climate change as a legal stress multiplier, analysing how projected water

insecurity intensifies institutional and regulatory fragility. Section four examines water as a medium through which biological risks may generate indirect harm. Section five analyses core principles of international law, including relevant provisions of the United Nations Charter and international humanitarian law, in order to identify emerging normative gaps. Section six introduces a projection-based scenario to illustrate how these legal ambiguities may materialise in practice. The final section discusses the broader implications of climate-driven systemic risk for international law and international relations theory.

1. Theoretical Framework: International Relations and the Limits of International Law

An integrated framework is adopted in which international relations theory is read alongside doctrinal approaches in international law, rather than being treated as analytically separate domains. Legal norms are not treated as autonomous or self-contained. Instead, international law is situated within the broader structural and political conditions shaped by climate change. In this context, climate-induced water insecurity reveals a growing tension between state-centric legal categories and emerging forms of risk that operate through vulnerability, infrastructural degradation, and indirect harm.

Structural approaches in international relations underscore the persistence of sovereignty and the constraints imposed by an anarchic international system. This point is not novel, yet it remains analytically consequential in the present context. From this perspective, international law reflects the boundaries of what states are prepared to accept in situations marked by uncertainty and perceived insecurity (Waltz, 1979: 88). Legal obligations tend to function most effectively where threats are clearly identifiable, actors can be attributed with confidence, and consequences unfold within discrete temporal frames. Environmental and climate-related risks, however, rarely conform to these conditions. Water insecurity develops incrementally, often without a single triggering event, thereby limiting the capacity of legal regimes designed to regulate direct and intentional forms of violence.

Critical security studies offer an important corrective to this state-centred orientation by redirecting analytical focus from territorial defence toward the protection of populations and essential life-support systems. Security, in this understanding, extends beyond the absence of military attack to encompass freedom from structural vulnerability and preventable harm (Booth, 1991: 319). Climate change intensifies such vulnerabilities by placing sustained pressure on infrastructures that underpin public health and social stability. Under conditions of climate stress, water systems therefore emerge as central referent objects of security (Booth, 2007: 112). This reconceptualisation complicates long-standing legal distinctions between internal and external threats, as well as between peace and security.

Insights from scholarship on the transformation of contemporary conflict further illuminate these dynamics. Analyses of changing patterns of violence point to a growing reliance on indirect means of harm, with civilian life increasingly affected through the degradation of social and infrastructural systems rather than through conventional military confrontation. As Mary Kaldor observes, contemporary forms of organised violence blur the boundaries between war and peace, and between military and civilian spheres. Violence is frequently exercised through the erosion of civilian infrastructures rather than through battlefield engagement (Kaldor, 2012: 7). Although Kaldor's framework is not grounded in legal analysis, it provides a useful lens for understanding why existing international legal

regimes struggle to regulate indirect and infrastructure-based forms of harm associated with climate-induced water insecurity.

Importantly, drawing on Kaldor's analysis does not imply that climate-induced water insecurity constitutes warfare or deliberate violence. Rather, it helps to clarify why legal frameworks rooted in traditional conceptions of armed conflict encounter categorical limitations when confronted with harm that is indirect, cumulative, and resistant to attribution. Water systems degraded under climate stress may generate consequences comparable in scale to those associated with conflict, yet without meeting the legal criteria required to trigger the application of international humanitarian law.

Debates on sovereignty further contextualise these challenges. Classical accounts of sovereignty emphasize exclusive authority and territorial control as the foundations of political order (Bodin, 1992: 1). Within contemporary international relations, however, sovereignty increasingly carries expectations related to responsibility and effective governance. When states are unable to prevent foreseeable harm to populations through the management of essential infrastructures, the legitimacy of sovereign authority becomes subject to normative scrutiny, even if its formal legal status remains intact. Climate-induced water insecurity thus raises questions not about the existence of sovereignty itself, but about its performance under conditions of systemic stress.

Taken together, these theoretical perspectives expose a widening gap between the nature of climate-induced risks and the assumptions embedded in international legal frameworks. Structural realism helps explain why legal adaptation remains slow and contested, critical security studies foreground the role of vulnerability, and conflict transformation scholarship clarifies why indirect harm escapes established legal categories. It is through this combined perspective that water insecurity can be examined as a legal and normative challenge, rather than as a problem of deliberate weaponisation.

2. Climate Change and Water Insecurity as a Legal Stress Multiplier

Climate change, rather than operating as a direct or autonomous cause of conflict or legal violation, functions as a structural condition whose significance lies in its capacity to intensify existing vulnerabilities within legal and institutional systems. In the context of water insecurity, this amplifying effect becomes particularly pronounced. Climate-induced pressures on water resources, including prolonged droughts, altered precipitation patterns, sea-level rise, and the increasing frequency of extreme weather events, place sustained strain on water infrastructure, regulatory oversight, and public health governance (United Nations, 2021: 62; UN-Water, 2023: 9). These pressures do not simply deepen conditions of scarcity, but also erode the institutional and regulatory capacity necessary to manage water systems effectively.

Under conditions of climate change, water insecurity therefore functions as a legal stress multiplier. It increases the likelihood that harm will emerge through indirect pathways, including biological risk, while simultaneously constraining the ability of states and international institutions to prevent, attribute, or remedy such harm. Drinking water systems, sanitation networks, and wastewater treatment facilities are especially vulnerable in this respect. The degradation of drinking-water infrastructure under conditions of climate stress directly undermines established public health standards, particularly with regard to water quality and safety, as reflected in the World Health Organization's guidelines on drinking-water quality (World Health Organization, 2017: 23). As climate stress degrades these systems, distinctions between natural hazard, infrastructural failure, and deliberate

interference become increasingly difficult to sustain. For international law, which relies on such distinctions to assess legality and assign responsibility, this growing ambiguity presents a fundamental challenge (United Nations, 2022: 45).

Projections for the mid-century indicate that water stress will be unevenly distributed, with disproportionate impacts falling on regions characterised by limited regulatory capacity and weak institutional resilience (IPCC, 2022: 121). In these settings, climate change does not so much generate entirely new risks as it magnifies pre-existing governance deficits. From a legal perspective, this uneven distribution complicates the application of universal norms. International law presumes a baseline level of state capacity necessary for compliance, enforcement, and accountability. Climate-induced water insecurity undermines this presumption by placing states under structural strain that restricts their ability to fulfil legal obligations related to public health, environmental protection, and civilian welfare.

The interaction between climate change and water insecurity also challenges the temporal assumptions embedded within international law. Legal responsibility is typically anchored to identifiable acts occurring at specific moments in time. By contrast, climate-related degradation of water systems unfolds gradually and cumulatively. Harm may materialise long after its initial causes, and its effects may be dispersed across populations and territorial boundaries. Such dynamics resonate with broader debates in international environmental law concerning transboundary environmental harm and the difficulties of attributing responsibility in complex ecological systems (McIntyre, 2016: 74). This temporal diffusion complicates the application of legal standards that depend on immediacy and direct causation. As a result, substantial harm may occur without activating existing legal thresholds for intervention, accountability, or remedial action (United Nations, 2020: 15).

From the perspective of international relations theory, the limitations of state-centric governance become increasingly apparent under conditions of systemic environmental stress. Although states remain the primary legal actors within the international system, their capacity to manage climate-induced risks is increasingly constrained by factors that extend beyond territorial control. Water insecurity illustrates how global environmental processes generate security-relevant outcomes in the absence of clear adversaries or intentional wrongdoing. In such contexts, traditional mechanisms of deterrence, reciprocity, and compliance lose much of their explanatory and practical force, thereby widening the gap between legal obligation and effective capacity (Waltz, 1979: 111).

Conceptualising climate change as a legal stress multiplier avoids the pitfalls of environmental determinism. The argument advanced here does not suggest that climate change inevitably leads to legal breakdown or conflict. Rather, it highlights how climate stress intensifies existing vulnerabilities within legal and institutional arrangements, making certain forms of harm more probable and more difficult to regulate. Water insecurity serves as a particularly revealing case in this respect, as it occupies the intersection of environmental change, public health, and state responsibility.

3. Water Insecurity and Biological Risks

Under conditions of climate change, water insecurity creates environments in which biological risks may emerge and spread through indirect pathways. Unlike conventional forms of violence regulated by international law, biological harm associated with water systems does not depend on the immediate use of force, clearly identifiable perpetrators, or explicitly defined targets. Such forms of harm pose a significant challenge to legal and

theoretical frameworks that presuppose intentionality, temporal immediacy, and clear attribution. In this context, rather than being reducible to a purely public health concern, the emergence of biological risk becomes closely intertwined with questions of state obligation, particularly in relation to due diligence, prevention, and the protection of civilian populations under international law. Among the multiple risks associated with water insecurity, biological risk is selected in this study not as an exclusive focus but as an illustrative analytical dimension, through which the indirect, cumulative, and attribution-resistant forms of harm produced by infrastructural degradation become particularly visible. Such biologically mediated risks transmitted through water systems may exceed existing capacities for early detection and prevention, particularly in vulnerable settings, a concern that has also been emphasised in the World Health Organization's analyses of climate change and health (World Health Organization, 2022: 14).

Water systems occupy a distinctive position within this context, functioning simultaneously as essential public goods and as potential vectors of harm. Drinking water networks, sanitation systems, and wastewater treatment facilities are designed to protect public health under conditions of institutional stability. When climate stress weakens these systems, their capacity to prevent contamination and manage biological hazards is diminished. Water may then become a medium through which pathogens spread in the absence of clear evidence of deliberate action. From the standpoint of international law, this ambiguity complicates efforts to distinguish between accidental harm, negligence, and hostile interference.

Biological risks associated with water insecurity are particularly difficult to regulate because they blur the boundary between public health and security. International legal regimes addressing biological threats have historically focused on intentional use and prohibited forms of weaponisation. Climate-induced vulnerability, however, enables patterns of harm that fall outside these established categories. Contamination of water systems may result from opportunistic exploitation, inadequate maintenance, or cascading infrastructural failure. Yet, for affected populations, the consequences may resemble those associated with prohibited biological means. This disconnect exposes a regulatory gap between the prohibition of biological weapons and the governance of indirect biological harm (United Nations Office for Disarmament Affairs, 2021: 4).

Attribution constitutes a central challenge in this context. International law relies on the identification of responsible actors in order to assign liability and determine appropriate responses. Biological harm emerging through water systems frequently lacks a clear point of origin. The delayed manifestation of effects, combined with the transboundary nature of water flows and environmental processes, further complicates efforts to establish causation. As a result, significant harm may occur without activating established legal mechanisms related to state responsibility, self-defence, or collective security (United Nations, 2022: 47).

From an international relations perspective, such forms of indirect harm challenge traditional assumptions about deterrence and compliance. Deterrence presupposes identifiable adversaries and credible threats of retaliation. Where attribution is uncertain or contested, these mechanisms lose much of their effectiveness. Moreover, when harm arises through systemic vulnerability rather than overt aggression, states may be reluctant to escalate legal or political responses. This dynamic reinforces tendencies toward legal inertia in the face of emerging biological risks linked to water insecurity (Waltz, 1979: 88).

The civilian impact of these risks further complicates their legal treatment. International humanitarian law is grounded in the distinction between combatants and non-combatants, as well as in the protection of civilians from direct attack. Biological risks transmitted through water systems undermine these distinctions by affecting populations indiscriminately through essential infrastructure. Civilians are not harmed as incidental victims of military operations, but as primary recipients of damage generated by structural vulnerability. This raises normative concerns regarding proportionality, precaution, and the protection of life-support systems in contexts that fall short of armed conflict (Walzer, 1977: 155; 2000: 33).

Taken together, this analysis demonstrates that biological risks associated with water insecurity do not fit neatly within existing legal frameworks governing the use of force, biological weapons, or armed conflict. The following section builds on this discussion by examining how core principles of international law struggle to address these forms of indirect harm, and by exploring the implications for sovereignty and legal responsibility.

3.1. Indirect Harm and the Limits of International Law

The challenges generated by climate-induced water insecurity and associated biological risks reveal significant gaps within the existing architecture of international law. Legal regimes governing the use of force, state responsibility, and civilian protection have largely evolved in response to direct, intentional, and temporally discrete forms of harm. Indirect biological harm emerging through degraded water systems does not align easily with these foundational assumptions, creating persistent uncertainty regarding legal applicability, responsibility, and enforcement.

A central difficulty arises in relation to the threshold of armed attack under Article 51 of the United Nations Charter. The legal architecture of the use of force established by the United Nations Charter rests on assumptions of identifiable actors, intentional conduct, and temporal immediacy, assumptions that complicate legal responses to indirect and delayed forms of harm (United Nations, 1945: 51). The right of self-defence presupposes the existence of an identifiable attacker, a clearly defined act of aggression, and a temporal proximity between action and response. Biological harm transmitted through water systems under conditions of climate stress challenges each of these criteria. Contamination may occur without immediate visibility, its effects may manifest gradually over extended periods, and attribution to a specific actor may remain inconclusive. Consequently, severe harm to civilian populations may fail to meet the legal threshold required to trigger lawful self-defence, despite its profound implications for human security (United Nations, 2022: 49).

Articles 2(6) and 2(7) of the United Nations Charter further complicate legal responses to such harm. Water governance, public health, and environmental protection have traditionally fallen within the sphere of domestic jurisdiction, limiting the scope for external intervention. Although international law recognises obligations related to transboundary harm, the indirect and cumulative nature of climate-related water insecurity frequently blurs the distinction between internal affairs and matters of international concern. This ambiguity reinforces state reluctance to accept external scrutiny or legal responsibility, even where the consequences of infrastructural failure extend beyond national borders (United Nations, 2021: 62).

International humanitarian law likewise encounters significant limitations in addressing indirect biological harm transmitted through water systems. The growing

difficulty of applying international humanitarian law to forms of harm that target civilian infrastructures rather than active hostilities has also been explicitly acknowledged by the International Committee of the Red Cross in its assessment of contemporary armed conflicts (International Committee of the Red Cross, 2015: 9). Its core principles of distinction, proportionality, and precaution are designed to regulate conduct during armed conflict. When harm arises outside active hostilities, or through the gradual degradation of civilian infrastructure, these principles lose much of their regulatory clarity. Civilians affected by contaminated or unsafe water supplies are not incidental victims of military operations, but primary recipients of harm generated by structural vulnerability. This raises normative concerns regarding the adequacy of existing legal protections for life-support systems in contexts that fall short of armed conflict (Walzer, 1977: 128; 2000: 33).

The problem of attribution further undermines the effectiveness of international legal responses. Yet, where harm unfolds through cumulative infrastructural degradation rather than discrete acts, the relationship between biological risk and legal responsibility becomes less easily traceable, raising complex questions concerning attribution, foreseeability, and the scope of state responsibility under conditions of environmental stress. In international legal doctrine, the attribution of responsibility and the establishment of causality remain central requirements for determining state liability in cases involving transboundary harm (Crawford, 2013: 45). In cases involving water insecurity and biological risk, causation is often diffuse, involving interacting factors such as environmental stress, governance failure, and technological fragility. Even where deliberate interference is suspected, evidentiary thresholds may prove difficult to satisfy. The result is a legal grey zone in which harmful outcomes persist without activating accountability mechanisms (United Nations Office for Disarmament Affairs, 2021: 4).

From the perspective of international relations theory, these legal constraints reflect broader structural dynamics. States remain hesitant to expand legal obligations in areas characterised by uncertainty, attribution challenges, and potential constraints on sovereignty. The resulting gap between formal legal norms and evolving threat environments contributes to norm erosion and selective compliance. Indirect biological harm associated with water insecurity thus underscores the tension between legal aspiration and political feasibility within the international system (Waltz, 1979: 88).

This section has demonstrated that existing international legal frameworks remain ill-equipped to address indirect and attribution-resistant harm arising from climate-induced water insecurity. The following section introduces a projection-based scenario to illustrate how these legal ambiguities may materialise in practice and to further clarify their implications for sovereignty, responsibility, and the international legal order.

4. Indicative Scenario and Legal Implications

This section introduces an indicative, projection-based scenario in order to illustrate how the legal ambiguities identified in the preceding analysis may materialise in practice. The purpose of this scenario is not to offer an empirical case study or a predictive account. Rather, it serves to examine how existing legal frameworks respond when climate-induced water insecurity intersects with biological risk under conditions anticipated toward the middle of the century.

Consider a region experiencing chronic water stress as a consequence of prolonged drought, rising temperatures, and increasingly unstable precipitation patterns. In this setting, drinking water infrastructure has deteriorated under sustained environmental

pressure and limited regulatory capacity. Water treatment facilities operate below established safety standards, monitoring mechanisms function intermittently, and public health institutions lack the resources required for early detection of contamination. Within such conditions, a biological pathogen enters the water system, whether through deliberate interference, opportunistic exploitation, or infrastructural failure. The contamination is not immediately identified, and its effects emerge gradually through rising illness and mortality among civilian populations.

From the standpoint of international law, this scenario raises immediate questions of classification and responsibility. The absence of a clearly identifiable perpetrator complicates any determination that the incident constitutes an armed attack within the meaning of Article 51 of the United Nations Charter. Even where external involvement is suspected, evidentiary standards necessary to attribute responsibility to a specific state or non-state actor may not be satisfied. As a consequence, the legal basis for unilateral or collective response remains uncertain (United Nations, 2022: 49).

The scenario also brings to the fore tensions surrounding sovereignty and non-intervention. Water governance, public health, and environmental management are traditionally treated as matters falling within domestic jurisdiction. Under Article 2(7) of the United Nations Charter, external intervention in such areas is constrained, even when internal failures generate significant harm. At the same time, the transboundary nature of water flows and biological risk complicates efforts to contain the consequences of contamination within national borders. This produces a legal paradox in which harm with international implications continues to be formally categorised as an internal matter (United Nations, 2021: 62).

International humanitarian law offers limited guidance in this context. In the absence of an armed conflict, the direct application of rules governing the conduct of hostilities and the protection of civilians is precluded. Yet the civilian impact of water contamination is both substantial and indiscriminate, affecting populations through essential life-support systems rather than through military objectives. This gap underscores the difficulty of extending existing legal protections to forms of harm that fall outside the traditional boundaries of armed conflict while nevertheless threatening fundamental human security (Walzer, 1977: 128; 2000: 33).

From the perspective of international relations theory, the scenario illustrates how climate-induced vulnerabilities undermine conventional mechanisms of deterrence and compliance. Uncertainty surrounding attribution reduces incentives for preventive action, while concerns over sovereignty discourage external engagement. States facing similar vulnerabilities may be reluctant to endorse the expansion of legal obligations that could later constrain their own autonomy. This dynamic reinforces patterns of legal inertia in the face of emerging threats, even as the potential for widespread harm increases (Waltz, 1979: 111).

The indicative scenario thus functions as a stress test for both international law and international relations theory. It demonstrates how climate-induced water insecurity and associated biological risks generate forms of harm that evade established legal categories while exposing the limits of state-centric governance. The inability to classify, attribute, and respond effectively to such harm highlights the growing disconnect between evolving threat environments and the normative structure of international law. Under such conditions, the deterioration of water systems may contribute to the gradual spread of waterborne diseases,

particularly in regions where regulatory and infrastructural capacity remains limited. While such outcomes may not result from deliberate action, they nonetheless give rise to situations in which questions of responsibility, prevention, and international legal accountability become increasingly difficult to ignore.

Conclusion

This analysis has approached climate-induced water insecurity not as an empirical case study, but as a conceptual and legal problem that exposes the limits of existing governance frameworks. One limitation of this approach lies in its reliance on projection-based reasoning rather than observed incidents. Nevertheless, the absence of clear empirical cases does not diminish the normative significance of the risks identified. On the contrary, it reflects the extent to which existing legal categories remain ill-equipped to register forms of harm that emerge gradually through infrastructural vulnerability rather than overt violence. From the perspective of international law, the findings point to significant normative and institutional gaps. This understanding of responsibility beyond territorial control is consistent with the principles articulated in the Responsibility to Protect framework, which frames sovereignty as entailing obligations of prevention and assistance rather than exclusive authority (United Nations General Assembly, 2005: 30). Core legal categories governing the use of force, self-defence, and state responsibility are built upon assumptions of identifiable actors, clear intent, and temporal immediacy. Climate-induced water insecurity disrupts these assumptions by generating harm that unfolds incrementally and often without a discernible perpetrator. As discussed in relation to the United Nations Charter, particularly Articles 51, 2(6), and 2(7), such harm frequently falls below established legal thresholds for intervention or response, even where its effects on civilian populations are severe. International humanitarian law likewise struggles to extend protection to life-support systems affected outside the context of armed conflict, leaving affected populations within a persistent legal grey zone.

International relations theory helps to explain why these legal shortcomings endure. Whether existing theoretical frameworks can accommodate this shift without substantive revision remains an open question. State-centric approaches prioritise sovereignty, autonomy, and political feasibility, limiting the willingness of states to expand legal obligations under conditions of uncertainty. Climate-induced water insecurity illustrates how global environmental processes generate security-relevant outcomes in the absence of clear adversaries or traditional deterrence mechanisms. In such contexts, legal inertia may appear rational from a state perspective, even as risks to human security intensify. The resulting gap between legal norms and material vulnerability contributes to the erosion of the protective functions traditionally associated with international law.

The analysis also underscores the importance of avoiding environmental determinism. Climate change does not inevitably lead to legal breakdown or conflict. Rather, it operates as a stress multiplier that amplifies existing institutional fragilities and governance deficits. Water insecurity is particularly revealing in this regard, as it lies at the intersection of environmental change, public health, and state responsibility. The vulnerability of water systems under climate stress creates conditions in which biological risks may emerge through deliberate interference, opportunistic exploitation, or systemic failure. The legal challenge lies not in the absence of prohibition, but in the inadequacy of existing frameworks to capture and regulate such indirect forms of harm.

The indicative scenario presented in this article further illustrates the practical consequences of these theoretical and legal gaps. When biological harm enters degraded water systems under conditions of climate stress, uncertainty surrounding attribution, sovereignty, and legal thresholds constrains both national and international responses. The inability to classify such incidents within established legal categories undermines accountability and weakens incentives for cooperation. Although the scenario is not predictive, it highlights the types of challenges international law is likely to confront as climate impacts intensify toward the mid-century.

In conclusion, climate-induced water insecurity constitutes a critical test for the future development of international law and international relations theory. Existing frameworks, shaped by assumptions of state-centric security and direct violence, are increasingly misaligned with emerging forms of systemic and indirect harm. Addressing this misalignment does not require abandoning foundational legal principles. It does, however, require rethinking how responsibility, protection, and cooperation are conceptualised in an era defined by climate-driven risk.

Future governance responses may therefore require stronger international cooperation mechanisms aimed at strengthening infrastructure resilience, monitoring systems, and preventive capacities in climate-vulnerable regions (UN-Water, 2023: 12). Addressing these challenges, however, will also depend on the gradual development of legal frameworks capable of responding to indirect, cumulative, and attribution-resistant forms of harm linked to environmental degradation. Viewed through the lens of biological vulnerability, water insecurity underscores the urgency of developing legal and theoretical approaches capable of responding to harm that is diffuse, delayed, and deeply embedded within global environmental change.

Bibliography

- Bodin, J. (1992). *On Sovereignty*, (Trans. J. H. Franklin), Cambridge: Cambridge University Press.
- Booth, K. (1991). "Security and Emancipation", *Review of International Studies*, 17(4), 313-326. <https://doi.org/10.1017/S0260210500112033>
- Booth, K. (2007). *Theory of World Security*, Cambridge: Cambridge University Press.
- Crawford, J. (2013). *State Responsibility: The General Part*, Cambridge: Cambridge University Press.
- Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Cambridge: Cambridge University Press.
- International Committee of the Red Cross. (2015). *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts*, Cenevre: International Committee of the Red Cross.
- Kaldor, M. (2012). *New and Old Wars: Organized Violence in a Global Era*, Cambridge: Polity Press.
- McIntyre, O. (2016). *Environmental Protection of International Watercourses*, London: Routledge.
- United Nations General Assembly. (2005). *2005 World Summit Outcome (A/RES/60/1)*, New York: United Nations.

- United Nations Office for Disarmament Affairs. (2021). Biological Weapons Convention and Public Health, New York: United Nations.
- United Nations. (1945). Charter of the United Nations, New York: United Nations.
- United Nations. (2020). World Water Development Report 2020: Water and Climate Change, New York: United Nations.
- United Nations. (2021). Climate Change and Water Security, New York: United Nations.
- United Nations. (2022). Climate Change, Water and Human Security, New York: United Nations.
- UN-Water. (2023). The United Nations World Water Development Report 2023, Paris: UNESCO.
- Waltz, K. N. (1979). Theory of International Politics, New York: McGraw-Hill.
- Walzer, M. (1977). Just and Unjust Wars, New York: Basic Books.
- Walzer, M. (2000). Just and Unjust Wars, New York: Basic Books.
- World Health Organization. (2017). Guidelines on Drinking-Water Quality, Cenevre: World Health Organization.
- World Health Organization. (2022). Climate Change and Health, Cenevre: World Health Organization.

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Üretken Yapay Zeka Kullanımı	Bu çalışmanın hazırlanma sürecinde üretken yapay zekâ araçları, yalnızca dil ve anlatımın iyileştirilmesi amacıyla sınırlı bir destek olarak kullanılmıştır.	Use of Generative Artificial Intelligence	Generative artificial intelligence tools were used only in a limited capacity for language editing and stylistic refinement during the preparation of this study.
Yazar Katkıları	Bu çalışma tek yazarlı olarak hazırlanmıştır.	Author Contributions	This study was prepared with a single author.
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Genişletilmiş Özet

İklim değişikliğinin uluslararası ilişkiler ve uluslararası hukuk üzerindeki etkileri son yıllarda giderek daha görünür hâle gelmiştir. Ancak iklim kaynaklı güvenlik riskleri çoğu zaman ani krizler, açık çatışmalar ya da doğrudan düşmanca eylemler şeklinde ortaya çıkmamaktadır. Özellikle su güvensizliği, ani ve dramatik kırılma anlarından ziyade, uzun vadeye yayılan ve birikimli biçimde ilerleyen süreçler aracılığıyla şekillenmektedir. Bu süreçler, su altyapıları, sanitasyon sistemleri ve kamusal sağlık yönetişimi üzerinde sürekli ve artan bir baskı oluşturarak, devletlerin önleyici ve düzenleyici kapasitesini kademeli biçimde aşındırmaktadır. Bu nedenle iklim kaynaklı su güvensizliği, yalnızca çevresel bir sorun değil; aynı zamanda hukuki, kurumsal ve normatif sonuçlar doğuran çok katmanlı bir güvenlik meselesi olarak değerlendirilmelidir.

Bu bağlamda su sistemleri, yalnızca doğal kaynaklar ya da teknik altyapılar olarak ele alınamaz. Aksine, su altyapıları modern toplumların işleyişi açısından vazgeçilmez olan yaşam destek sistemleri niteliği taşımaktadır. İçme suyu şebekeleri, atık su arıtma tesisleri ve sanitasyon ağları, kamusal sağlığın, toplumsal istikrarın ve devlet otoritesinin sürdürülebilirliği açısından merkezi bir rol oynamaktadır. İklim değişikliğinin yarattığı yapısal baskılar, bu sistemlerin zaman içerisinde zayıflamasına yol açmakta; bu durum ise dolaylı, gecikmeli ve çoğu zaman atfedilmesi güç zarar biçimlerinin ortaya çıkmasına zemin hazırlamaktadır. Su güvensizliğiyle ilişkili biyolojik riskler, çoğunlukla kasıtlı bir saldırı niyetinden değil, önleyici kapasitenin ve kurumsal dayanıklılığın aşınmasından kaynaklanmaktadır. Bu özellik, söz konusu risklerin uluslararası hukuk çerçevesinde ele alınmasını önemli ölçüde karmaşıktırmaktadır.

Bu durum, uluslararası hukuk sisteminin temel varsayımlarında yer alan yapısal bir gerilimi görünür kılmaktadır. Silahlı saldırı, atf ve sorumluluk gibi temel hukuki kavramlar, büyük ölçüde niyetin ve nedenselliğin tespit edilebildiği durumlara dayanır. Uluslararası hukuk, zararın belirli bir fiil ve belirli bir aktörle ilişkilendirilebildiği koşullarda en etkin biçimde işlemektedir. Ancak iklim kaynaklı su güvensizliği bu mantığı sistematik biçimde bozmaktadır. Bozulmuş ya da zayıflamış su sistemleri üzerinden ortaya çıkan biyolojik zararlar, çoğu zaman açık bir fail barındırmaz; uzun zaman dilimlerine yayılır ve sıklıkla ulusal sınırları aşar. Bu nedenle ciddi sivil zararlar meydana gelmesine rağmen, mevcut hukuki mekanizmalar kolektif müdahale veya hesap verebilirlik eşiklerini harekete geçirmekte yetersiz kalabilmektedir.

Uluslararası ilişkiler teorisi, bu hukuki açmazın neden kalıcı olduğunu anlamak açısından önemli kavramsal araçlar sunmaktadır. Devlet merkezli yaklaşımlar, egemenliği ve uluslararası sistemin anarşik yapısı içinde yetki ve sorumluluğun coğrafi olarak sınırlandırılmış olduğunu vurgular. Bu bakış açısından uluslararası hukuk, kapsamlı çözümler sunan bir sistemden ziyade, devletlerin uzlaşarak kabul ettiği sınırları yansıtan bir düzen olarak görülür. İklim kaynaklı su güvensizliği ise bu sınırları zorlamaktadır. Riskler çoğu zaman devlet sınırları içinde ortaya çıkmakta, ancak etkileri sınır aşan nitelik taşımaktadır. Bu durum, yetkinin coğrafi olarak tanımlanması ile kırılabilirliğin sınır tanımaması arasındaki uyumsuzluğu giderek daha görünür hâle getirmektedir.

Eleştirel güvenlik yaklaşımları, bu sorunu daha da derinleştirerek, güvenlik kavramını yalnızca toprak savunmasıyla sınırlamaktan çıkarır ve nüfusların ile hayati altyapıların korunmasını merkeze alır. Bu perspektife göre güvenlik, yalnızca silahlı saldırının yokluğu anlamına gelmez; aynı zamanda yapısal kırılmalardan ve önlenemez zararlardan özgür olmayı da içerir. İklim baskısı altındaki koşullarda su sistemleri, silah hâline getirildikleri için değil, işlevsiz hâle gelmelerinin sivil yaşamın sürdürülebilirliğini, toplumsal refahı ve kamu düzenini tehdit etmesi nedeniyle güvenliğin temel referans nesneleri hâline gelmektedir. Bu durum, güvenliğin referans noktalarının yeniden düşünülmesini zorunlu kılmaktadır.

Bu çalışma, çağdaş zarar biçimlerinin dönüşümüne ilişkin daha geniş tartışmalarla da ilişki kurmaktadır. Günümüzde büyük ölçekli acılar, giderek daha az doğrudan askeri çatışmalar yoluyla, daha çok sivil altyapıların aşınması üzerinden üretilmektedir. Enerji, sağlık ve su altyapıları bu dönüşümün merkezinde yer almaktadır. Su sistemleri, birbirine bağlı ve vazgeçilmez ağlar olmaları nedeniyle bu dönüşümün çarpıcı bir örneğini sunmaktadır. Bu ağların çöküşü, mevcut hukuki kategoriler arasında sıkışan zarar biçimleri üretmektedir. Bu zararlar ne klasik silahlı çatışma mantığına tam olarak uymakta ne de yalnızca halk sağlığı ya da çevre yönetimi alanıyla sınırlı kalmaktadır.

Bu dinamikler, egemenlik ve meşruiyet kavramları açısından da önemli soruları gündeme getirmektedir. Devletler, kendi toprakları içindeki su kaynakları üzerinde hukuki egemenliğe sahip olmaya devam etmektedir. Ancak hayati yaşam destek sistemlerini etkileyen ve öngörülebilir nitelik taşıyan zararları önleyememek, egemenliğin normatif temelleri üzerinde baskı yaratmaktadır. Bu durum, egemenliğin hukuki bir ilke olarak ortadan kalktığı anlamına gelmez. Aksine, hukuki egemenlik ile iklim kaynaklı sistemik baskılar altında etkin yönetim kapasitesi arasındaki açığın giderek büyüdüğüne işaret eder. Bu boşluk, uluslararası

toplumun sorumluluk, iş birliği ve dayanışma mekanizmalarını yeniden değerlendirmesini zorunlu kılmaktadır.

Bu bağlamda, Koruma Sorumluluğu (R2P) çerçevesinin önleyici boyutu yeniden önem kazanmaktadır. R2P, zorlayıcı müdahale doktrininden ziyade, erken uyarı, kapasite geliştirme ve kurumsal destek çerçevesi olarak ele alındığında, iklim kaynaklı kırılganlıkların egemenliği aşındırmadan ele alınabilmesi için kavramsal bir zemin sunmaktadır. Su güvensizliği bağlamında bu yaklaşım, yaptırım ya da zorlamadan çok, yardım, iş birliği ve dayanıklılık inşasını önceleyen bir anlayışı teşvik etmektedir.

Sonuç olarak iklim kaynaklı su güvensizliği, hem uluslararası hukuk hem de uluslararası ilişkiler açısından kritik bir sınama alanı oluşturmaktadır. Bu çalışma, silahlaştırma söylemini merkezine almak yerine kırılganlığı öne çıkararak, dolaylı biyolojik risklerin mevcut hukuki kategorilerin ve yönetim yapılarının sınırlarını nasıl görünür kıldığını ortaya koymaktadır. Bu risklerle başa çıkabilmek, analitik odağın kasıtlı şiddetten ziyade altyapısal kırılganlık, kurumsal zafiyet ve önleyici kapasite eksikliği üzerinden yeniden düşünülmesini gerektirmektedir. İklim kaynaklı sistemik risklerin belirginleştiği bir dönemde, sorumluluk, koruma ve meşruiyet kavramlarını yeniden ele almak artık yalnızca gerekli değil, aynı zamanda kaçınılmazdır.