



Naif Arab University for Security Sciences

Arab Journal for Security Studies

المجلة العربية للدراسات الأمنية

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AJSS

The Climate-Conflict-Displacement Nexus: The Case of Lebanon (2019–2025)



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العلاقة بين المناخ والصراع والنزوح: حالة لبنان (2019–2025)

خليل جبارة

الجامعة اللبنانية الأمريكية، جمهورية لبنان

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Received 1 Jan. 2026; accepted 2 Mar.; available online 10 Sep. 2026

Abstract

This study examines the nexus of climate, conflict, and displacement in Lebanon, portraying the state as an environment where multiple systemic risks interact.

It employs a qualitative, one-sided case study design and utilizes a theory-driven process tracing approach within the framework of Human-Environmental-Climate Security (HECS). It draws on secondary data from international organizations (World Bank, UNHCR, UNDP), social perception surveys (ARK & UNDP, 2017–2024), government strategies, and peer-reviewed literature to trace the causal mechanisms associated with governance failures, environmental degradation, and social tensions in Lebanon during the period 2017–2024.

The study's findings indicate that the nexus of climate, conflict, and displacement in Lebanon is primarily mediated by state failure. Scarcity is not absolute but rather politically produced through decades of corruption, infrastructure neglect, and elite appropriation of resources. Environmental degradation increased from 3.2% of GDP in 2005 to 10.9% in 2023, with the growing burden of Syrian displacement accounting for approximately 30% of this cost.

Keywords: *security studies, climate-conflict nexus, manufactured scarcity, Lebanon, governance failure, complex displacement*



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المستخلص

تناولت هذه الدراسة مظاهر ترابط المناخ والنزاع والنزوح في لبنان؛ حيث تم تصوير الدولة باعتبارها بيئة تتفاعل فيها مخاطر نظامية متعددة، واعتمدت تصميم دراسة حالة نوعية أحادية، وتوظف أسلوب تتبع العمليات الموجه بالنظرية ضمن إطار الأمن الإنساني- البيئي - المناخي (HECS). واستندت إلى بيانات ثانوية مُستمدة من تقارير المنظمات الدولية (البنك الدولي، المفوضية السامية للأمم المتحدة لشؤون اللاجئين، برنامج الأمم المتحدة الإنمائي)، ومسوح التصورات الاجتماعية (ARK & UNDP, 2017-2024) والإستراتيجيات الحكومية، والأدبيات المُحكمة؛ وذلك بهدف تتبع الآليات السببية المرتبطة بفشل الحوكمة، والتدهور البيئي، والتوترات الاجتماعية في لبنان خلال الفترة من 2017-2024.

وتشير نتائج الدراسة إلى أن ترابط المناخ والنزاع والنزوح في لبنان يتوسطه أساساً إخفاق الدولة؛ حيث لا تُعدُّ الندرة مطلقة بقدر ما هي مُنتجة سياسياً عبر عقود من الفساد، وإهمال البنية التحتية، واستحواذ النخب على الموارد. وقد ازداد التدهور البيئي من 3.2% في الناتج المحلي الإجمالي في عام 2005 إلى 10.9% في عام 2023، فيما يشكّل العبء المتزايد الناجم عن النزوح السوري نحو 30% من هذه التكلفة.

الكلمات المفتاحية: الدراسات الأمنية، ترابط المناخ والصراع، الندرة المُصنَّعة، لبنان، فشل الحوكمة، النزوح المُعقّد

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Email: khalil.gebara@outlook.comdoi: [10.26735/KREC2614](https://doi.org/10.26735/KREC2614)

The study concludes that effective mitigation strategies must shift from an emergency humanitarian response approach to structural recovery, integrated resource governance, and a rights-based approach to managing cross-border mobility. Without fundamental governance reform, Lebanon will remain trapped in a feedback loop, where each climate shock could become a potential trigger for renewed conflict and displacement..

وتخلص الدراسة إلى أن إستراتيجيات التخفيف الفعّالة ينبغي أن تنتقل من نهج الاستجابة الإنسانية الطارئة إلى التعافي البنوي، وحوكمة الموارد المتكاملة، واعتماد نهج قائم على الحقوق في إدارة التنقل عبر الحدود. ومن دون إصلاح جوهري في الحوكمة، سيظل لبنان عالقاً في حلقة تغذية راجعة، حيث يمكن لكل صدمة مناخية أن تتحول إلى عامل محفز محتمل لتجدد النزاع والنزوح.

1. Introduction

The relationship between climate change, armed conflict, and human displacement has evolved from a hypothesis of linear causality to a complex, multi-dimensional field of scholarly inquiry that now occupies a central position in both academic research and policy discourse. The early formulations of the climate-security relationship, which often posited a direct, deterministic path from environmental degradation to resource scarcity to violent conflict, have been subjected to highly rigorous critique and largely abandoned in favor of more sophisticated frameworks (Selby et al., 2017; Buhaug, 2015). The academic consensus currently firmly rejects simplistic models of environmental determinism, which fail to account for the complex political, social, and economic factors that mediate the relationship between environmental stress and human outcomes (López Bremme & Regilme, 2025).

Instead, the contemporary understanding of the climate-security nexus focuses on how climate change interacts with pre-existing social, economic, and political vulnerabilities to alter conflict dynamics and displacement patterns in nonlinear, context-dependent ways (Mach et al., 2019; Abel et al., 2019). Climate change is increasingly understood not as a direct cause of conflict, but as a potent threat multiplier that worsens existing fragilities, deepens inequalities, and strains the adaptive capacity of vulnerable societies (CNA Corporation, 2007;

Goodman, 2024). This conceptual shift represents a fundamental reframing of the research question itself, moving from “does climate change cause conflict?” to “how does climate change interact with pre-existing vulnerabilities to alter conflict dynamics along with displacement patterns?” (Mach et al., 2019).

The Arab region represents the world’s most acute hotspot for this nexus, characterized by a convergence of superlative environmental vulnerability and profound political instability (UNDP, 2023; Norman et al., 2024). The region is warming nearly twice as fast as the global average, with projections indicating a potential temperature increase of 4–5 °C by the end of the century if current trends continue, far exceeding the global target of limiting warming to 1.5 degrees Celsius (Norman et al., 2024). The Arab region is also home to 12 of the 17 most water-stressed countries globally and is the world’s most food-import dependent region, creating a dangerous confluence of resource vulnerability and external dependency (World Bank, 2022). The State of the Climate in the Arab Region report characterizes the Arab region as among the most climate vulnerable regions in the world, highlighting that temperatures are rising at roughly twice the global average and that droughts are becoming more frequent and severe, particularly in ways that affect water availability and agriculture (World Meteorological Organization [WMO], 2025). Layered upon this extreme physical vulnerability



is a political context characterized by governance deficit, corruption, weak institutions, and ongoing conflicts, with the region hosting the world's largest populations of refugees and internally displaced persons (United Nations Development Programme [UNDP], 2023).

Within this volatile regional context, Lebanon offers a unique and critical vantage point for interrogating the nexus of climate, conflict, and displacement. The country represents a state of compounded crises, a term used to describe situations where multiple systemic risks, such as economic collapse, profound institutional fragility, extreme environmental degradation, and the world's highest per capita refugee population, intersect and compound one another to produce outcomes that are greater than the sum of their parts (World Bank Group, 2024). By early 2024, Lebanon was struggling with one of the most severe economic contractions in any country since the mid-19th century, with its GDP declining by approximately 40% between 2018 and 2023 (World Bank Group, 2024). This economic implosion was accompanied by hyperinflation that peaked at 221.3% in 2023, a sovereign debt default, the collapse of the banking sector, and a currency crisis that wiped out the middle class's savings (Central Administration of Statistics, 2024).

Despite the growing literature on the climate–security nexus, there is still a relative paucity of empirical case studies that trace the concrete causal mechanisms by which governance failure mediates the relationships among environmental stress, social conflict, and displacement in fragile states. Lebanon's compounded crises offer a critical case for examining these mechanisms because it exhibits the simultaneous operation of the four indirect pathways identified in the literature: economic

shocks, agricultural decline and food insecurity, natural resource competition, and migration, under conditions of extreme governance failure. This combination provides strong analytical leverage for assessing the mediating role of political variables in the climate–conflict–displacement nexus.

This study addresses three research questions:

1. How does the climate–conflict–displacement nexus manifest in Lebanon, and through what mechanisms does governance failure mediate the translation of environmental stress into social tension and displacement?
2. How have the 2024–2025 political transitions, the fall of the Assad regime in Syria, and the election of a new Lebanese president altered displacement dynamics, and what do these shifts reveal about the relative weight of political versus environmental variables in the nexus?
3. What policy interventions are required to break the feedback loop between governance failure, environmental degradation, and social conflict in Lebanon?

This research is defined by three key parameters. Chronologically, it focuses on the period from 2019 to 2025, characterized by Lebanon's economic collapse and the immediate aftermath of the Assad regime's fall in Syria; earlier events are included only when necessary for context. Geographically, the study covers Lebanon broadly, with particular emphasis on regions where the influx of refugees and environmental stress intersect, including the Bekaa Valley, Akkar, and parts of Mount Lebanon. Conceptually, the research uses the Human–Environmental–Climate Security (HECS) framework to examine vulnerability, resilience, and the impact of political and economic structures throughout



three essential service delivery sectors: water, energy, and solid waste. These sectors consistently constitute significant sources of environmental strain and social tension in Lebanon.

The central argument of this paper is that the climate-conflict-displacement nexus in Lebanon is not primarily a story of climate-driven scarcity leading inexorably to conflict, but rather one of state-induced vulnerability and politically manufactured scarcity. Applying the Human-Environmental-Climate Security (HECS) framework developed by Daoudy (2021), the analysis shows that governance failure is the central mediating variable that transforms manageable environmental stress into acute social and security crises. The paper argues that in Lebanon, scarcity is rarely absolute; it is manufactured through decades of irregularities, infrastructural neglect and the absence of regulatory frameworks.

This research makes several contributions to the literature on the climate-security nexus. First, it provides a detailed empirical case study of how the nexus manifests in an extreme state of fragility, providing insights into the mechanisms by which governance failure mediates environmental stress. Second, it contributes to the growing body of work on complex displacement by documenting the non-sequential nature of refugee movements in the aftermath of political change. Finally, it offers policy-relevant insights into the types of interventions required to break the feedback loop between governance failure and environmental degradation in fragile states.

The paper is structured as follows. Section 1 develops the theoretical framework, reviewing the evolution of thinking on the climate-security nexus and presenting the HECS framework as an analytical tool. Section 2 presents the methodology.

Section 3 gives a detailed overview of the Lebanese context, documenting the convergence of economic, political, environmental, and demographic crises. Section 4 analyzes the manifestations of the nexus in Lebanon, focusing on water, energy, and waste as arenas of resource competition and social tension. Section 5 discusses the findings through the lens of manufactured scarcity and governance failure. Section 6 concludes with policy implications and recommendations for future research.

2. Theoretical Framework: From Climate Determinism to Political Ecology

2.1. The Evolution of Climate-Security Scholarship

The literature on climate security is characterized by a gradual shift away from deterministic models toward frameworks that embrace complexity, context-dependence, and the primacy of political factors. Early scholarships in the field, particularly in the 1990s and early 2000s, were often characterized by what critics have termed “neo-Malthusian” thinking, which posited a relatively straightforward causal chain from population growth and environmental degradation to resource scarcity to violent conflict (Homer-Dixon, 1999). These early formulations were appealing in their simplicity and generated significant policy attention, but they were also subject to substantial empirical and theoretical critique.

Quantitative studies attempting to establish a direct causal link between climate variables and conflict onset have produced mixed and often contradictory results (Buhaug, 2015). Large-N statistical analyses have struggled to identify robust, generalizable relationships between climate shocks and conflict, with effect sizes often small and highly



sensitive to model specification (Theisen et al., 2013). More fundamentally, critics have argued that these early quantitative approaches suffered from methodological limitations, including the use of overly broad spatial and temporal units of analysis, inadequate controls for confounding variables, and a tendency toward “climate determinism and reductionism” that failed to account for the complex political and social factors that mediate outcomes (López Bremme & Regilme, 2025; Selby et al., 2017).

The body of knowledge on the climate-conflict relationship remains fragmented precisely because displacement and conflict rarely, if ever, result from individual triggers in isolation (Abel et al., 2019). Instead, they emerge from the confluence of overlapping political, economic, and environmental pressures operating at multiple scales. As the Intergovernmental Panel on Climate Change (IPCC) has noted, climate change intersects with pre-existing vulnerabilities to further exacerbate risks or cause new ones, but it does so in ways that are highly context-dependent and mediated by adaptive capacity (IPCC, 2022).

This recognition has led to a fundamental reframing of the climate-security research agenda. Rather than seeking to establish universal causal laws, contemporary scholarship focuses on identifying the mechanisms and pathways through which climate change can contribute to conflict and displacement in specific contexts, and on understanding the conditions under which these pathways are activated or mitigated (Mach et al., 2019). This shift represents a move from positivist-quantitative approaches toward more interpretive, qualitative, and mixed-methods research designs that can capture the complexity of real-world cases.

2. 2. Core Concepts: Complex Displacement and Cascading Risks

To capture the complexity of the climate-conflict-displacement relationship, scholars have developed new conceptual vocabulary that moves beyond simplistic categorizations. The term complex displacement has emerged as a particularly valuable analytical concept, referring to situations in which communities are forced to flee amid the complex interaction of climate change, disasters, and conflict (Burt & Kebero, 2023). The value of this term lies in its analytical precision and its rejection of artificial distinctions. It moves beyond the often-politicized and legally fraught efforts to distinguish a “climate refugee” from a “conflict refugee,” recognizing that in many humanitarian settings, such a distinction is empirically impossible and operationally unhelpful.

The concept of complex displacement acknowledges that climate change can trigger both conflict and displacement, often simultaneously, and that these phenomena are deeply intertwined in ways that resist simple categorization. A family fleeing violence in Syria, for example, may have been driven from their land initially by drought-induced agricultural collapse, then displaced again by conflict, and may now face climate-related risks in their host community in Lebanon. Attempting to classify such a family as either a climate refugee or a conflict refugee obscures more than it reveals. The term complex displacement instead encapsulates the nuanced and intricate factors contributing to displacement, acknowledging the compounded challenges faced by affected communities (Burt & Kebero, 2023).

Closely related to this concept is cascading risks, which describe the adverse impacts that occur after relocation to new communities (Neef et al., 2023). In this model, an initial displacement event (e.g.,



from conflict) can expose a population to new climate-related risks (e.g., settling in a flood-prone area or an area with severe water scarcity), which, in turn, creates new vulnerabilities and the potential for protracted and multiple disaster displacements. This mechanism operates as a bidirectional feedback loop: conflict is a primary driver of displacement, often pushing populations into areas prone to unfamiliar environmental hazards. A family fleeing violence may have no choice but to settle in a marginal area, a flood-prone riverbed, an informal settlement without access to water infrastructure, or an area vulnerable to heat stress, thus dramatically increasing their vulnerability to the next climate shock (Neef et al., 2023).

The concept of cascading risks is particularly relevant in the Lebanese context, where the influx of Syrian refugees has occurred in a country with severely degraded infrastructure and limited adaptive capacity. Many Syrian refugees in Lebanon live in informal settlements that lack basic services and are located in areas vulnerable to flooding, extreme heat, and other climate hazards. The initial displacement from conflict in Syria has thus cascaded into new forms of climate vulnerability in Lebanon, creating a situation where displaced populations face compounded risks.

2. 3. The Nexus Dynamics Framework

A nexus dynamics framework provides the analytical architecture for examining these complex interactions (Läderach et al., 2021). This framework posits that environmental and public health risks, which are exacerbated by climate change, must be analyzed in the context of the spatial, demographic, political, and structural factors that surround them. It is these pre-existing factors that exert a strong

influence on the severity of and response to climate shocks. The framework explains the central empirical observation of the climate-security field: the same climate shock, such as a severe drought, can have vastly different outcomes depending on the context into which it occurs.

In a stable, well-governed state with strong social safety nets, diversified livelihoods, robust infrastructure, and effective early warning systems, a drought may be a manageable economic event that triggers a coordinated government response, agricultural support programs, and temporary safety net expansions. In a fragile state with deep-seated religious, sectarian, or ethnic grievances, poor resource management, corruption, weak institutions, and a legitimacy deficit, the same drought can act as a profound destabilizer, triggering rural-urban migration, intensifying competition over scarce resources, fueling grievances against the government, and potentially escalating into violent conflict. The impact of the climate stressor is therefore entirely mediated by the political, economic, and social context into which it falls (Läderach et al., 2021).

This framework has important implications for both research and policy. For research, it suggests that understanding the climate-security nexus requires deep contextual knowledge and careful attention to the political economy of resource management. For policy, it implies that building resilience to climate change is inseparable from strengthening governance, reducing inequality, and addressing the root causes of fragility.

2. 4. The Human-Environmental-Climate Security Framework

Building on these insights and integrating critiques of traditional security frameworks, Marwa Daoudy has



proposed a “Human-Environmental-Climate Security (HECS)” framework that offers a systematized method of process tracing while explicitly recentring the human subject and incorporating local conceptions of security (Daoudy, 2021). This framework represents a significant advance in climate-security scholarship because it provides both a normative critique of state-centric security paradigms and a practical analytical tool for empirical research.

The HECS model is predicated on an assessment of three primary factors: vulnerability, resilience, and structures (Daoudy, 2021). Vulnerability captures disruptions to daily life patterns from the perspective of the marginalized, including water insecurity, land degradation, food insecurity, and poverty. This dimension focuses on the lived experience of environmental stress, asking how climate change affects the most vulnerable members of society in their daily struggles for survival and dignity. Resilience is defined as a lack of vulnerability due to structural factors and elite decision-making. This dimension examines the resources, institutions, and social capital that enable communities to cope with and adapt to environmental shocks. Critically, Daoudy emphasizes that resilience is not an inherent quality of communities but is shaped by political choices and power structures. Structures refer to the political and economic systems, particularly government structures and policy choices, that shape how communities experience climate shocks. This dimension brings politics to the center of the analysis, examining how governance, institutions, and elite decision-making create or mitigate vulnerability.

The central argument of the HECS framework is that ecological drivers of conflict are best understood as a result of policy decisions that reflected the ideology and preferences of ruling elites rather than direct functions

of climate change (Daoudy, 2021). This model moves beyond simplistic determinism to analyze how “manufactured scarcity” and political failures create the conditions for conflict. In Daoudy’s analysis of Syria, for example, the drought of 2007-2010 is understood not as a direct cause of the 2011 uprising, but as one factor among many that exposed and exacerbated the consequences of decades of unsustainable agricultural policies, water mismanagement, and authoritarian governance (Daoudy, 2022).

The HECS framework is particularly well-suited to the Lebanese case because it directs analytical attention to the role of governance and elite decision-making in constructing vulnerability. As this paper will demonstrate, Lebanon’s environmental crisis is not primarily a result of absolute resource scarcity or overwhelming climate impacts, but rather governance complexities, policy challenges and institutional gaps see Table 1.

2. 5. Climate as a Threat Multiplier: Mechanisms and Causal Pathways

The concept of climate change as a threat multiplier is widely used by the international policy and security community to describe the climate-security relationship (CNA Corporation, 2007). The term was coined by a group of retired U.S. military officers to convey to a broader policy audience the potential for climate change to drive instability in fragile regions of the world. It effectively frames climate change as an accelerant that adds to other threats and makes every conflict more dangerous (Goodman, 2024).

This concept has been widely adopted by international organizations, including the United Nations (UN) Security Council and the UN Secretary-General, who have recognized climate change as a threat multiplier in multiple resolutions



Table 1

Operationalization of the HECS Framework for the Lebanese Case

HECS dimension	Definition	Operationalization in Lebanon	Key indicators and data sources
Vulnerability	Disruptions to patterns of daily life from the perspective of the marginalized	Water insecurity, energy poverty, waste-related health risks, food insecurity experienced by poor Lebanese and Syrian refugees	ARK & UNDP Perception Surveys (2017–2024); World Bank COED (2024); UNHCR vulnerability assessments
Resilience	Lack of vulnerability due to structural factors and elite decision-making	Private coping mechanisms (generators, solar panels, private water tanks) available to wealthier households; absence of public safety nets for refugees and poor Lebanese	Household energy access data; legal status restrictions on refugees; HDI trends (United Nations Development Programme [UNDP], 2024);
Structures	Political/economic systems, government structures, and policy choices that shape how communities experience climate shocks	Confessional power-sharing system; corruption and patronage networks; decades of infrastructure underinvestment; absence of regulatory frameworks for water, energy, and waste	Corruption Perceptions Index (TI, 2025); World Bank Governance Indicators; EDL service data; non-revenue water statistics

Note. Adapted from the Human–Environmental–Climate Security (HECS) framework developed by Daoudy (2021). Lebanon-specific indicators were compiled from ARK and UNDP surveys, World Bank reports, UNHCR assessments, Transparency International data, and national statistics. HECS = Human–Environmental–Climate Security; ARK = Analysis, Research, and Knowledge; UNDP = United Nations Development Programme; HDI = Human Development Index; TI = Transparency International; EDL = Électricité du Liban.

and reports (United Nations, 2009). The framing is powerful because it correctly identifies that climate change does not directly or inevitably cause violent conflict. Instead, its interactions with other social, political, and economic factors can exacerbate drivers of conflict and fragility, and negatively affect peace, stability, and security.

However, while the threat multiplier concept is a powerful communication tool, some scholars have argued that it may be analytically insufficient. Critics contend that climate change “doesn’t just multiply threats, it also creates new ones” (Tarif, 2022). This critique rests on the idea of non-linearity and tipping points, in which an ecosystem, such as the Amazon rainforest or a coastal aquifer, is

pushed beyond a critical threshold and undergoes a fundamental transformation. Such an event is not merely a multiplication of an existing threat; it is a fundamental transformation of the system, a new dynamic that creates qualitatively different challenges. In the Arab region, this distinction is critical. Climate change does not just mean less water; it would multiply existing scarcity. It could mean the permanent salinization of a coastal aquifer due to sea-level rise, the irreversible desertification of a region’s agricultural heartland, or the collapse of traditional livelihood systems. These transformations create new dynamics that were not previously present and require fundamentally different adaptation strategies (Tarif, 2022).



The threat multiplier hypothesis has also been criticized for artificially separating climate threats from complex political processes and lacking analytical rigor and precision (Daoudy, 2021). By treating climate as an external factor that multiplies pre-existing threats, the framework can obscure the ways in which climate change and political processes are deeply intertwined and mutually constitutive.

Despite these critiques, syntheses of the literature have identified four primary indirect pathways through which climate change affects conflict risk, providing a useful heuristic for empirical analysis (Mach et al., 2019; van Baalen & Mobjörk, 2017):

1. **Economic shocks and livelihood disruption:** Climate-related stressors (higher ambient temperatures, heat stress) and shocks (floods, storms, droughts) damage critical infrastructure, disrupt markets, reduce agricultural productivity, and decrease economic output. These economic shocks can weaken state capacity by reducing tax revenues, exacerbate inequality by disproportionately affecting the poor, and fuel grievances against the government for failing to provide protection and support.
2. **Agricultural decline and food insecurity:** This is one of the most frequently cited pathways in the literature. Climate change leads to widespread crop failure and livestock losses due to drought, changing precipitation patterns, extreme heat, and pest outbreaks. The collapse of rural livelihoods is a primary driver of both economic grievance and human mobility, as farming families lose their primary source of income and food security (Kelley et al., 2015).
3. **Natural resource competition:** Climate change directly exacerbates the scarcity of key

resources, particularly water and arable land. This can intensify competition between different livelihood groups (farmers and pastoralists, upstream and downstream water users). This competition, when it maps onto pre-existing ethnic, religious, or political cleavages and is exploited by political entrepreneurs, can escalate into violent conflict.

4. **Migration and mobility:** This pathway is a critical component of the nexus, acting as a mediating factor between climate stress and conflict. Here, climate-driven agricultural decline, water scarcity, or sea-level rise force populations to move. This mass movement of people then becomes the proximate driver of conflict in the destination location due to new competition over resources, pressure on services and infrastructure, or the exacerbation of pre-existing social tensions between host and newcomer communities (Abel et al., 2019).

It is important to emphasize that these pathways do not operate in isolation; they interact in complex ways. Moreover, as noted earlier, their activation and intensity are highly dependent on contextual factors, particularly governance and adaptive capacity. In Lebanon, as this paper will demonstrate, all four pathways are active, but their manifestation is overwhelmingly shaped by the country's enduring governance constraints.

3. Methodology

3.1. Research Design

This study employs a qualitative single-case design utilizing theory-guided process tracing (Beach & Pedersen, 2019; Collier, 2011). Lebanon is selected as a critical case (Yin, 2018)



because it simultaneously exhibits all four climate-conflict pathways identified in the literature. Its governance challenges offer analytical leverage to test the HECS framework's core proposition that political structures serve as the primary mediating variable in the climate-security nexus. The case is temporally bounded (2019–2025) and focused on water, energy, and solid waste. Historical context is incorporated as necessary to trace the evolution of manufactured scarcity.

3. 2. Analytical Framework and Process Tracing Steps

The analysis follows three process-tracing steps aligned with the HECS framework:

1. Map vulnerability: Document environmental stresses experienced by vulnerable populations, including poor Lebanese and Syrian refugees, across the three resource sectors. This step utilizes quantitative indicators from international reports and longitudinal survey data.
 2. Assess resilience and its absence: Examine how structural factors, including wealth inequality, legal status restrictions, and availability of private coping mechanisms, unevenly distribute adaptive capacity across the population.
 3. Trace structures: Analyze how governance structures and policy choices have contributed to scarcity and vulnerability. This analysis draws on documentary evidence from government records, World Bank assessments, and institutional analyses.
1. International organization reports: World Bank Country Climate and Development Report (CCDR, 2024), Cost of Environmental Degradation assessment (COED, 2024), Rapid Damage and Needs Assessment (RDNA, 2025); UNDP Human Development Reports; UNHCR operational data and situation reports (2025a, 2025b).
 2. Longitudinal survey data: ARK and UNDP Regular Perception Surveys on Social Tensions (Waves 1–18, 2017–2024), which provide consistent tracking of Lebanese-Syrian inter-communal perceptions over time. Government statistical data: Central Administration of Statistics Consumer Price Index data; Lebanon's First Biennial Transparency Report on greenhouse gas emissions (UNDP, 2024).
 3. Peer-reviewed literature: Academic publications on the climate-security nexus, political ecology, and the HECS framework, identified through systematic searches of scholarly databases and academic journals.
 4. Policy documents and grey literature: Lebanon Response Plan (LRP), Gebara (2025) policy report on Syrian refugee returns, and Transparency International Corruption Perceptions Index

3. 3. Data Sources

The study relies on the following categories of secondary data:

3. 4. Verification and Triangulation

To strengthen inferential validity, triangulation is employed across data sources by cross-referencing quantitative indicators (e.g., environmental degradation costs, inflation rates, refugee numbers) with qualitative perception data (survey results on social tensions) and policy analysis (governance assessments). When claims rely on a single source,



this is explicitly noted, and confidence levels are qualified accordingly. The reliance on secondary data is acknowledged as a limitation (see Section VI-F, Limitations).

4. The Lebanese Context: Anatomy of a Compounded Crisis

4.1. Economic Collapse and State Failure

By 2024, Lebanon had become a prominent example of state instability and economic crisis. The country experienced one of the most severe and prolonged economic contractions recorded globally since the mid-19th century (World Bank Group, 2024). Between 2018 and 2023, Lebanon's GDP contracted by approximately 40%, erasing decades of economic progress and pushing the majority of the population into poverty (World Bank Group, 2024). This crisis was not a sudden event but the result of decades of unsustainable policies and political system with varying levels of administrative effectiveness.

The proximate trigger for the crisis was the collapse of a Ponzi-like financial system in which Lebanese banks had been offering high interest rates to attract deposits, which were then used to finance government debt and help maintain a currency peg at a high exchange rate. When this system became unsustainable in 2019, the banks imposed informal capital controls, effectively confiscating depositors' savings. The government defaulted on its sovereign debt in March 2020, the first default in the country's history. The Lebanese pound, which had been pegged to the U.S. dollar at 1,507 pounds since 1997, lost over 98% of its value on the parallel market, reaching over 150,000 pounds to the dollar by 2024.

The human consequences of this collapse were severe. Annual inflation, measured by the Consumer Price Index, reached 171.2% in 2022 and peaked at 221.3% in 2023, meeting the technical criteria for hyperinflation (Central Administration of Statistics, 2024). Although inflation moderated to 45.24% in 2024, it remained at levels that rendered basic goods unaffordable for most of the population. The World Bank estimated that by 2023, over 80% of the Lebanese population lived below the poverty line, compared to less than 30% in 2019 (World Bank Group, 2024).

This economic crisis was the consequence of governance challenges. Lebanon's political system, based on a confessional power-sharing arrangement established by the 1943 National agreement and modified by the 1989 Taif Agreement, allocates political power among the country's 18 recognized religious sects. Although designed to prevent domination by any single sect and maintain fragile inter-communal peace, the system has determined how political power is shared within the state institutions. Political leaders use state resources to reward their sectarian constituencies, creating patron-client networks that undermine meritocracy and accountability (Salti & Chaaban, 2010).

The severity of this governance issue is evident in Lebanon's performance on international governance indicators. In the 2024 Corruption Perceptions Index published by Transparency International, Lebanon scored 22 out of 100, ranking 154th out of 180 countries (Transparency International, 2025). This score declined by 2 points from the previous year, continuing a downward trend. Lebanon performed low on specific governance dimensions measured by the World Bank's Worldwide Governance Indicators, ranking in the bottom 10th percentile globally for the rule of law and government effectiveness.



The effects of these governance challenges extended to all dimensions of state capacity. The electricity sector, managed by the state utility Électricité du Liban (EDL), collapsed entirely, with the national grid providing at most 2–3 hours of power per day by 2023 and often none at all (World Bank Group, 2024, p. 37). The water sector fared little better, with aging infrastructure, lack of maintenance, and the absence of cost-recovery mechanisms leading to over 50% of water being lost through leaky pipes—classified as non-revenue water (World Bank, 2024, pp. 22–24). The waste management sector, which had lacked a national plan for decades, descended into crisis, with garbage accumulating in streets and being dumped in rivers and along the coast (World Bank, 2024).

The human development consequences of this multi-dimensional crisis were significant. Lebanon's Human Development Index (HDI) score declined from 0.744 in 2020, when it ranked 93rd globally, to 109th place in 2023 (UNDP, 2024).

4.2. Environmental Degradation: The Hidden Crisis

While economic and political crises dominated headlines, Lebanon simultaneously experienced a severe and accelerating environmental crisis that received considerably less attention but was equally consequential for the country's future. The World Bank's Cost of Environmental Degradation (COED) assessment for Lebanon quantifies this crisis. In 2023, the total cost of environmental degradation was estimated at 10.9% of GDP, approximately US\$2.35 billion (World Bank, 2024). This represents a significant increase from 4.4% of GDP in 2018 and 3.2% in 2005, indicating rapid deterioration of environmental conditions amid declining economic and institutional capacity to address them.

The breakdown of environmental degradation costs by sector reveals the breadth of the crisis. Water pollution accounted for 4.0% of GDP (approximately US\$722.5 million), driven by untreated wastewater discharges into rivers and coastal waters due to the absence of functional wastewater treatment plants. Air pollution contributed 3.5% of GDP (approximately US\$632.3 million), with the primary sources being vehicle emissions, diesel generators (which proliferated as the electricity grid failed), and industrial emissions in the absence of environmental regulation. Solid waste mismanagement accounted for 1.5% of GDP (approximately US\$273.3 million), reflecting the public health and environmental costs of improper disposal. Land degradation, deforestation, and quarrying contributed 1.4% of GDP (approximately US\$241.2 million), while coastal zone degradation added another 0.5% of GDP (approximately US\$81.7 million) (World Bank, 2024).

The COED assessment estimated that environmental degradation associated with the additional population from Syrian displacement amounted to approximately US\$590 million, representing about 30% of the total environmental degradation cost in 2023 (World Bank, 2024). It is important to clarify that this does not imply that "refugees cause 30% of pollution." Instead, a counterfactual modeling exercise indicates that the incremental population linked to Syrian displacement accounts for roughly 30% of the 2023 COED under Lebanon's current governance and infrastructure conditions. The causality stems not from the presence of refugees per se but from the limitations of the Lebanese state to expand infrastructure and services to accommodate the increase in population. In a well-governed state with functional infrastructure, absorbing such a



population increase would require investment in expanded water treatment, waste management, and other services. In Lebanon, the limited investment in public services has strained systems as the population grows.

Lebanon's greenhouse gas emissions profile further illustrates the environmental crisis. According to the country's First Biennial Transparency Report (BTR) and Long-Term Low Emission Development Strategy (LT-LEDS), total GHG emissions (excluding Land Use, Land Use Change and Forestry - LULUCF) have nearly tripled since 1994 (UNDP, 2024). The waste sector (solid waste and wastewater) accounted for 6.6% of total GHG emissions in 2022, equivalent to approximately 1,347 Gg CO₂-equivalent, primarily from landfilling and wastewater treatment (or the lack thereof). The energy sector, dominated by diesel generators and inefficient power plants, was the largest source of emissions.

Urbanization patterns have intensified environmental vulnerabilities. Approximately 89% of Lebanon's population resides in urban areas, predominantly along the coast (UNDP, 2024). This concentration heightens vulnerability to sea-level rise, coastal flooding, and storm surges, while also increasing exposure to air pollution and heat stress. The largely unplanned nature of this urbanization, characterized by weak building codes and extensive informal construction, further exacerbates vulnerability to climate hazards.

The forestry sector, which could function as a carbon sink and provide essential ecosystem services, has experienced severe degradation. Rising fuel prices and energy insecurity have driven illegal logging for firewood, while increased temperatures and altered precipitation patterns

have elevated wildfire risk, accelerating forest degradation and soil erosion (UNDP, 2024). Lebanon has lost a substantial portion of its forest cover over recent decades, diminishing the country's natural resilience to climate change.

4.3. Climate Change Projections: A Vulnerable Future

Lebanon's environmental crisis unfolds amid accelerating climate change impacts. The World Bank's Country Climate and Development Report (CCDR) projects a temperature increase of 1.7 to 2.2 degrees Celsius by 2040 relative to the 1986-2005 baseline, with warming accelerating thereafter (World Bank Group, 2024). This warming rate aligns with regional trends indicating that the MENA region is warming nearly twice as fast as the global average.

The warming's impact on water resources is especially concerning for Lebanon, a country already facing water stress. The CCDR projects that water availability during the critical dry season (April to September) could decrease by up to 50% by 2040 under high-emissions scenarios (World Bank Group, 2024). Annual water availability is expected to decline by approximately 9% by 2040, accompanied by significant interannual variability. These projections result from reduced precipitation, increased evapotranspiration due to higher temperatures, and diminished mountain snowpack.

The reduction in snowpack is critical for Lebanon's water security. The mountain ranges have historically functioned as natural water towers, with winter snowfall accumulating and gradually melting during spring and summer, thus providing a steady water supply during the dry season. Climate



projections indicate a substantial decrease in snow days, from approximately 110 days per year to between 101 and 104 days by 2030, and further to between 60 and 72 days by 2050 (World Bank Group, 2024). This decline in natural water storage capacity will increase reliance on artificial storage methods, such as dams and reservoirs, at a time when investment in such infrastructure is limited.

Additional climate impacts include increased frequency and intensity of heat waves, affecting public health, agricultural productivity, and energy demand; altered precipitation patterns characterized by greater variability and a higher proportion of intense events, thereby elevating flood risk; and sea-level rise, which threatens coastal infrastructure and may cause saltwater intrusion into coastal aquifers.

The World Bank's analysis highlights that Lebanon's vulnerability to climate impacts stems less from the magnitude of physical changes and more from the country's severely limited adaptive capacity (World Bank Group, 2024). The CCDR presents two scenarios: a Muddling Through scenario, in which Lebanon persists on its current path of governance challenges and economic stagnation, and a Recovery scenario, where comprehensive reforms restore macroeconomic stability, rebuild institutions, and promote climate adaptation investments. Under the Muddling Through scenario, climate change economic costs could reach 14% of GDP by 2040. Conversely, the Recovery scenario could reduce these costs by 41%, to approximately 8% of GDP (World Bank Group, 2024). This analysis supports the paper's central argument that the climate-conflict nexus in Lebanon is primarily influenced by governance and adaptive capacity.

These projections align with broader regional patterns documented in the State of the Climate in the Arab Region report, which identifies statistically significant warming trends across all four Arab subregions over recent decades. The Arab region as a whole is warming at approximately 0.43 °C per decade between 1991 and 2024 (WMO, 2025).

4. 4. The Refugee Crisis: Demographic Pressure and Resource Competition

Lebanon faces a demographic crisis of unprecedented scale, compounding its economic, governance, and environmental challenges. The country hosts the highest number of refugees per capita worldwide, hence creating challenges for public services and the social infrastructure (United Nations High Commissioner for Refugees [UNHCR], 2025b).

The majority of refugees are Syrians who fled the civil war beginning in 2011. By 2024, Lebanon hosted approximately 1.5 million displaced Syrians, based on estimates from humanitarian organizations and the Lebanese government (UNHCR, 2025a; The United Nations in Lebanon, 2024). This total comprises about 800,000 Syrians registered with UNHCR and an estimated 700,000 unregistered individuals. Since 2015, the Lebanese government has prohibited UNHCR from registering new Syrian refugees, resulting in a substantial population with precarious legal status due to lack of documentation.

In addition to Syrians, Lebanon hosts approximately 180,000 to 200,000 Palestine Refugees in Lebanon (PRL), descendants of Palestinians. These individuals primarily reside in 12 official refugee camps and numerous informal settlements, facing significant restrictions on their rights to work and own property. Lebanon also accommodates approximately 23,000 Palestinian



refugees from Syria (PRS), who fled Syria after 2011 and experience even more precarious legal status (UNHCR, 2025a).

To put these numbers in perspective, Lebanon's pre-crisis population was approximately 4.5 million Lebanese citizens. The addition of 1.5 million Syrian refugees represents a population increase of approximately 33% in less than a decade. No country in modern history has absorbed such a large refugee population relative to its size in such a short period. For comparison, this would be equivalent to the United States absorbing over 100 million refugees in a decade.

The spatial distribution of refugees is highly uneven, with the largest concentrations in Lebanon's most environmentally vulnerable regions. The Bekaa Valley, the country's agricultural heartland, hosts the greatest number of Syrian refugees. The North governorate, especially the Akkar region, also accommodates a substantial refugee population. These regions were among the poorest and most marginalized prior to the Syrian crisis, characterized by limited infrastructure and high environmental vulnerability (World Bank Group, 2024).

Syrian refugees in Lebanon experience extremely precarious living conditions. The Lebanese government has declined to establish formal refugee camps, fearing permanence similar to Palestinian camps. Consequently, Syrian refugees reside in informal settlements, often in agricultural areas, substandard rental housing, or collective shelters. Many of these settlements lack access to essential services such as water, sanitation, electricity, and waste collection. Refugees face severe legal restrictions, with many lacking valid residency permits due to burdensome renewal requirements and fees. This precarious

legal status restricts their ability to work legally, access services, and move freely, resulting in enforced vulnerability.

The refugee influx has significantly impacted Lebanon's environment and natural resources; however, this impact must be understood within the context of state failure rather than as an inherent consequence of refugee presence. The World Bank's COED assessment estimates that incremental environmental degradation attributable to the Syrian displaced population amounts to approximately US\$590 million, representing 30% of total environmental degradation costs (World Bank, 2024). This impact is concentrated in several key areas:

1. **Water resources:** The additional population has increased demand for water in a country already experiencing water stress. However, the problem is not absolute scarcity but infrastructure shortcomings. Lebanon receives sufficient precipitation to meet the needs of its population and the refugee population, but up to 50% of water is lost through leaky pipes; there is insufficient storage capacity, and there is an inadequate system for managing water demand or allocating water efficiently.
2. **Wastewater:** The refugee population contributes additional wastewater; however, Lebanon's wastewater treatment infrastructure was grossly inadequate prior to the Syrian crisis. The majority of wastewater from both Lebanese and Syrian populations is discharged untreated into rivers and the sea.
3. **Solid waste:** Refugees produce additional solid waste; however, Lebanon's waste



management system was already struggling before 2011. The lack of a national waste management plan, insufficient landfill capacity, and the collapse of municipal services have caused waste accumulation independent of the refugee population.

4. **Energy:** The refugee population has increased energy demand, but the electricity crisis results from decades of underinvestment, governance issues, and operational difficulties in the state's electricity company, despite the refugee consumption.

In all cases, the environmental impact associated with the refugee population primarily reflects the state's issues in expanding infrastructure and services to accommodate population growth, rather than an inherent consequence of refugee presence.

5. The Manifestations of the Nexus: Water, Energy, and Social Tension

5. 1. The Water-Energy-Conflict Trap

The climate-conflict-displacement nexus in Lebanon manifested most clearly in the period before the collapse of the Assad Regime and the election of President Joseph Aoun and the formation of the PM Nawaf Salam Government through the deterioration of public services and the erosion of social cohesion between Lebanese host communities and Syrian refugees. Longitudinal data from the Regular Perception Surveys on Social Tensions, conducted by ARK and UNDP between 2017 and 2024, provide detailed empirical evidence of how resource scarcity and service degradation fueled inter-communal tension (ARK & UNDP, 2024).

The water sector emerged as a primary site of conflict. Public satisfaction with water services declined sharply, with 51.3% of households rating

these services as “poor” or “very poor” by early 2023 (ARK & UNDP, 2023). This dissatisfaction was geographically concentrated in regions with high refugee populations, notably the Bekaa Valley and the North. The perception that refugees competed for scarce water resources significantly contributed to social tensions, despite the underlying cause being infrastructure constraints rather than absolute water scarcity or refugee consumption.

The collapse of the state electricity sector generated a complex dynamic. As Électricité du Liban's service deteriorated to complete failure by 2022–2023, Lebanese households and businesses increasingly relied on private diesel generators and solar energy. Although the transition to solar energy represented climate adaptation and a shift toward renewable sources, it also became a new source of conflict in urban areas. In densely populated urban environments with limited rooftop space, competition for sunlight access for solar panels emerged as a significant issue. By 2024, 26.7% of urban residents identified solar access as a contributor to local tensions (ARK & UNDP, 2024).

The solar tension phenomenon exemplifies manufactured scarcity. Solar energy is not inherently scarce, as Lebanon receives abundant sunlight. However, the absence of a state-led energy strategy led to a privatized, disorderly transition to solar energy, generating new forms of competition and conflict. A coordinated state response that invests in utility-scale solar energy and maintains a functional electricity grid could have prevented this dynamic.

5. 2. Waste Management as Environmental and Social Crisis

The solid waste sector represents a critical intersection of environmental degradation and



social tension. Lebanon's waste management crisis predates the Syrian refugee influx; a coherent national waste management plan is yet to be established. Landfilling and open dumping have been the dominant disposal methods, accounting for 77% of waste before the 2019 economic crisis (World Bank, 2024). This sector was already the largest source of methane emissions in the country, a potent greenhouse gas.

The economic crisis and state collapse significantly exacerbated the waste crisis. Municipal waste collection services, previously irregular and inadequate, ceased entirely in many areas due to municipalities lacking funds to pay contractors. Consequently, garbage accumulated in streets, was burned in open pits, or dumped in rivers and along roadsides. These conditions resulted in severe public health and environmental consequences, including increased vector-borne diseases, air pollution from waste burning, and contamination of water resources.

Within this context, Syrian refugee informal settlements were scapegoated for the waste crisis. Survey data from 2023-2024 indicated that 72.3% of Lebanese respondents attributed environmental degradation to temporary settlements, with waste accumulation cited most frequently (ARK & UNDP, 2024). Although informal settlements often lacked waste collection services, leading to waste accumulation in and around these areas, the primary factor was the limited provision of waste collection facilities to these settlements, in addition to broader obstacles in delivering waste management services to the population.

Connecting waste management issues to refugee communities helped shift public discourse away from systemic governance constraints. The

narrative contributed to the amplification of anti-refugee sentiment and favored the return-oriented policies aimed at refugees, regardless of whether conditions were safe for return to Syria.

5. 3. Inter-communal Perceptions and the Narrative of Competition

The strain on resources and services contributed to a broader narrative of zero-sum competition between Lebanese and Syrian populations. By late 2023, 47.7% of Lebanese respondents in the Regular Perception Surveys characterized relations with Syrians as negative, marking a significant increase from earlier survey waves (ARK & UNDP, 2024). This negative perception was explicitly associated with the belief that refugees were overburdening collapsing infrastructure and competing for scarce resources and employment opportunities.

The spatial distribution of negative perceptions revealed that the highest levels of tension occurred in areas with the largest refugee populations and the weakest infrastructure, notably the Bekaa Valley and Akkar in the North. By April 2024 (Wave 18 of the surveys), competition over services was identified as a source of tension by 63% of respondents in Mount Lebanon (an increase of 17 percentage points from the previous wave), 29% in the Bekaa (an increase of 8 percentage points), 33% in Nabatieh, and 25% in the North (ARK & UNDP, 2024).

These perceptions were shaped by genuine, severe material pressures (water shortages, electricity blackouts, waste accumulation, and economic hardship). However, attributing these problems primarily to the presence of refugees rather than to structural governance shortcomings can be acknowledged as part of a broader political narrative. Lebanese politicians across the sectarian



spectrum have found to highlight the role of Syria and refugee communities, while deeper issues like institutional challenges remain present. This scapegoating served to deflect public anger away from the political elite and toward a vulnerable population with no political voice.

The concept of solastalgia (the distress caused by environmental change in one's home environment) provides a useful lens for understanding the psychological dimension of these tensions (Albrecht et al., 2007). Lebanese host communities, particularly in areas that had absorbed large refugee populations, experienced visible changes in their landscapes and environments: informal settlements appearing in agricultural areas, increased population density, and environmental degradation. These changes, occurring in the context of economic collapse and the loss of familiar ways of life, generated a sense of loss and alienation that was then channeled into resentment toward refugees.

5. 4. The Role of Humanitarian Aid in Social Dynamics

The international humanitarian response to the Syrian refugee crisis in Lebanon, while crucial for refugee survival, also influenced social dynamics in complex ways. The concept of “alienation” in humanitarianism, as defined by Estella Carpi, elucidates how aid interventions can unintentionally intensify social tensions (Carpi, 2025). Carpi contends that the organizational amnesia and bunkerization of international aid workers, their physical and social detachment from local communities and lack of historical and political awareness, can result in interventions perceived as bypassing host communities and deepening social divisions.

In Lebanon, the perception that international aid disproportionately benefited Syrian refugees while Lebanese communities endured economic collapse generated significant resentment. This perception was partially justified. International humanitarian funding was explicitly designated for refugees and excluded Lebanese citizens, despite a sharp increase in Lebanese poverty rates. Although this distinction aligned with humanitarian law and donor policies—recognizing refugees as a specific vulnerable group requiring international protection—it produced a politically volatile dynamic in a context where Lebanese and Syrians frequently lived side-by-side under comparable poverty conditions.

The Lebanon Crisis Response Plan (LCRP), later renamed the Lebanon Response Plan (LRP), sought to mitigate this issue by implementing a stabilization strategy that provided support to Lebanese host communities alongside refugee aid. Nevertheless, the assistance allocated to Lebanese communities remained insufficient given the scale of the economic crisis, and perceptions of aid that was disproportionately favoring refugees persisted.

This dynamic exemplifies a broader challenge within the humanitarian system: delivering protection and assistance to refugees without intensifying tensions with host communities, especially when host populations face severe economic and environmental stress. The Lebanese case indicates that, in contexts of state limitations and economic crisis, the conventional humanitarian distinction between refugees and citizens warrants reconsideration in favor of integrated approaches addressing vulnerability irrespective of legal status.



5. 5. The Fall of the Assad Regime and Political Reset in Lebanon

The dynamics of the climate-conflict-displacement nexus in Lebanon shifted significantly following two interconnected geopolitical events in late 2024 and early 2025. On December 8, 2024, the Assad regime in Syria collapsed after 13 years of civil war, fundamentally altering the political landscape of the Levant. Subsequently, on January 9, 2025, Joseph Aoun was elected President of Lebanon, ending a presidential vacuum that had persisted for over two years and paralyzed the country's political system.

This analysis is necessarily preliminary. Political transitions in Syria and Lebanon were ongoing at the time of writing (early 2025), and the long-term trajectories of governance reform, refugee return, and security stabilization remain uncertain. Consequently, the observations below represent an early analytical assessment of an evolving situation, subject to revision as events develop.

The fall of the Assad regime removed the primary barrier to refugee return: fear of persecution by the Syrian government. For over a decade, Syrian refugees in Lebanon faced a difficult choice: remain in increasingly precarious and hostile conditions or return to Syria and risk arrest, torture, or forced conscription by the Assad regime. The regime's collapse theoretically enabled the possibility of safe return, generating expectations of a mass exodus of Syrian refugees from Lebanon to Syria.

The election of a new Lebanese president ended a political vacuum that had left the country without a functioning executive branch. The election of President Aoun raises hopes that Lebanon can begin to address its multiple crises and implement the reforms required to access international financial assistance.

5. 6. Complex Displacement Dynamics

Contrary to initial expectations of a linear mass repatriation process, the period following December 2024 exhibited complex, bidirectional population movements that resisted simple categorization. UNHCR data from December 8, 2024, to June 30, 2025, presents a nuanced overview (United Nations High Commissioner for Refugees [UNHCR], 2025b).

During this seven-month period, approximately 698,282 Syrians returned from neighboring countries to Syria, indicating a significant population movement. Of these, 199,204 originated from Lebanon, making it the second-largest source of returns after Turkey (UNHCR, 2025b). This figure represents about 13% of the estimated Syrian refugee population in Lebanon, indicating a substantial yet incomplete return.

Simultaneously with these returns, Lebanon experienced a new influx of Syrian arrivals. UNHCR recorded 108,032 new entries into Lebanon from Syria during the December 2024 to June 2025 period (UNHCR, 2025b). This influx was driven by transitional instability in Syria following the regime change. Although the Assad regime had fallen, Syria remained fragmented among multiple armed factions, with ongoing violence in some regions, political uncertainty, and concerns about revenge attacks and score-settling in the post-Assad period.

The net effect was a reduction of approximately 91,000 in Lebanon's Syrian population over seven months (199,000 returns minus 108,000 new arrivals), representing about 6% of the total Syrian population in Lebanon. This figure was considerably lower than the mass exodus anticipated by some and promised by Lebanese politicians.

Furthermore, the movement was more complex than a simple one-way return. UNHCR and other



organizations documented a phenomenon termed “go-and-see” visits, in which Syrian refugees crossed into Syria to assess conditions, inspect property, and evaluate the viability of return before returning to Lebanon (Gebara, 2025). Research indicates that approximately 60% of refugees preferred this approach prior to committing to permanent return (Gebara, 2025). This behavior resulted in a pattern of pendular migration, with individuals and families crossing the porous Lebanon-Syria border multiple times.

5. 7. Spatial Patterns and Environmental Implications

The spatial distribution of both returns and new arrivals significantly influenced the climate-conflict nexus. Returns from Lebanon were concentrated near the Lebanese border, especially in the Damascus countryside and Homs governorate, rather than being evenly spread across Syria. Many returnees resettled in areas severely damaged by the war, which lacked essential services and infrastructure. These return areas frequently exhibited harsh environmental conditions, including damaged water and sanitation systems, unexploded ordnance, and degraded agricultural land.

New arrivals in Lebanon primarily settled in the Bekaa Valley and the Akkar region in the North, areas previously identified as hotspots of environmental vulnerability and social tension (World Bank Group, 2024; UNHCR, 2025b). These regions already hosted the largest concentrations of Syrian refugees, possessed the weakest infrastructure, and experienced severe water stress and environmental degradation. The influx of additional populations, despite concurrent returns to Syria, increased pressure on already strained

resources and risked intensifying social tensions.

This spatial dynamic exemplifies cascading risks. Syrians fleeing renewed instability in post-Assad Syria settled in Lebanese areas highly vulnerable to climate change impacts, especially water scarcity and heat stress. Consequently, displacement created a shift from political insecurity in Syria to environmental and social tension in Lebanon, thereby generating compounded vulnerability.

5. 8. The Governance Challenge: Managing Mobility in a Fragile State

Complex population movements posed significant governance challenges for the new Lebanese government. The country faced constraints in institutional capacity to manage these flows effectively, including registering new arrivals, tracking returns, and coordinating with Syrian authorities and international organizations. Additionally, the porous Lebanon-Syria border, characterized by numerous unofficial crossing points, prevented full control or accurate monitoring of population movements.

The absence of a formal framework for managing returns was especially problematic. Unlike other refugee situations where voluntary repatriation is managed through Tripartite Agreements involving UNHCR, the host country, and the country of origin, no such agreement existed for Syrian returns from Lebanon (Gebara, 2025). As of November 2025, this lack of agreement left returns largely unmanaged, thereby increasing risks for returnees.

The new Lebanese government confronted a fundamental dilemma. While reducing the refugee population was politically essential and a key demand of the Lebanese public, the government had limited capacity to facilitate returns. Furthermore, it



lacked control over conditions in Syria, and the new Syrian regime was reluctant to support large-scale refugee returns.

5. 9. The Persistent Environmental Crisis

Although the political landscape shifted dramatically, the underlying environmental and infrastructural drivers of the climate-conflict nexus remained largely unchanged. The new government inherited a state apparatus characterized by institutional fragility, governance shortcomings, and serious financial strain. The electricity grid was non-functional, and the water infrastructure was degraded, causing substantial water losses due to leaky pipes. The waste management system remained in crisis, air pollution levels were severe, and the country's vulnerability to climate change impacts remained high.

The World Bank's Rapid Damage and Needs Assessment (RDNA), published in March 2025, quantified the additional environmental damage resulting from the military escalation between Israel and Hezbollah from late 2023 to November 2024 (World Bank, 2025). The conflict caused an estimated US\$512 million in direct environmental damage and US\$790 million in associated losses over 26 months. The total recovery and reconstruction needs for the environmental sector alone were estimated at US\$444 million (World Bank, 2025).

The conflict's most significant environmental impact affected natural resources and ecosystems, which sustained US\$501 million in damage. This included extensive harm to riverine ecosystems (US\$356 million), as well as forests, grasslands, and coastal areas (US\$130 million). The RDNA noted that although ecosystems possess some capacity for natural recovery, full restoration could

require up to a decade and substantial intervention and investment (World Bank, 2025).

A secondary yet equally critical impact was the emergence of a substantial debris and waste management crisis. The conflict generated an estimated 16.9 million tons of debris, including hazardous materials from destroyed infrastructure, solar panels, batteries, and other electronic waste (World Bank, 2025). Effective waste management was identified as a prerequisite for reconstruction efforts and posed a significant threat to public health and the environment if improperly handled. The estimated cost of debris removal and management was US\$105 million (World Bank, 2025).

This additional environmental damage compounded the pre-existing crisis, further degrading the country's natural capital and increasing vulnerability to climate change. Forest destruction reduced carbon sequestration capacity and heightened soil erosion and flood risk. Damage to water infrastructure exacerbated water scarcity. Moreover, the extensive debris challenge diverted resources and attention from other environmental priorities.

6. Manufactured Scarcity and the Primacy of Governance

6. 1. Applying the HECS Framework to Lebanon

The application of the Human-Environmental-Climate Security (HECS) framework to Lebanon demonstrates that the climate-conflict-displacement nexus is predominantly influenced by the "structures" dimension, encompassing political and economic systems, government institutions, and policy decisions that determine community experiences of environmental stress (Daoudy, 2021). Lebanon's crisis stems not from absolute scarcity or severe



climate impacts but from politically shaped resource limitations and systemic governance defeat.

Vulnerability: Among the most marginalized groups, including Syrian refugees and impoverished Lebanese communities, disruptions to daily life are severe and multifaceted. Water insecurity is acute, as many households lack reliable access to safe drinking water. Energy insecurity is widespread due to the collapse of the electricity grid, which compels reliance on costly and polluting diesel generators or prohibitively expensive solar systems. Food insecurity has escalated sharply, with the economic crisis rendering basic food items unaffordable for the majority. Air pollution from generators, waste burning, and vehicle emissions contributes to chronic health issues. These vulnerabilities manifest as immediate, daily challenges to survival and dignity.

Resilience: This dimension highlights disproportion in Lebanon's capacity to manage environmental stress. Many Lebanese mitigate vulnerabilities through private measures such as generators and solar systems for electricity, private water tanks and filtration, air conditioning to alleviate heat stress, and the ability to purchase or import food despite inflated prices. In contrast, Syrian refugees and impoverished Lebanese lack these protective buffers. Their diminished resilience results not from inherent traits but from structural factors including poverty, absence of legal status and rights for refugees, lack of social safety nets, and inadequate public service provision.

Structures: The root causes of Lebanon's crisis are evident at the level of structures, including governance, institutions, and elite decision-making. The environmental crisis primarily results from deliberate policy decisions and governance failures accumulated over decades, rather than climate

change or population pressure. The electricity crisis stems from mismanagement within Électricité du Liban, rather than insufficient generating capacity or fuel shortages. The water crisis arises from overlooked infrastructure and the absence of a coherent water management strategy, not from absolute water scarcity. Similarly, the waste crisis reflects the lack of a national waste management plan and the disintegration of municipal services, rather than the quantity of waste produced.

These governance setbacks are a result of Lebanon's confessional political system, which influences incentivizes and the organisation of public service provision. Political leaders have systematically undermined state institutions, appropriated public resources for private benefit, and obstructed reforms that could threaten their authority. Consequently, the state is unable to fulfil its fundamental responsibilities, including the provision of electricity, water, waste management, and environmental protection.

6. 2. Manufactured Scarcity: The Water-Energy Nexus

The concept of "manufactured scarcity," central to the HECS framework, provides valuable insight into the Lebanese context (Daoudy, 2021). Lebanon does not experience absolute resource scarcity. It receives sufficient rainfall to satisfy the needs of its population, including refugees, and possesses abundant solar energy potential. Additionally, Lebanon has the human capital and technical capacity to manage resources effectively. The scarcity that fuels social tension and conflict results from broader policy and institutional decisions.

The water sector exemplifies this issue. Lebanon receives an average of 8.6 billion cubic meters of



precipitation annually, while total water demand, including agricultural, domestic, and industrial uses, is approximately 1.5 billion cubic meters (World Bank, 2024). Thus, water availability exceeds demand. However, up to 50% of water is lost through leaky pipes before reaching consumers, known as non-revenue water. Additionally, storage capacity is insufficient to capture winter rainfall for use during dry summer months. The absence of effective water demand management, scarcity-based pricing, and efficient allocation among competing uses results in acute summer water scarcity despite overall abundance.

This scarcity is manufactured, stemming from policy decisions and governance deficiencies rather than natural limitations. A well-governed state would invest in repairing and upgrading water infrastructure, expanding storage capacity, implementing water demand management, and establishing a regulatory framework for water allocation. Lebanon's setbacks to address these issues reflects decades of underinvestment, kickbacks and inflated contracts in water infrastructure projects, and a limited prioritization to pursue necessary reforms.

The energy sector exhibits a comparable pattern. Lebanon possesses significant renewable energy potential, especially solar and wind, with approximately 300 days of sunshine annually, making it highly suitable for solar power. However, the state electricity company, *Électricité du Liban*, has faced long-standing governance and operational challenges shaped by the wider institutional context. Instead of investing in modern, efficient generation capacity and renewable energy, the government has depended on costly, short-term contracts for diesel-powered generation, frequently awarded to politically connected firms at inflated

prices. Consequently, the electricity sector is environmentally harmful—due to reliance on fossil fuels—and financially unsustainable, operating at substantial losses that burden the state budget while failing to provide reliable service.

The collapse of state electricity provision has precipitated a disorganized privatization, prompting households and businesses to invest in private diesel generators and, more recently, solar panels. Although this adaptation has facilitated significant solar energy adoption, it has also generated new forms of inequality and conflict. In densely populated urban areas, competition for rooftop space to install solar panels has emerged as a novel source of tension.

This dynamic illustrates how governance setbacks transform a potentially positive development (solar energy adoption) into a source of public tension. A coordinated state-led energy transition that invested in utility-scale solar and wind generation, maintained a functional distribution grid, and ensured equitable access could have avoided these problems. Instead, the absence of state capacity has led to an inconsistent energy system that can create tension.

6. 3. The Refugee Scapegoating Dynamic

Framing environmental problems as primarily caused by refugee presence constitutes a politically constructed narrative that diverts attention from government-related factors. Empirical evidence demonstrates that Lebanon's environmental crisis predates the Syrian refugee influx and is mainly driven by state errors rather than population pressure. Environmental degradation was accelerating before 2011 and has continued to worsen due to the economic crisis and the breakdown of state institutions, rather than refugee presence itself.



However, the narrative that refugees are the primary cause of environmental degradation has been politically useful for some Lebanese political elites. It provides a convenient scapegoat for problems that are the result of their own governance issues and administrative deficiencies. It channels public anger away from the political elite and toward a vulnerable population with no political voice or ability to defend itself. It justifies policies aimed at refugees to return to Syria, regardless of whether conditions are safe for return.

This scapegoating dynamic is not unique to Lebanon but reflects a broader pattern in refugee-hosting contexts globally. Research on the politics of refugee hosting documents how host country governments frequently portray refugees as environmental and economic pressures, despite evidence indicating that refugees can have positive economic impacts and that environmental degradation is mainly driven by other factors (Betts & Collier, 2017). In Lebanon, this framing has been especially pronounced, contributing to a significant deterioration in social cohesion and an increase in anti-refugee violence and discrimination.

The reality, as documented in the World Bank's COED assessment, is more complex. The incremental environmental degradation linked to the Syrian displaced population, estimated at US\$590 million or 30% of total environmental degradation, does not result from refugees being inherently more polluting or resource-intensive than Lebanese citizens. Instead, it reflects the gaps in the state's provisions to expand infrastructure and services to accommodate the population increase. In a counterfactual scenario where Lebanon had invested in expanded water treatment, waste management, and other services for the refugee

population, the incremental environmental impact would have been minimal. Thus, the high environmental cost arises from integrating a large population into an inadequate system rather than from refugee presence itself.

6. 4. The Primacy of Political Variables

Geopolitical changes in Syria and Lebanon highlight the dominant role of political variables in shaping the climate-conflict-displacement nexus. The most significant shift in displacement during the study period resulted from a geopolitical event, the fall of the Assad regime, rather than a climate or environmental event. This political shock immediately changed the situation for hundreds of thousands of Syrian refugees, creating the possibility of return that had been closed for more than a decade.

The primacy of political variables does not imply that environmental factors are insignificant. Climate change generates chronic background stress via water scarcity, heat stress, and other impacts. These environmental stresses intensify social tensions and complicate governance. Nevertheless, the political context—including governance quality, conflict presence, and political institutions—remains the primary factor determining whether environmental stress leads to social conflict and displacement.

This finding aligns with the broader literature on the climate-security nexus, which consistently identifies political and institutional factors as the primary mediators of climate impacts (Mach et al., 2019; Buhaug, 2015). It indicates that addressing the climate-conflict nexus requires prioritizing governance strengthening, institutional capacity building, and political economy considerations in



resource management, rather than focusing solely on climate mitigation or adaptation.

6. 5. The Humanitarian Dilemma: Aid, Alienation, and Social Cohesion

The Lebanese case highlights a fundamental dilemma in humanitarian response: how to provide protection and assistance to refugees without increasing tensions with host communities, especially when these communities face severe economic and environmental stress. The concept of “alienation” in humanitarianism (Carpi 2025) offers a useful framework for analyzing this issue.

In Lebanon, the perception that international aid disproportionately benefited Syrian refugees while Lebanese communities endured economic collapse generated significant resentment and fueled anti-refugee sentiment.

This perception stems from the structure of international humanitarian financing, which is explicitly designated for refugees and excludes citizens of host countries. From a humanitarian law perspective, this distinction is justified: refugees constitute a specific category of vulnerable individuals requiring international protection, and humanitarian aid targets their particular needs. However, in contexts such as Lebanon, where economic collapse has driven the majority of the population into poverty, this distinction generates a politically volatile dynamic.

The Lebanon Response Plan (LRP) sought to address this issue through a stabilization approach that provided support to Lebanese host communities alongside refugee assistance. Nevertheless, the assistance to Lebanese communities was insufficient relative to the magnitude of the economic crisis. Furthermore, delivering aid through international

organizations and NGOs instead of state institutions reinforces the perception that the international community was circumventing the Lebanese state.

This dynamic indicates the necessity for a fundamental rethinking of humanitarian response in contexts of state instability and economic crisis. Traditional approaches focusing solely on refugees may prove inadequate or counterproductive when host communities face comparable or greater vulnerabilities. More integrated strategies that address vulnerability irrespective of legal status, reinforce rather than bypass state institutions, and invest in public goods such as water infrastructure and waste management benefiting both refugees and host communities are likely required.

6. 6. Study Limitations

This study has several limitations. First, the analysis relies exclusively on secondary data sources, such as international reports, survey data, and published literature, rather than primary fieldwork. Although these sources are authoritative and triangulated, the absence of primary interviews with affected communities, government officials, and humanitarian actors necessitates inferring certain causal mechanisms rather than directly observing them. Future research incorporating primary qualitative data would strengthen the causal claims presented.

Second, the temporal proximity of the 2024–2025 political transitions complicates definitive inference. The fall of the Assad regime and the election of Lebanon’s new president occurred shortly before this study’s completion, leaving the long-term consequences for governance reform, refugee return, and environmental management uncertain.

Consequently, the analysis of this period should be regarded as a preliminary assessment.



Third, the single-case design, although allowing for in-depth analysis, inherently limits the generalizability of the findings. Although the HECS framework is intended for application across contexts, the specific mechanisms identified in Lebanon, particularly the role of the confessional system in producing manufactured scarcity, may not be directly transferable to other fragile states with different political configurations.

Comparative studies applying the HECS framework to other poly-crisis contexts, such as Yemen, Iraq, or Libya, would help evaluate the external validity of these findings.

Fourth, the quantitative data used in the analysis, including the World Bank's COED estimates, UNHCR refugee figures, and CPI data, contain inherent measurement uncertainties. In particular, the estimated number of unregistered Syrian refugees in Lebanon and the COED's counterfactual modeling of incremental environmental degradation from displacement depend on assumptions about baseline infrastructure capacity that may not accurately reflect actual conditions.

Despite these limitations, this study offers a systematic and theoretically grounded analysis of the climate-conflict-displacement nexus within a context of extreme fragility, contributing empirical evidence and policy-relevant insights to an expanding field of research.

7. Conclusion and Policy Implications

7. 1. Summary of Findings

This study examines the climate-conflict-displacement nexus in Lebanon using political ecology and the HECS framework. The analysis presents several key findings:

First, the nexus in Lebanon is primarily mediated by governance implications rather than absolute environmental scarcity or severe climate impacts. The environmental crisis results largely from decades of corruption, infrastructural neglect, and deliberate policy decisions by political elites, rather than direct effects of climate change or population pressure. This exemplifies “manufactured scarcity,” where manageable environmental challenges become acute crises due to political failure.

Second, the presence of Syrian refugees has increased environmental pressures; however, this increase results from the state's failure to expand infrastructure and services to accommodate population growth, rather than being an inherent consequence of refugee presence. The incremental environmental degradation linked to the refugee population, estimated at 30% of total environmental degradation costs, reflects the integration of a large population into a failing system. In a well-governed state with functional infrastructure, the environmental impact of hosting refugees would be significantly lower.

Third, the 2024-2025 political transitions, including the fall of the Assad regime and the election of a new Lebanese president, highlight the primacy of political factors in shaping displacement dynamics. These geopolitical shocks triggered complex, bi-directional population movements that defied straightforward predictions of mass repatriation. The emergence of “go-and-see” visits and pendular migration patterns illustrates the non-linear and context-dependent nature of displacement following political change.

Fourth, despite political changes, the underlying structural drivers of the climate-conflict nexus, namely infrastructure failure, resource



mismanagement, and governance deficits, remain largely unchanged. The new Lebanese government faces economic and institutional pressures, while the country remains vulnerable to the effects of climate change. Without fundamental governance reform and substantial infrastructure investment, Lebanon will remain trapped in a poly-crisis, where each environmental shock risks triggering renewed social conflict and displacement.

Fifth, the Lebanese case exemplifies cascading risks, where initial displacement from conflict exposes populations to additional climate-related vulnerabilities within host communities. Syrian refugees in Lebanon face compounded risks, including political insecurity in Syria, social tensions in Lebanon, and environmental vulnerabilities arising from inadequate infrastructure and services in refugee-concentrated areas.

7. 2. Policy Implications: Breaking the Feedback Loop

This research offers significant implications for policy responses addressing the climate-conflict-displacement nexus in Lebanon and comparable fragile states. Effective strategies should address the nexus's structural causes rather than merely its symptoms. The subsequent recommendations are organized by timeframe, aligned with HECS dimensions, and identify key actors and associated risks.

1. Short-Term Priorities (0–2 Years)

Integrated and Conflict-Sensitive Humanitarian Response

HECS dimension: Vulnerability

Implementing actors: International organizations (UNHCR, UNDP, WFP), INGOs, municipalities.

- Adopt an integrated vulnerability approach

that allocates support based on need regardless of legal status, addressing perceptions of disproportionate aid to refugees that fuel social tension.

- Deliver humanitarian assistance through local municipalities to build their capacity in waste, water, and service management instead of bypassing them.
- Prioritize investment in shared public goods such as water infrastructure, waste management systems, and public spaces that benefit refugees and host communities alike.
- Subject all programming to rigorous conflict sensitivity analysis, with ongoing monitoring of social dynamics.

Key risk: Donor fatigue and reduced humanitarian funding may limit response scale. Host government resistance to integrated approaches that blur refugee and citizen distinctions is another potential barrier.

2. Medium-Term Priorities (2–5 Years)

Structural Recovery of Public Services

HECS Dimension: Resilience / Structures

Implementing actors: Lebanese government (ministries of energy, water, environment), World Bank, bilateral donors, municipalities.

Water sector: Implement a national water strategy to reduce non-revenue water via infrastructure repair, expand storage, apply demand management and pricing reforms, and improve wastewater treatment. The World Bank's CCDR estimates these investments could cut water scarcity costs by up to 40% (World Bank Group, 2024).

Energy sector: Advance the energy transition with utility-scale solar and wind; rehabilitate



transmission and distribution grids; establish a regulatory framework for distributed generation (rooftop solar) ensuring access and equity; and reform Électricité du Liban.

Waste management: Implement a national integrated solid waste strategy with expanded collection services (including informal settlements), waste treatment and recycling infrastructure, closure of uncontrolled dumpsites, and sustainable financing.

Key risk: Governance reform is essential; without anti-corruption safeguards, infrastructure investments risk not being allocated effectively. Required investments (billions of dollars) exceed Lebanon's fiscal capacity and depend on international support conditioned on reform.

Climate Adaptation Integrated with Peacebuilding

HECS Dimension: Vulnerability / Resilience

Implementing actors: Municipalities, civil society, international climate funds, UNDP.

Develop participatory adaptation plans that unite Lebanese and Syrian communities to identify priorities and design solutions, thereby fostering social cohesion.

Pursue ecosystem restoration of forests, wetlands, and coastal areas as a shared project that provides employment and enhances environmental resilience.

Advocate reform of international climate finance to better serve fragile states through simplified access and increased use of grants..

Key risk: Trust-building needed for community participation may be difficult amid high social tension. Climate finance mechanisms still favor stable-state applicants.

3. Long-Term Priorities (5+ Years)

Governance Reform as the Foundation

HECS dimension: Structures

Implementing actors: Lebanese government, judiciary, parliament, international community (conditionality).

Strengthen anti-corruption measures by ensuring judicial independence, effective institutions, and accountability for looted state resources. International aid should be explicitly tied to measurable progress.

Rebuild capacity in ministries overseeing water, energy, environment, and municipal services via competitive salaries, technical training, and protection from political interference.

Promote decentralization and empower municipalities, the most trusted government level and often more effective in managing local environmental disputes (ARK & UNDP, 2024).

Key risk: Governance reform can face resistance from actors benefiting from the current system. The confessional power-sharing structure creates barriers, as reforms are seen as altering the sectarian power balance. International conditionality struggles when reforms threaten elite interests.

7.3. Final Reflections

The case of Lebanon from 2019 to 2025 demonstrates that the climate-conflict-displacement nexus is fundamentally political. While climate change induces physical stresses such as water scarcity, heat stress, and extreme weather, governance, institutions, and political decisions mediate their transformation into conflict and displacement. Lebanon, despite its relative abundance of natural resources and human capital, confronts an environmental crisis caused not only



by natural limitations but also by policy challenges and declining state capacity

The findings indicate that technical solutions such as improved water management, renewable energy, and climate adaptation, although necessary, remain insufficient without fundamental political will to implement reforms. The feedback loop between governance issues and environmental decline cannot be disrupted solely through technical interventions. However, the crisis is neither inevitable nor irreversible; political will, governance reform, and sustained investment could enable Lebanon to break this cycle and establish a more sustainable and peaceful future.

The climate-conflict-displacement nexus represents not an abstract academic concept but a lived reality for millions of Lebanese and Syrians. Addressing this nexus requires more than environmental intervention or humanitarian response; it involves considerations of justice, human rights, and peace.

Funding

This article did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

Author declare that they have no conflict of interest.

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