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Managing an Invisible Disaster: Developing a Comprehensive Heat Action Plan for Istanbul

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Abstract

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Extreme heat is a climate hazard threatening the future of urban life. However, due to its invisible nature, heat often remains peripheral in disaster management. This study examines how extreme heat is framed within Türkiye's national and Istanbul's municipal level disaster management and climate action frameworks. It analyzes a total of 15 documents through thematic content analysis to assess the extent to which heat is treated as a disaster risk requiring coordinated response within these frameworks. Findings reveal that while climate plans acknowledge heat as an urban health challenge, disaster management policies largely omit it or refer to it marginally, with little actionable protocols. This gap underscores the need for a dedicated Heat Action Plan for Istanbul. By identifying policy blind spots and drawing on international best practices, this study contributes to the emerging literature on urban heat governance.

Keywords: Climate change; extreme heat; disaster management; public health.

1. Introduction

Extreme heat is one of the most pressing climate threats of the 21st century. As global temperatures rise due to climate change, extreme heat events are becoming more frequent, intense, and longer (Campbell et al., 2018; Luber & McGeehin, 2008). Cities are particularly vulnerable to the impacts of extreme heat due to the Urban Heat Island (UHI) effect, where heat adsorption by built environments results in higher temperatures in urban settings compared to the surrounding rural areas (Mayrhuber et al., 2018; Stewart, 2019; Tuholske et al., 2021). In densely built cities where heat remains trapped in urban surfaces and lingers through the night, the lack of nighttime cooling leads to serious public health challenges (Stewart, 2019). Prolonged exposure to heat can lead to health issues ranging from sunburn, dehydration and heat exhaustion to life-threatening conditions such as heatstroke, cardiovascular stress, and respiratory complications (Bell et al., 2024; Campbell et al., 2018).

Despite the growing severity of the issue, extreme heat is still not widely perceived as a disaster hazard in either policy or public discourse, especially due to its invisible nature (Davis, 1997; Klinenberg, 2015). Unlike floods or earthquakes, which are associated with images of destroyed buildings, roads, and bridges; heat doesn't often cause visible destruction. A heatstroke killing an elderly resident alone at home or hospitalizing a construction employee working outdoors happens quietly, and without leaving much trace. Yet, the consequences of extreme heat can be just as deadly as any other major disaster.

In the U.S. heatwaves cause more deaths each year than all the other weather events combined (Davis, 1997; Stephens et al., 2024). In 2003, heatwaves in Europe claimed the lives of an approximate 70,000 people (Mitchell et al., 2019). In France alone, the death toll reached around 15,000, a figure comparable to the casualties from the one of the most devastating disasters in Türkiye: the 1999 Marmara earthquake. Furthermore, the threat is only intensifying, as heatwaves are becoming more frequent, prolonged, and severe under accelerating climate change. In recent years, heatwaves have continued to claim tens of thousands of more lives across Europe, with over 60,000 excess deaths recorded in 2022 and another 48,000 in 2023 (Gallo et al., 2024). The morbidity and mortality risks of extreme heat events are especially acute for vulnerable populations, including the elderly, young children, and people with existing health conditions (Mayrhuber et al., 2018).

In Istanbul, the largest metropolis in Türkiye with 16 million population, extreme heat is a growing challenge that's been under-researched. Having more than doubled its built area since 1970s, Istanbul is one of the most rapidly transforming cities in the Global South (Angel et al., 2012). Particularly, the rapid urban development and redevelopment processes, dating back to early 2000s, have led to significantly denser construction and shrinking green spaces (Baykara, 2023; Yazar et al., 2020, 2023). This intensification of UHI effect has amplified heat risks in Istanbul, especially for certain vulnerable demographics (Ögçe & Erdem Kaya, 2024; Sarı et al., 2025; Ünal et al., 2020; Zaeemdar & Baycan, 2017).

In recent years, Istanbul has experienced hotter days, higher nighttime temperatures and longer heatwaves (Erlat et al., 2021; Toros et al., 2017; Toros & Abbasnia, 2017; Unal et al., 2013). Climate projection studies suggest that Istanbul will see significant warming throughout the 21st century (Demircan et al., 2014; Ögçe & Erdem-Kaya, 2025; Sonuç et al., 2023; Tomrukcu & Ashrafian, 2024). These changes signal that the city will face escalating risks associated with extreme heat. Some recent studies have shown excess mortality due to the recent heatwave events in Istanbul (Can et al., 2019; Çulpan et al., 2022; Leone et al., 2013). Yet, there remains a research and policy gap addressing this challenge.

Through literature review and policy analysis, this paper contributes to urban climate policy and disaster governance debates by highlighting how extreme heat as a growing climate hazard remains largely invisible in disaster governance in one of the largest cities of the Global South. It also offers a framework for examining how extreme heat is framed within climate adaptation and disaster management policies and contemplating how the city could benefit from a dedicated, comprehensive Heat Action Plan.

2. Material and Methods

This paper employs a qualitative, document-based research design. It draws on an analysis of national and municipal level disaster management plans and programs alongside climate adaptation and mitigation documents. Through a thematic analysis of these materials, the study investigates whether and how extreme heat is addressed in disaster management policies and identifies discursive gaps. Additionally, through a targeted literature review on heat governance, best practices around the world are examined to inform a proposed comprehensive heat action plan for Istanbul.

The analysis primarily focused on a total of 10 core disaster management plans and programs including four national and six local level documents (see Table 1). In addition, two national and three municipal level climate adaptation and mitigation documents were also reviewed to provide a broader understanding of how extreme heat is addressed within the wider climate policy landscape (see Table 2). The documents selected for analysis were drawn from a range of government and municipal agencies across different sectors. The goal of this cross-sectoral selection was to reflect the full disaster management landscape in Türkiye and Istanbul. Regarding periodically updated documents such as climate action plans and monitoring reports, the most recent edition was selected to ensure the analysis reflects up-to-date policy priorities and frameworks. Disasters plans focusing on a specific topic such as earthquakes were excluded from the analysis.

All documents were collected from official government websites; therefore, the study did not require an ethics approval for data collection. While the document analysis provides important insight into institutional framing, the study is limited in its ability to capture how policies are implemented in practice.

Table 1. List of analyzed national and municipal disaster management frameworks.

	Organization	Document	Year
NATIONAL	Ministry of Health - General Directorate of Emergency Health Services	Hospital Disaster and Emergency Plan Preparation Guide	2021
	Ministry of Interior - Disaster and Emergency Management Authority	Türkiye Disaster Risk Mitigation Plan	2022
	Ministry of Interior - Disaster and Emergency Management Authority	Türkiye Disaster Response Plan	2022
	Ministry of Interior - Disaster and Emergency Management Authority	Disaster and Emergency Management Authority Strategic Plan 2024-2028	2024
LOCAL	Ministry of Development - Istanbul Development Agency	Istanbul Province Disaster Logistics Plan Guide	2013
	Ministry of Development - Istanbul Development Agency	Financial Support Program for Disaster Preparedness	2014
	Office of the Governor of Istanbul	Istanbul Provincial Disaster Risk Reduction Plan	2022
	Office of the Governor of Istanbul	Disaster Guide for Healthcare Institutions	2023
	Office of the Governor of Istanbul	Istanbul Provincial Disaster Response Plan	2024
	Ministry of Health - Istanbul Public Health Directorate	Environmental Health Unit Disaster Action Plan	2024

Table 2. List of analyzed national and municipal climate change adaptation and mitigation frameworks.

	Organization	Document	Year
NATIONAL	Ministry of Environment, Urbanization and Climate Change	Climate Change Mitigation Strategy and Action Plan 2024-2030	2024
	Ministry of Environment, Urbanization and Climate Change	Climate Change Adaptation Strategy and Action Plan 2024-2030	2024
LOCAL	Istanbul Metropolitan Municipality	Climate Change Action Plan	2021
	Istanbul Metropolitan Municipality	Climate Change Monitoring Report	2023
	Istanbul Metropolitan Municipality	Istanbul Sustainable Energy and Climate Action Plan 2030	2024

3.Results

A review of national and municipal policy documents reveals that extreme heat remains largely peripheral, in disaster management, framed as a low priority disaster hazard or omitted entirely. While climate adaptation and mitigation documents acknowledge extreme heat and sometimes recognize it as a disaster hazard, this approach doesn't translate into a local disaster policy where heat is framed as a risk requiring urgent and coordinated response.

The two national level climate frameworks by the Ministry of Environment, Urbanization and Climate Change, namely Climate Change Mitigation Strategy and Action Plan 2024-2030 and Climate Change Adaptation Strategy and Action Plan 2024-2030, were among the most recently published documents analyzed in this study. While the Ministry's mitigation plan only briefly mentions extreme heat (Ministry of Environment, Urbanization and Climate Change, 2024b), the adaptation plan explores heat challenges and vulnerabilities in detail and proposes actionable steps (Ministry of Environment, Urbanization and Climate Change, 2024a). Furthermore, heatwaves are explicitly referred to as climate hazards that "have been increasing in frequency, intensity and severity in recent years" (Ministry of Environment, Urbanization and Climate Change, 2024a). However, the document doesn't classify extreme heat among high impact disaster risks and doesn't propose specific actions under disaster risk reduction strategies. Nevertheless, it proposes heat adaptation actions focusing on UHI mitigation such as increasing green spaces, providing air conditioning in public transportation, and enhancing sustainable urban transportation through pedestrianization as a strategy for minimizing public transportation's contribution to the UHI effect. These strategies specifically aim to mitigate urban heat and task municipalities with their application. Additionally, the document assesses the heatwave related risks for the health sector and proposes broad measures regarding encouraging further research and building institutional capacity.

Meanwhile, the national level key strategic disaster frameworks including Hospital Disaster and Emergency Plan Preparation Guide by Ministry of Health (2021) and three other plans by the Disaster and Emergency Management

Authority under the Ministry of Interior (2022a, 2022b, 2024) notably omit any explicit acknowledgement of extreme heat as a disaster category. While they provide broad frameworks for disaster preparedness, response, and coordination that could be applicable to a heat related disasters, it remains ambiguous whether the national level disaster management policy perceives extreme heat as a secondary concern or does not acknowledge it at all.

At municipal level, neither Climate Change Action Plan nor Climate Change Monitoring Report by Istanbul Metropolitan Municipality (2021, 2023) explicitly addresses heat risks. However, they briefly mention urban heat islands. On the other hand, the most recent climate framework published by Istanbul Metropolitan Municipality (2024), titled the Istanbul Sustainable Energy and Climate Action Plan 2030, acknowledges the city's extreme heat risks and trajectories in detail. It proposes actionable steps including increasing green roofs and pervious surfaces, utilizing light-colored materials to ensure low albedo and providing shade through green spaces; all of which are adaptation measures targeting UHI mitigation. None of these local climate frameworks classify extreme heat as a disaster hazard and propose disaster management measures.

Lastly, six local disaster management frameworks by Istanbul Development Agency (2013, 2014), Office of the Governor of Istanbul (2022, 2023, 2024) and Istanbul Public Health Directorate (2024) were analyzed. Despite being the oldest document analyzed in this paper, Istanbul Province Disaster Logistics Plan Guide by the Istanbul Development Agency (2013), classifies heatwaves as a disaster hazard, although a low impact one. This indicates that heat risks were acknowledged in Istanbul's disaster management policies as early as 2013. However, a review of more recent documents reveals a lack of continuity in this recognition, suggesting that extreme heat has not been consistently acknowledged in or integrated into subsequent disaster management frameworks.

Of the three documents by the Office of the Governor of Istanbul, which were all published recently, only Istanbul Provincial Disaster Risk Reduction Plan proposes action steps regarding extreme heat. However, the proposed actions remain limited to public awareness campaigns via one public panel and two informative text messages per year. Finally, Istanbul Health Directorate's Environmental Health Unit Disaster Action Plan published in 2024 doesn't acknowledge or strategize about heat-related public health risks.

4. Discussions

The findings of this study reveal a critical disconnect between the rising threat of extreme heat and its institutional treatment within Türkiye's disaster management and climate policy frameworks. Although climate frameworks, particularly the Climate Change Adaptation Strategy and Action Plan 2024-2030, acknowledge extreme heat as a growing disaster hazard, this recognition is not mirrored in national or municipal disaster planning. Most national and local disaster management frameworks entirely omit the topic. While some disaster management documentation refers to heat risks, it remains marginal. Furthermore, there is no consistent or evolving pattern of recognition over time, suggesting that extreme heat is seen as a low priority concern. This institutional silence is reinforced by what scholars such as Klinenberg (2015) have referred to as the "invisibility" of heat as a disaster.

At the national level, the Ministry of Environment, Urbanization and Climate Change appears to be the only central authority proposing to integrate heat-related risks into planning. Although, the proposed actions mainly target long-term adaptation through changes in the urban form, infrastructure, and health system resilience. Meanwhile, frameworks strategizing immediate response are still lacking. Other key disaster preparedness frameworks, including those from the Ministry of Health and the Disaster and Emergency Management Authority, fail to identify heat as a discrete hazard and develop action steps. This absence indicates the need for a formal acknowledgment of extreme heat as a disaster hazard that requires strategic institutional response.

While national level climate and disaster frameworks task municipalities with taking action against disaster hazards, at the local level, a similar gap persists in Istanbul's disaster management policy. Although the Municipality's Sustainable Energy and Climate Action Plan (2024) offers a more detailed view of the city's exposure and proposes adaptive measures targeting UHI mitigation, emergency planning and public health readiness are not addressed. Notably, Istanbul's disaster-focused documents pay little attention to heat risks and only propose surface level gestures, such as public awareness campaigns. In none of these frameworks, extreme-heat-related disaster management is strategized in terms of emergency response protocols and coordination.

This mismatch between large-scale climate policy goals and local level disaster governance has significant implications. First, it suggests that Istanbul, a city with rapidly intensifying heat risk, is institutionally underprepared to respond to the growing threat of extreme heat events. Second, it highlights a broader challenge for urban climate governance in the Global South: the institutional fragmentation between long-term resilience planning and short-term disaster response mechanisms. Lastly, it reveals a deeper problem of risk perception where the absence of dramatic visuals of destruction allows a disaster hazard to be invisible in the eyes of policy makers, despite the high mortality.

From a policy perspective, the findings of this paper call for the integration of extreme heat into disaster risk planning at both the national and municipal levels. This would include formally classifying heatwaves as disaster hazards, developing emergency response strategies, and assigning clear institutional responsibilities for coordination across public health, disaster management and climate action sectors. Moreover, a dedicated local Heat Action Plan is needed to operationalize these efforts, ensure coordination, and provide a structured framework for responding to future heat emergencies in a swift manner.

Drawing on best practices from world cities (Benmarhnia et al., 2018; Çulpan et al., 2022; Knowlton et al., 2014; Magotra et al., 2021; Salagnac, 2007; Uejio et al., 2024), an effective heat action plan must include temperature-based local thresholds for extreme heat alerts, real-time heat monitoring, and a public communication strategy that reaches vulnerable populations promptly with clear and accessible guidance. It is also crucial to provide cooling resources and designate cooling centers, particularly in heat-vulnerable neighborhoods, along with coordinating healthcare resources.

The plan must assign institutional responsibility, allocate funding, and include mechanisms for long term monitoring and evaluation. Furthermore, in a city like Istanbul, where spatial inequalities amplify heat risks, an effective Heat Action Plan should also take climate justice implications into account.

5. Conclusions

While climate projections clearly signal intensifying extreme heat risks globally and inhabitants of densely built cities are particularly more vulnerable to detrimental health impacts of heat, this study finds that institutional recognition of extreme heat as a disaster hazard remains largely marginal and inconsistent across Türkiye's national and Istanbul's municipal disaster and climate governance frameworks. Overall, extreme heat is increasingly acknowledged in climate policy documents, particularly at the national level. Yet, this recognition fails to translate into Istanbul's local disaster governance, where extreme heat is perceived as a secondary concern rather than a pressing hazard requiring coordinated, actionable response.

In Türkiye, there is an urgent need to formally classify extreme heat as a disaster hazard and integrate it into national and local disaster preparedness plans with clearly defined actions and institutional responsibilities. Drawing on global best practices, Istanbul needs a dedicated Heat Action Plan to coordinate emergency protocols and implement long term disaster resilience strategies. As climate change continues to amplify heat risks, Istanbul's ability to adapt to and protect its residents from extreme heat will depend not only on long-term resilience planning but also on the official acknowledgement of heat as the public emergency that it already is.

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Conflict of Interests

The Author declares that there is no conflict of interest.

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