

Sustainable Housing in Climate and Disaster Vulnerable Contexts: A Comparative Legal and Policy Analysis of Turkey and Germany's Adaptation and Disaster Response Frameworks

Vivienda sostenible en contextos vulnerables al clima y a los desastres: un análisis comparativo jurídico y de políticas de los marcos de adaptación y respuesta ante desastres de Turquía y Alemania

Elnaz Nahavandi

Istituto Universitario di Studi Superiori di Pavia

E-mail: elnaz.nahavandi@iusspavia.it

ORCID: <https://orcid.org/0009-0001-7961-9716>



Author



This article examines how Germany and Turkey address sustainable refugee and disaster-displaced housing in the context of natural hazards. Using a functional comparative legal methodology, it compares the governance allocation and coordination; housing standards and resilience plans; and the integration of refugee shelters into welfare and disaster framework. The analysis combines doctrinal review with empirical data such as official statistics, surveys, policy reports, and testimonies examining housing stability, resilience and legal protection. The study is anchored in post-disaster housing response for the 2023 Kahramanmaraş Earthquake and the 2021 Ahr Valley Floods. Turkey's centralized governance has reactive approach results in endemic loopholes, subjecting refugees to secondary displacement and insecure housing. Germany's precautionary and decentralised framework integrates housing within broader welfare regimes. The analysis directs policy suggestions for both countries that emphasize the relevance of joined-up governance and resilient, inclusive shelter systems as a way to properly address compound displacement risks.



Abstract

Este artículo analiza la gestión de vivienda sostenible para personas refugiadas y desplazadas por desastres naturales en Alemania y Turquía. Mediante un método jurídico comparado funcional, se examinan la gobernanza, los estándares de resiliencia y la integración de refugios en los sistemas de bienestar y marcos de desastre. El estudio se fundamenta en la respuesta habitacional tras los terremotos de Kahramanmaraş (2023) y las inundaciones del valle del Ahr (2021). El análisis revela que el modelo centralizado y reactivo de Turquía genera vacíos legales que derivan en desplazamientos secundarios. En contraste, el marco preventivo y descentra-

lizado de Alemania integra la vivienda en regímenes de bienestar más amplios. Finalmente, se proponen políticas que enfatizan la gobernanza coordinada y sistemas de refugio inclusivos para mitigar los riesgos de desplazamiento compuesto.

Disaster governance; climate change; refugee housing; comparative legal analysis; sustainable housing; displacement



Gobernanza de desastres; cambio climático; vivienda para refugiados; análisis jurídico comparado; vivienda sostenible; desplazamiento

Received: 29/08/2025. Accepted: 27/02/2026



1. Introduction

Sustainable shelter for the displaced is closely linked to the United Nations Sustainable Development Goals (SDGs), which aim to leave no one behind (United Nations Sustainable Development Group [UNSDG], 2022), and sustainable shelter supply is crucial to the long-term security and dignity of some of the structurally most vulnerable social groups (Seifert et al., 2023). Political ecology research views shelter as a socio-environmental right shaped by governance, resource distribution, and individual risks and exposures (Sobczak-Szelc et al., 2024). According to political ecology migration research, migration flows are complex and multifaceted, and individuals' cumulative and differential socio-ecological risks and vulnerabilities shape migration (Sánchez & Riosmena, 2021). Legal precarity and social isolation can result from long-term temporary living without permanent housing regulations.

Despite separate legal and policy frameworks, refugee camps and disaster shelters typically operate similarly amid climate-related risks (Moench et al., 2015). Thus, refugee camps and disaster shelters are intended to be temporary yet often remains operational for years or decades; they have been heavily reliant on emergency relief and support; and they have been linked to environmental hazards, legal uncertainty, and exclusion from long-term urban planning. The availability of temporary shelters in hazard-prone places can reproduce dangers, and their legal regimes might leave displaced individuals uncertain of their rights during crises (Biermann & Boas, 2008). Analysing refugee and disaster shelters together therefore shifts attention from the legal label of displacement toward a core governance question: whether shelter systems can provide durable, hazard-resistant, and rights-compliant refuge regardless of the cause of displacement.

Turkey and Germany share this challenge, but their risk profiles and governance styles differ. Turkey is among Europe's and the Middle East's most seismically active nations. Seismic zones cover 96% of its territory and 99% of its people (Bohnhoff et al., 2024). The February 2023 Kahramanmaraş earthquakes, devastating 11 provinces, caused massive displacement. They also exposed the structural flaws of institutional shelter and reconstruction mechanisms (Giyik, 2024). Under Law No. 5902, the Disaster and Emergency Management Authority (AFAD) governs central disaster management policies (Disaster and Emergency Management Presidency Law No. 5902, 2009). The Turkish Temporary Protection Regulation (2014) and

Law on Foreigners and International Protection (2013) control refugee management, with a parallel framework that restricts access to secure and stable housing (Çetin, 2021; Law on Foreigners and International Protection No. 6458, 2013; Temporary Protection Regulation, 2014). Refugees face worsening services, increasing health risks, and secondary displacement to meet citizen housing demands (Çakın & AlMajdalawi, 2024).

Germany presents a contrasting configuration. Although seismic risks are comparatively low (Tyagunov et al., 2006), climate-related hazards have caused significant losses, including approximately €40 billion in flood damage and €25.6 billion in forestry and agricultural impacts (Martens, 2024). The 2021 Ahr Valley flood revealed weaknesses in early warning systems and municipal response capacities, while simultaneously testing the performance of Germany's decentralised disaster governance and welfare-based accommodation system under conditions of acute displacement (Martens, 2024). Germany is also a major asylum destination and maintains legally defined reception standards. The Asylum Seekers' Benefits Act (AsylbLG) guarantees subsistence and minimum accommodation (AsylbLG, 1997), while the Federal Building Code (BauGB) incorporates safety and resilience considerations into municipal land-use planning (Kreichauf, 2018).

Functional comparative analysis shows that both systems address the same policy issue differently. Turkey's disaster governance system is reactive and centralised, based on emergency management (Öcal, 2021), and running alongside migration control, while Germany's is preventive and decentralised, integrating accommodation into welfare, planning, and mitigation (Richter et al., 2010). These disparities are institutional and normative. The recent German Federal Constitutional Court (2021) decision that the state must protect against disproportionate burdens on future generations shows that Germany's system prioritises forward-looking risk protection, including environmental and social risks (Hartwig, 2024).

Comparing the two scenarios has important scientific and normative implications. The United Nations High Commissioner for Refugees (UNHCR) Shelter Guidelines and Sphere Standards set safety, space, and habitability rules for disaster response activities (United Nations High Commissioner for Refugees [UNHCR], 2026; Sphere Association, 2018). The Sendai Framework for Disaster Risk Reduction also encourages Build Back Better during disaster recovery and reconstruction (Beatini et al., 2022; Tamura et al., 2018; United Nations Office for Disaster Risk Reduction [UNDRR], 2015). The Reception Conditions Directive (EU) 2024/1346, Article 19, sets minimum living conditions for asylum seekers in Germany but not Turkey (Directive (EU) 2024/1346, 2024). Historical migration operations between Turkey and Germany, such as the guest-worker programmes after the 1966 Varto earthquakes, show how disasters and migration are linked (Gedik, 2024).

The study sets out to examine the impact of different legal-institutional configurations on the provision of resilient, rights-based, and sustainable shelter for displaced persons. Using a functional comparative approach, the analysis critically examines three interconnected areas: responsibility allocation and coordination, housing standards and resilience-based planning, and the integration of refugee housing and broader welfare and disaster response frameworks. This article uses the 2023 Kahramanmaraş earthquakes and the 2021 Ahr Valley floods as real-world stress tests for evaluating housing stability, environmental resilience, legal security, and the risk of secondary displacement. By shedding light on the impact of different institutional configurations on shelter provision during times of pressure, the paper hopes to inform law reform to achieve more integrated, inclusive, and climate-resilient housing responses.

2. Context and Research Problem

Repeated major earthquakes in Turkey, most notably the 2023 Kahramanmaraş disaster has consistently generated internal displacement. Large-scale environmental shocks, such as the 1966 Varto earthquakes, led to internal displacement and migration to Europe, specifically Germany. The use of guest-worker agreements with Germany to grant preferential treatment to earthquake victims in affected districts such as Varto illustrates how disaster displacement intersected with established labour-migration channels (Gedik, 2024). These earlier examples offer important precedents for how future climate-related disasters in Turkey may again catalyse cross-border displacement, especially toward Germany, reviving historical migration channels.

In Germany, refugee reception facilities are organised in a multi-level system, in which German federal states (Länder) and municipalities implement federal welfare minima, leading to marked differences in facilities and accessibility to private housing. Although Germany has experienced fewer disaster-induced displacements than Turkey, recent flood events have nevertheless tested these decentralised housing and welfare arrangements (International Federation of Red Cross and Red Crescent Societies [IFRC], 2021).

Despite extensive scholarship on disaster displacement and refugee reception, legal research rarely examines disaster sheltering and refugee accommodation within a single comparative framework. As a result, the influence of legal and administrative design on the delivery of rights-compliant and resilient housing remains insufficiently understood. This article addresses this gap by comparing Turkey and Germany across responsibility allocation, housing standards, and integration mechanisms to assess which institutional configurations better prevent prolonged precarity and secondary displacement. Accordingly, the research problem is how differing legal-institutional designs shape shelter outcomes—housing stability, legal security, and secondary displacement risk—when exposed to comparable stress tests.

The research questions that this article aims to answer are the following: What are the allocations of legal responsibility for housing resilience in Turkey and Germany, and how do these allocations perform in the context of acute displacement? What is the role of minimum standards for shelter and housing, whether legally binding or guidance-oriented, in ensuring habitability and reducing secondary displacement risk in post-disaster situations? How do integration mechanisms between migration law, disaster law, and welfare law play in access to housing and equality of protection for displaced individuals?

3. Methodology

This study employs a functional comparative design consisting of three stages. First, it identifies functional equivalents of governance activities in each system including responsibility allocation and coordination; housing standards and resilience-related planning. The second stage focuses on analysing the allocation of powers in both systems through a review of constitutional, statutory, administrative, and policy guidance sources. The third stage employs secondary data related to the two mega-disasters that occurred in Kahramanmaraş in 2023 and the Ahr Valley in 2021 for the assessment of residency, legal certainty, and risks of subsequent displacement. Turkey and Germany were selected due to their high exposure to migration and hazards despite contrasting political and legal systems.

The comparison adopts three interlocking dimensions. First, the responsibility of housing resilience is examined by investigating legal frameworks and planning requirements as well as the building standards. Secondly, the efforts of providing sustainable shelters are examined in the context of disaster relief schemes. Thirdly, the inclusion of refugee accommodation into the framework concerning disaster, welfare schemes is interrogated. These factors are assessed through outcome-oriented criteria, including housing stability, environmental resilience, legal security, and the exposure to secondary displacement. The functional comparison is accompanied by a doctrinal analysis of relevant constitutional and statutory provisions, regulations, court decisions, and official guidelines, in the two legal systems.

This analysis is illustrative rather than exhaustive, focusing on binding norms and authoritative court decisions that have a direct impact on housing, in order to keep it functional in comparison across different legal systems. Sources for comparison were identified based on three criteria: (1) inclusion criteria, such as constitutional provisions and binding legislation; (2) relevance to post-disaster or refugee housing, including binding disaster-response legislation, planning measures, welfare rights; and (3) relevance based on functionality, using similar criteria regardless of differences in structures, such as assignment of responsibilities, basic standards, planning, *inter alia*.

The legal analysis was based on secondary qualitative data such as policy documents, results of surveys, official statistics, scholarly publications, or documented information related to the 2023 Kahramanmaraş Earthquakes in Turkey and the Ahr Valley Floods of 2021 in Germany. Empirical data have a confirmatory and analytical role as they show the operation of the legal frameworks under stress and the discrepancies between the legal frameworks and the actual results in housing. No original fieldwork was carried out. Secondary materials were selected where they directly document housing or shelter outcomes in the two focal events and were triangulated across at least two types of sources, for example official data plus survey and report evidence.

Functional equivalence was operationalised by matching the legal-institutional structures of each system to the same set of functional requirements—namely, responsibility allocation, the specification of minimum standards, and integration with welfare and disaster management. Then, the comparative analysis examined the performance of these structures under duress in the context of the two central disasters using outcome measures of housing stability, legal security, and vulnerability to cyclic displacement derived from the secondary evidence base.

4. Results and Discussion

The results are discussed in this section, and they will be presented along three dimensions: responsibility allocation, housing and shelter, and integration and accommodation. These dimensions will be evaluated based on outcome-oriented criteria, and the 2023 Kahramanmaraş earthquake in Turkey and the 2021 floods in Germany will be used as stress tests. Each subsection concludes with a brief comparative synthesis.

4.1. Responsibility for Housing Resilience

Article 57 of the Turkish Constitution enshrines housing rights. This makes the state directly responsible for housing welfare (Constitution of the Republic of Turkey, 1982, Art. 57).

In Germany, the Constitution does not guarantee housing rights. A comparable obligation can be identified in the German legal system, which prescribes basic living conditions. Precarious housing conditions put migrants, refugees, and disaster-affected populations at risk of displacement, according to law and social science research (Nur & Sethman, 2016; Stazen, 2021). Insecure shelter, especially temporary shelter, might fail during natural disasters such as heatwaves or cold spells, precipitating secondary displacement (Dam, 2023). Thus, in both countries, housing resilience is both a responsibility and a normative framework for the allocation of disaster-resilient housing mandates.

Turkey has also contended with fragmented accountability for housing resilience, with a partial shift of responsibility to private actors. The 2018 Construction Amnesty, for instance, regularised 305,000 substandard structures, including those within seismic zones, without requiring retrofitting (Haliloğlu Kahraman, 2024). This signified a devolution of responsibility to building owners, who were often incapable of ensuring structural compliance. Although compulsory earthquake insurance has been mandated since 1999 to incentivise seismic resilience, certain groups, including migrants and tenants of low-income households, have been excluded from compensation.

Apportionment of liability was clarified in a recent decision of the Constitutional Court (Anayasa Mahkemesi, 2024), which adjudicated that the state cannot delegate the responsibility for earthquake safety to private parties. The court invalidated provisions within the zoning framework that had allocated responsibility for the structure of buildings to individual parties, holding that it violated the individual's right to life (Constitution of the Republic of Turkey, 1982, Art. 17) and the effective remedy (Constitution of the Republic of Turkey, 1982, Art. 40). It is evident that the responsibility for the safety of the environment is a positive obligation of the state. Therefore, despite the explicit recognition of the right to housing in the Constitution, the responsibility for disaster-resistant construction is a non-delegable public duty.

In Turkey, disaster governance operates under Law No. 5902 on the Organisation and Duties of AFAD, which establishes a highly centralised institution with broad authority to coordinate all phases of disaster management, from emergency response to recovery and risk reduction (Bagherzadeh & Shigemitsu, 2021; Disaster and Emergency Management Presidency Law No. 5902, 2009). Existing reports indicate scope for greater shared responsibility in this system. The system operates on a clear top-down structure. The Disaster and Emergency Board formulates policy, whereas AFAD headquarters manages and coordinates response operations. Provincial coordination is overseen by the governor in coordination with AFAD Headquarters (AFAD, 2022).

In Germany, the mandate for housing resilience is codified in statutory planning law, as opposed to being anchored in a constitutional right. Indeed, the Federal Building Code, obligates municipalities to ensure safe and sustainable living conditions within their jurisdictions, necessitating proactive planning for the prevention of environmental and hazard risks and the incorporation of climate and disaster resilience considerations into planning decisions (BauGB § 1, 2009). Accordingly, the mandate for ensuring resilient housing lies within the standard administrative and planning functions of the municipality, rather than the individual property owner.

A comparable formulation of the state's preventive responsibility to mitigate potential risks can be derived from the German climate ruling (*Neubauer et al. v. Germany*, 2021). Although

this case was decided in the context of greenhouse gas emissions reduction, its structural reasoning is analogous to the principles applicable in the context of housing and territorial resilience. In this case, the German Constitutional Court relied on Article 20a of the Basic Law and an intertemporal understanding of fundamental rights (Basic Law, 1949, Art. 20a). It held that the legislative branch must take timely and sufficiently concrete steps to mitigate predictable environmental risks and cannot postpone action in such a manner that burdens future generations with disproportionate risk (*Neubauer et al. v. Germany*, 2021). In this respect, Hartwig (2024) argues that this case advances the concept of responsibility toward future generations under the German Basic Law from a non-binding aspiration to one that constrains legislative action, potentially through precautionary principles in the context of scientific uncertainty. While Neubauer primarily concerns emissions pathways and intergenerational climate protection, its reasoning on the timely prevention of foreseeable environmental risks is used here as an interpretive lens for precautionary governance, rather than as a direct doctrinal extension of housing rights. In this respect, the case is analogous to the Turkish Constitutional Court's holding that disaster safety cannot be privatised. In the Turkish case, earthquake safety cannot be left to private actors. In the German case, climate risk precludes regulatory abdication.

On the local level, the distribution of responsibility is further specified in building regulations. For example, the Hamburg Building Code (HBauO) regulates the responsibility of the owner, the designer, and the contractor in the context of compliance, while the public authority is responsible for supervision and control (HBauO §§ 48–49, 2005). In this case, the concept of resilience is implemented through the regulation of private compliance, which is subject to ongoing state supervision and control. Unlike the Turkish amnesty model, the responsibility is not abandoned but rather implemented through control and supervision mechanisms.

A salient institutional divergence emerges from this comparison. Although Turkey has a constitutional commitment to the right to housing, there has been a tendency for responsibilities in relation to resilience to be fragmented and delegated to private actors, which in turn has led to a reactive approach in its enforcement. By contrast, in Germany, there has been a holistic inclusion of responsibilities for resilience within planning and building regulations. This has conceptualised housing safety as a public *ex ante* requirement rather than a corrective response. The research indicates that the effectiveness of housing resilience is not necessarily related to constitutional recognition but rather how responsibilities are operationally allocated. Under the 2023 and 2021 stress tests, these allocations translated into divergent enforcement capacity and speed of transition to safe housing. Recent nationwide evidence also provides support for the idea that flood risk adaptation in Germany is not fully internalised by markets. This limitation of market-based allocation is also reflected in housing market behaviour. A recent nationwide study of the German housing market following the 2021 Western European flood reveals that, on average, property prices in flood-risk zones did not significantly change following the flood event (Gruhl et al., 2025). However, properties in close proximity to flood-risk zones were found to have experienced significant discounts in their prices (Gruhl et al., 2025). This suggests that flood risk is still undercapitalised in the German housing market. This also implies that markets alone may not be an effective means of reducing flood risk, as they may lead to suboptimal investment decisions. As such, risk reduction is also an issue of planning, regulation, and governance.

4.2. Sustainable Shelters in Disaster Relief

The Kahramanmaraş earthquakes that struck Turkey on February 6, 2023, affected over 13 million people and precipitated large-scale internal displacement, where over 100,000 people left the affected cities in a matter of days, while tens of thousands were also transported through air travel (Tiryaki Yenilmez, 2023). Disaster-induced displacements have been limited in Germany; nevertheless, the floods that occurred in 2021 exposed systemic vulnerabilities in early warning systems and the capacity of municipalities to react. Research has found that considerable differences exist regarding recovery outcomes, including access to temporary accommodation and speed of housing reconstruction, which can be ascribed to the decentralised character of shelter provision (Kienzler et al., 2015).

In spite of the existence of scientific models for assessing risks and early damage assessment systems like the AFAD Rapid Earthquake Damage system (AFAD-RED), the emergency response in the 2023 disaster showed that systemic coordination deficits emerged in the provision of shelter (Yalçın et al., 2017). For instance, the empirical records indicate protracted mobilisation, fragmented inter-agency cooperation, and the lack of consideration of climate adaptation in the planning of temporary shelters, indicating a reactive rather than a preventive approach to disaster management (Hermansson, 2016; Yetiskin, 2025).

According to Law No. 5902, the Disaster and Emergency Management Authority (AFAD) in Turkey is responsible for planning and coordinating emergency shelter provision. Additionally, the AFAD establishes national criteria for temporary accommodation, including privacy, social support, and basic infrastructure (Disaster and Emergency Management Presidency Law No. 5902, 2009). However, the implementation of national standards has been patchy, especially in disadvantaged areas. One year was needed to build 12,000 permanent shelter units after the 2011 Van earthquake (Giyik, 2024), highlighting the need for long-term temporary shelter during natural disasters. The narratives of displaced Syrians reveal a sense of double victimisation and uncertainty due to temporary accommodation (Eraslan, 2024).

Evidence from post-earthquake Turkey reveals that shelters built for displaced persons rarely meet both the physical and psychosocial needs of the displaced population. While shelters built for displaced persons were meant for short-term use, in reality, displaced persons end up staying for long periods in shelters, thereby creating a situation whereby what was meant for temporary use ends up being used for long-term housing. Comparative research from disaster scenarios reveals that the transition from emergency to permanent housing is usually delayed for long periods, especially in scenarios where there is inadequate planning and participation (Paterson et al., 2023).

Empirical studies of temporary housing in Turkey further document persistent deficiencies in basic living standards. Research conducted in the aftermath of the 1999 earthquake in Turkey revealed that there was considerable dissatisfaction with the size of the facilities, ventilation, insulation, and thermal conditions, implying that these facilities were not designed for permanent use (Eranil et al., 2024). Other evidence of the failure of these facilities in colder climates, as in the case of Malatya, is the exposure of residents to temperatures below zero degrees with inadequate heating facilities (Ayik, 2024).

In the aftermath of the earthquake, the number of organised camps increased from 7 to 12, while the population doubled to around 88,000. This increase resulted in overcrowding, worsening sanitation conditions, and an increase in health risks (Haliloğlu Kahraman, 2024). These camps, instead of functioning as a temporary safe zone, operated beyond the intended

capacity, indicating a problem in the structural capacity of Turkey in addressing the need for emergency shelters.

Interviews and field reports reveal governance obstacles that hinder shelter delivery. Most respondents were dissatisfied with state institutions, citing delays in search-and-rescue, food distribution, and temporary housing. Limited transparency in disaster financing, destroyed local administrative infrastructure, and restrictive conditions for civil society and humanitarian organisations exacerbated coordination difficulties (Sevinin et al., 2023; Yetiskin, 2025). Institutional barriers hindered relief operations and impeded shelter services, leading households to employ self-purchased tents or informal networks. High reliance on individual coping mechanisms suggests the emergency shelter system was not reliable as a public safety net.

The results of field interviews and post-disaster assessment studies also reveal the existence of broader structural issues in the areas of planning and preparedness. For instance, the results of the field interviews with survivors and other relevant stakeholders in the post-disaster assessment revealed that the underlying issues in the provision of shelter security in the face of disasters include the poor enforcement of zoning regulations, the poor integration of seismic safety standards, and the ongoing production of risky and poor-quality housing stock (Şiğin & Akyıldız, 2024). These findings indicate that temporary shelter problems are not solely operational but stem from pre-existing shortcomings in urban planning and land-use governance, which limit the state's capacity to provide resilient accommodation when disasters occur.

International and national technical systems provide tangible guidelines for assessing the effectiveness of disaster shelters. For example, the Sphere Project provides humanitarian guidelines on safety, health, spatial planning, and environmental sustainability. Similarly, Turkish design studies provide guidelines on participation, the use of durable materials, and energy efficiency. For instance, it has been recommended that shelters should be built above floodplains and that the slope of the drainage system should be considered to reduce environmental and climatic risks (Giyik, 2024). These guidelines provide a framework for assessing the effectiveness of emergency shelters in providing safe and sustainable living conditions.

Spatial and planning analyses indicate that structural deficiencies exist in the spatial distribution and accessibility of emergency shelters. For example, shelter spaces are disproportionately allocated or absent in a number of high-risk and populated zones. Parts of Hatay's central area and Istanbul's Fatih district have insufficient open space and routes for evacuation, and shelter spaces are absent in some of these zones (Dinç & Gök, 2024). The spatial analysis indicates that shelter spaces were not incorporated into spatial and urban development plans; therefore, their practicality and sustainability are compromised.

Results from shelter site planning reveal considerable disparities between allotted sites and their suitability. The 2022 Turkey Disaster Response Plan identifies provinces like Kırklareli as support locations for high-risk districts along the North Anatolian Fault. However, spatial assessments of 21 suggested emergency shelter sites reveal significant site inadequacies, as identified by Kuru et al. (2024). Over half of the plots are on protected agricultural land, some are on steep slopes over the safe construction threshold, and some lack access to key infrastructure like gas and municipal services. Additionally, sites near waterways and atop alluvium are vulnerable to secondary disasters like flooding. Importantly, these locations are not included in local zoning and development plans, preventing their deployment during disaster response and recovery. Research indicates that shelter provision is impacted by both emergency shelter

capacity and pre-disaster land use and development decisions, which are crucial for resilience and sustainability.

Turning to Germany, hazard integration is increasingly addressed through legally embedded land-use planning and environmental assessment procedures, particularly after the 2021 flood events. In Germany, this approach of hazard integration has increasingly been implemented through legally binding land-use planning processes as per the BauGB (BauGB, 2009; Greiving et al., 2023). After the 2017 reforms, urban land-use plans have been required to address impacts anticipated from the susceptibility of allowed land-uses to major accidents and disasters, such as risks to human health, cultural heritage, and the environment. This is evaluated through the environmental report of binding land-use plans. Using the recent case of the 2021 flood-affected town of Erftstadt, Germany, it has been demonstrated that a hazard zone-based approach can indeed be integrated into the current BauGB through an evaluation of land-uses based on their restrictions and building precaution measures through an evaluation of hazard intensity, such as water depth and flow velocity (Greiving et al., 2023). A significant aspect of this approach is the “protection worthiness” criterion, which prioritises critical and sensitive infrastructures due to cascading failure risks. The approach has been taken up by the state’s planning authority for North Rhine-Westphalia as an essential component of municipal land-use planning.

Evidence from emergency accommodation facilities also reveals qualitative limitations within the German shelter system. Reports from Bremen, Berlin, and Rhineland-Palatinate document inadequate thermal protection in temporary structures, including excessive cold in winter and overheating in summer, leading to health risks for residents (Riemer et al., 2025). Survey data further indicate that collective shelters frequently operate under capacity constraints and score lower on privacy and space compared to private housing (Baier & Siegert, 2018). Although national guidelines developed by the German Red Cross and the IFRC establish thermal and environmental standards, the need for retrofitting suggests gaps between formal standards and actual implementation (IFRC & Shelter Research Unit, 2016).

Aside from post-disaster reconstruction, shelter provision in Germany is underpinned by a legal obligation of municipalities under police and public order laws in the Länder to provide shelter to those without homes. Shelter provision is heterogeneous in form, including hotels, dormitories, and temporary apartments integrated into existing housing stock. Although conceived in terms of short-term provision, evidence of its use is of longer durations, with over one-third of residents occupying shelter for over two years. However, in the absence of national standards, municipalities enjoy significant discretion in shelter provision, with variable quality and capacity. In terms of functionality, the German system differs from Turkey in its use of welfare provision but is similar in terms of its potential for prolonged temporariness (Engelmann, 2021).

In addition, in situations characterised by acute arrival pressure, Germany has also used large-scale emergency shelter infrastructures that are comparable to disaster response camp systems. In 2015 and 2016, for example, the Federal Government set up mass facilities waiting rooms in Bavaria that could accommodate up to 20,000 people and were managed in collaboration with the Federal Office for Migration and Refugees, civil protection units, the German Red Cross, and the Federal Agency for Technical Relief (THW). The facilities were set up via disaster management structures and were specifically designed to ensure that they are compatible with international humanitarian standards. Expertise from international deployments has been used for local operations that involve disaster response and relief operations. In essence,

these waiting rooms are comparable to temporary camps that are used in disaster response situations. Therefore, Germany, just like Turkey, uses centralised mass shelter solutions in crisis situations (Dittmer & Lorenz, 2021).

Post-disaster housing management in the wake of the 2021 Ahr Valley flooding event demonstrates the effects of a coordinated intervention by the state. Qualitative interview-based research conducted in the Ahr Valley further indicates that displacement was largely short-distance and temporary: households with strong local social ties, property ownership, and access to state reconstruction aid were significantly more likely to remain or relocate within the county rather than migrate permanently (Jaafari, 2023). The disaster was considerable in terms of scale. The 2021 flood caused over 180 fatalities in the country, with more than 130 fatalities reported in the Ahr Valley. The disaster affected 42,000 people, while the damage was estimated at 33 billion euros. Within the Ahr district, there were over 9,000 buildings destroyed or severely damaged, leading to at least 17,000 people being temporarily without habitable shelter (Truedinger et al., 2023). This created a significant shelter need, given Germany's strong housing stock. Significantly, the federal and state governments quickly mobilised significant financial and administrative capacity, which included a €30 billion reconstruction fund, accelerated hazard mapping, and the creation of municipal recovery agencies to speed up the process of rebuilding and rehoming (Birkmann et al., 2023). Accordingly, the majority of households moved from their provisional housing within a year, while 12.9% of households remained in provisional housing. Nevertheless, there were significant variations in the recovery process in different municipalities, which demonstrates that even with significant financial capacity, there are socio-economic inequalities in exposure and recovery (Odersky & Löffler, 2024).

As a functional stress test of Germany's decentralised system of shelter and housing governance, the Ahr Valley 2021 flood event offers some useful lessons on how well the system can respond under acute displacement pressures. Notwithstanding significant physical destruction, pre-existing municipal planning authority and welfare entitlements, along with rapid mobilisation of federal finances, facilitated relatively quick transitions from temporary to permanent housing solutions. A majority of displaced people exited their temporary shelters within a year, and only a small percentage remained in temporary shelters. This contrasts with the situation in Turkey and demonstrates the advantages of embedding shelter within ordinary planning and welfare structures. Having adequate financial and technical resources does not automatically ensure resilience outcomes. An overall assessment of the recovery process in the Ahr Valley, Germany, after the 2021 flood event revealed that most of the financial support programmes developed for recovery focused on compensating losses rather than reducing risk or promoting relocation, thus not offering much opportunity for *Build Back Better*. While new tools, such as new hazard maps, recovery agencies, and planning tools, were developed, the responsibilities of individual cities, legal continuation rights, and funding criteria sometimes limited more transformative changes in land use. This, therefore, implies that shelter recovery resilience outcomes are not only linked to resources but also to the overall design of recovery processes (Birkmann et al., 2023).

The above outcomes suggest the presence of institutional differences, rather than operational errors. In the German context, the combination of decentralised accountabilities, binding land use planning, hazard maps, and the prompt mobilisation of financial resources facilitates the transition to permanent accommodation in a relatively quick manner and integrates shelter provision in regular welfare systems. In contrast, the 2023 stress test in the context of

Turkey reveals the presence of systemic coordination, enforcement, and pre-disaster planning problems, which make the provision of shelter in emergency situations both lengthy and unsustainable in environmental terms. In particular, the Turkish example reveals that the application of central standards was not sufficient to ensure the habitability of shelter provision, nor was it sufficient to ensure the selection of appropriate sites, primarily because shelter provision was not well integrated in the decision-making process of binding land use planning. In the context of the 2021 stress test in Germany, the application of the planning procedures and the prompt mobilisation of resources facilitates the relatively quick transition to permanent accommodation, but it does not always lead to the desirable outcomes of *Build Back Better*, such as the reduction of risk through relocation or the transformation of land use patterns.

4.3. Integration of Refugee Accommodation into Disaster and Welfare Frameworks

Disasters increase the impact of structural inequalities, and the impact of disasters on refugees is particularly severe, as they often face temporary legal status, economic instability, and social marginalisation (Brauch et al., 2011). In Turkey, where there are millions of Syrian refugees under temporary protection, the 2023 earthquakes have particularly affected the refugee population. The refugee population faced severe physical destruction as well as secondary displacement, legal and administrative challenges, and psychological impacts. The refugee vulnerability was not just due to socio-political marginalisation but also due to their concentration in hazard-prone areas and lack of integration in disaster management structures.

Turkey is one of the world's major refugee-holding countries, with 3.6 million refugees, including 3.2 million Syrian nationals (Akar, 2024). Syrian refugee movement simulations reveal Hatay, Gaziantep, Şanlıurfa, and Mardin as main refugee-holding sites near war zones such as Idlib and Aleppo (Güngör et al., 2024). These districts were also most damaged by the 2023 earthquakes, highlighting the connection between environmental dangers and migration movements. According to Güngör et al. (2024), the distribution of refugees in Turkey leads to the overcrowding of refugee camps in locations like Şanlıurfa and Mardin. About 1.7 million refugees, including those with prior displacement, were anticipated to live in the earthquake-affected area. Some persons have attempted return migration to Syria, while others have sought migration to other places in Turkey after the crisis. Exposure to natural disasters can repeat pre-existing displacement patterns, leading to secondary displacement. Displacement is not solely a result of individual decisions, but also a structural process that excludes refugees from catastrophe planning and accommodation methods. Since 2011, some Syrians have been displaced and now they are forced to flee again.

Recent survey data highlights the prevalence of secondary displacement and the gap between refugees and host communities. Syrians have been disproportionately affected, with 80% experiencing housing damage compared to 60% for Turkish residents, and 20% experiencing complete housing destruction, twice the rate of Turkish residents (Ruhnke et al., 2024). Over 80% of Syrians and 48% of Turkish residents stayed in shared housing for a month or more. Additionally, 33% Syrians and 67% Turkish inhabitants utilised emergency shelters near their old homes. Despite their efforts to stay local, 40% of both groups moved to other parts of Turkey. Access to secure housing, legal aid, and institutional support may have influenced relocation outcomes beyond the hazards individuals faced. Prior to the disaster, refugee households relied more on shelters due to housing insecurity (Ruhnke et al., 2024). In Istanbul, spa-

tial analysis reveals that climatic vulnerability and refugee concentration often occur simultaneously. High Syrian population density areas like Bağcılar, Esenler, and Küçükçekmece tend to have insufficient infrastructure, less green space per person, and increased flood and heat risks. Spatial concurrence indicates refugee concentration in environmentally and infrastructurally fragile urban areas (Güneş, 2023).

This reveals a significant segment of Turkey's population of non-citizens who is not integrated into a system of permanent housing and settlements but is instead residing in a state of transitional accommodation. This reveals how a disaster response and shelter system designed with the assumption of permanent residency and formal registration might inadvertently exclude such populations from assistance. In this sense, the status of Turkey as a transit country presents a further layer of challenge in terms of disaster shelter provision: how to accommodate citizens and registered refugees alongside a population with such high mobility and ambiguous residential and immigration status.

Turkey regulates refugee accommodation under the Law on Foreigners and International Protection and the Temporary Protection Regulation, which provide a separate legal pathway for Syrians and other non-European asylum seekers (Law on Foreigners and International Protection No. 6458, 2013). This regime operates outside the norms of welfare and disaster management, and does not guarantee state-provided shelter as a right. Lack of systematic integration into disaster planning and post-disaster housing responses leads to *ad hoc* administrative arrangements for access to housing, resulting in weakened protection during crises. Despite large-scale refugee resettlement efforts by TOKİ and other organisations, transparency and equity difficulties have hindered the benefits for vulnerable refugees (Yetiskin, 2025). The issue is exacerbated by Turkey's refugee policy, which only affords protection within the 1951 Refugee Convention's geographical limits and grants Syrians temporary protection rather than refugee status (Stephen, 2013). Refugees lack permanent and safe homes.

The AFAD agency is responsible for disaster response and registering and managing Syrian asylum seekers, creating a complex mandate that can be difficult to manage, particularly during disasters and displacement (Stephen, 2013). Post-earthquake data reveals unstable conditions, with 44% of Syrians citing lack of livelihoods, 20% citing unstable housing, and 17% citing security concerns as reasons for returning to their country (UNHCR, 2024). Additionally, over half rated safety conditions in Syrian reception areas as good. Despite Turkey adopting UNHCR-based standards and strict technical standards for refugee camps (de Rooij, Wascher, & Paulissen, 2017), many refugee facilities in isolated locations have hindered integration, perpetuating temporary and segregated accommodation (Fransen et al., 2023).

The implications of such a system on individual rights can be seen in the jurisprudence of the European Court of Human Rights (ECtHR). In *Amato v. Turkey* (2007), the ECtHR held that the demolition of homes located in a disaster zone without appropriate compensation constituted a violation of the right to property, emphasising that even emergency actions must be accompanied by appropriate procedures. However, such a level of constitutional protection does not appear to be afforded to refugees in Turkey, leaving individuals holding temporary protection status forced to rely on discretionary and short-term solutions.

The post-earthquake findings reveal that poor shelter conditions played a significant role in the secondary displacement experienced by refugees. In most cases, refugee shelters in temporary camps did not meet physical and social standards. Reports indicated that refugees were denied access to evacuation procedures and that tensions increased among host communities

(Sevinin et al., 2023). Such findings reveal that refugee shelters did not form part of the disaster and welfare systems.

Thermal performance represents another critical weakness of Turkey's temporary shelter system. Empirical assessments show that many units fail to provide adequate protection against extreme heat and cold, exposing residents to unsafe living conditions (Yolaçtı & Gülten, 2024). The prioritisation of rapid mass production over environmental and climatic suitability thus compromises both habitability and the longer-term sustainability of emergency accommodation.

Unlike Turkey's parallel and largely segregated temporary protection regime, Germany embedded refugee accommodation within its established civil protection and welfare infrastructure (Dittmer & Lorenz, 2021). During the 2015-2016 arrivals, the needs of hundreds of thousands of asylum seekers were addressed through the deployment of civil protection units, including the German Red Cross and the Federal Agency for Technical Relief, which constructed and operated emergency shelters across municipalities and federal facilities. Mass reception centres waiting rooms in Bavaria were organised using disaster-management command structures and humanitarian minimum standards, while accommodation during the initial months was financed and administered by state authorities (Dittmer & Lorenz, 2021). This institutional integration meant that refugee sheltering was not treated as an exceptional or parallel system, but as part of the ordinary architecture of welfare and crisis governance.

In Germany, refugee accommodation is subject to a multi-level legal and administrative structure, common to the federal states (Länder) and municipalities. According to §47 of the German Asylum Act (AsylG), asylum seekers are first accommodated in state-run accommodation centres and then allocated to the respective states (AsylG §47, 2025). The range of accommodation settings ranges from collective accommodation to decentralised private residences (Dudek et al., 2022; Laubenthal, 2015). Although this creates a variety of accommodation settings, it also establishes responsibility within established welfare and planning structures, hence offering a certain guarantee of access to accommodation.

In addition, there is formal technical backing for the provision of emergency shelter in Germany, with guidelines from the German Red Cross and the IFRC providing detailed specifications for the minimum standards of thermal comfort, ventilation, and environmental management. These include the establishment of specific temperature limits, such as ranging from 16-19 °C in sleeping areas and 20-22 °C in other areas, fresh air requirements based on DIN norms, and basic waste management ratios, including one 240-litre container per 30 persons per day, for the maintenance of hygienic conditions (Molina Metzger et al., 2016). This is an example of the operationalisation of sustainability concepts based on specific environmental and health parameters. Outside of these formal guidelines, modern practices of public administration also confirm the practical integration of the accommodation of refugees with the normal structures of public administration. For example, the Berlin State Office for Refugee Affairs has implemented the following compulsory measures regarding the saving of energy and the management of the environment: monthly monitoring of the consumption of heating, hot water, and electricity; the setting of a maximum temperature of 20 degrees Celsius during the day and a maximum of 16 degrees Celsius during the night; the restriction of the use of high-consumption appliances; and the provision of training programmes regarding the importance of the aforementioned practices. It is also interesting to notice that any departure from the minimum standards of accommodation, which might be temporarily necessary,

is considered an exceptional measure, primarily intended to prevent emergency solutions of homelessness (Landesamt für Flüchtlingsangelegenheiten [LAF], 2022).

By the end of 2023, 83% of Ukrainian refugees in Germany resided in private accommodation and showed high levels of satisfaction with their living conditions (Kosyakova et al., 2023). According to Tanis (2022), the migration of refugees in Germany between 2013 and 2019 was primarily motivated by administrative distribution and legal obligations, not living situations. In general, accommodation satisfaction varies greatly between collective and private living arrangements. Collective living is often linked with overcrowding, low levels of privacy and autonomy, and poor mental health outcomes, while private living is associated with larger living spaces, social integration, and high levels of residential satisfaction, notwithstanding inequalities in access to services and transportation. Empirical research also reveals that refugee mobility in Germany is driven by administrative allocation policies rather than housing quality. In fact, refugee households are still allocated to their initial locations years after their arrival in Germany (Tanis, 2022). The case of Ukrainian refugees presents an alternative model of governance in refugee management. The application of the EU Temporary Protection Directive facilitated access to private accommodation and minimised reliance on collective living arrangements (Luyten, 2024).

In response to the humanitarian effects of the earthquakes, the German government has implemented legal and migratory measures in addition to the provision of shelter. In this respect, the German government relaxed the visa requirements for Turkish nationals, which resulted in the issuance of 9,500 short-term visas, 900 family reunification visas for Turkish nationals, and over 1,200 visas for Syrians in the affected areas. Furthermore, the Turkey Earthquake Residence Transition Ordinance exempted the residence requirements of those who entered the country with valid Schengen visas between February and May 2023 (Federal Ministry of the Interior, 2023). In this context, the German government did not view protection as limited to the shelter response to the earthquakes but instead utilised the legal instruments of migration and residence law to provide a sense of security to the affected population. In this respect, the legal migratory response of the German government to the earthquakes served as an auxiliary mechanism of shelter and housing protection for the affected population.

Comparatively, these measures highlight a structural divergence between the two systems. Turkey's parallel temporary protection regime leaves disaster-time access to accommodation more discretionary and uneven, thereby amplifying secondary displacement risks for non-citizens. Germany's embedded welfare-civil protection architecture, by contrast, integrates refugee accommodation within ordinary administrative and social systems, stabilising both access to shelter and legal status. Although administrative allocation may still constrain residential autonomy, the German framework more effectively reduces housing precarity under stress. Overall, integration into mainstream welfare and legal structures—rather than the mere expansion of emergency camps—appears decisive in limiting prolonged temporary accommodation and repeat displacement. In addition to institutional issues, Ahr Valley empirical evidence reveals that incorporation into welfare and civil protection systems does not guarantee social and mental resilience. In the empirical study of Ahr Valley residents 65 and older three years after the 2021 flood, 47% tested positive for anxiety disorders, 38% for depression, and 39% for PTSD. In afflicted municipalities like Bad Neuenahr-Ahrweiler and Dernau, spatial clustering is obvious (Song et al., 2026). Even though the region had rapid rehousing and strong family and neighbourhood networks, early warning systems, information, and coordinated support during the flood were lacking. Despite the institutional anchoring of refugee

and emergency accommodations in the welfare system, psychosocial risk in the region is long-lasting, limiting healing and mobility. This case underscores that while structural integration reduces precarity and secondary displacement compared to parallel systems as in Turkey, sustained psychosocial support, improved early warning, and inclusive information flows remain essential to address persistent mental health burdens—even in well-institutionalised contexts.

5. Conclusions

This comparison between Turkey and Germany shows that the phenomenon of displacement cannot be attributed to environmental hazards but to the interaction between exposure to risk and the design of law and governance. The division of responsibilities, shelter, and integration of immigrant accommodation into welfare and crisis response systems have various effects. Turkey's centralized and reactive approach to managing disasters and migrations, with its parallel regime of temporary protection, makes refugees and disaster-affected communities vulnerable to temporariness. In contrast, Germany's decentralised approach to housing is integrated with municipal planning responsibilities and sets minimum welfare-based standards, facilitating the transition from emergency to more permanent forms of accommodation. However, the Ahr Valley case also shows that even well-resourced systems may prioritize compensation over risk reduction, limiting more transformative “Build Back Better” recovery. Overall, the findings suggest that resilient and equitable shelter outcomes depend less on formal legal recognition of housing rights than on joined-up governance that links enforceable standards, risk-sensitive land-use planning, and inclusive access to welfare and accommodation.

Acknowledgment

This article was produced while attending the PhD programme in Sustainable Development and Climate Change at the University School for Advanced Studies IUSS Pavia, Cycle 39, with the support of a scholarship co-financed by the DM118/2023 - M4C1 – Inv. 4.1, based on the PNRR I53C23000830001.

References

- AFAD. (2022). *Türkiye afet müdahale planı (TAMP)*. T. C. İçişleri Bakanlığı.
- Akar, S. (2024). Natural disasters and Syrian refugees: The case of Kahramanmaraş earthquakes in Türkiye. In *Migration and forced displacement – Vulnerability and resilience* (Vol. 1). IntechOpen. <https://doi.org/10.5772/intechopen.1004790>
- Amato v. Turkey*, no. 58771/2000 (ECHR, 2007).
- Mahkemesi, Anayasa (2024). *Esas Sayısı: 2023/74, Karar Sayısı: 2024/141, 23 July 2024*. Resmî Gazete No. 32741.
- Asylum Act (Asylgesetz – AsylG), § 47 (as amended 2025).
- Asylum Seekers' Benefits Act (Asylbewerberleistungsgesetz – AsylbLG), § 3 (1997).

- Ayık, U. (2024). Şimdi çok uzaktasınız! 6 Şubat 2023 depremleri sonrasında Türkiye’de afet kaynaklı yerinden edilme süreçlerinin analizi. *Journal of Planning*, 34(2), 330-341. <https://doi.org/10.14744/planlama.2024.49260>
- Bagherzadeh, M., & Shigemitsu, M. (2021). *Building the resilience of Turkey’s agricultural sector to droughts* (OECD Food, Agriculture and Fisheries Papers No. 164). OECD Publishing. <https://doi.org/10.1787/75430b86-en>
- Baier, A., & Siebert, M. (2018). *The housing situation of refugees in Germany* (Brief Analysis 02|2018). Federal Office for Migration and Refugees.
- Basic Law for the Federal Republic of Germany (Grundgesetz), Article 20a (1949, as amended 2008).
- Beatini, V., Rajanayagam, H., & Poologanathan, K. (2022). Structural and spatial minimal requirement efficacy of emergency shelters for different emergencies. *Buildings*, 13(1). <https://doi.org/10.3390/buildings13010032>
- Biermann, F., & Boas, I. (2008). Protecting climate refugees: The case for a global protocol. *Environment: Science and Policy for Sustainable Development*, 50(6), 8-17. <https://doi.org/10.3200/ENVT.50.6.8-17>
- Birkmann, J., Schüttrumpf, H., Handmer, J., Thielen, A., Kuhlicke, C., Truedinger, A., Sauter, H., Klopries, E.-M., Greiving, S., Jamshed, A., Merz, B., Solecki, W., & Kirschbauer, L. (2023). Strengthening resilience in reconstruction after extreme events: Insights from flood affected communities in Germany. *International Journal of Disaster Risk Reduction*, 96, Article 103965. <https://doi.org/10.1016/j.ijdr.2023.103965>
- Bohnhoff, M., Martínez-Garzón, P., & Ben-Zion, Y. (2024). Global warming will increase earthquake hazards through rising sea levels and cascading effects. *Seismological Research Letters*, 95(5), 2571-2576. <https://doi.org/10.1785/0220240100>
- Brauch, H. G., Oswald Spring, Ú., Mesjasz, C., Grin, J., Kameri-Mbote, P., Chourou, B., Dunay, P., & Birkmann, J. (eds.) (2011). *Coping with global environmental change, disasters and security: Threats, challenges, vulnerabilities and risks* (Vol. 5). Springer. <https://doi.org/10.1007/978-3-642-17776-7>
- Çakın, B., & AlMajdalawi, R. (2024). Unsettled ground, unsettled lives: The ontological (in)securities of Syrian refugees in the shadow of Turkey’s 2023 earthquake. *Journal on Migration and Human Security*, 13(2), 257-275. <https://doi.org/10.1177/23315024241291830>
- Çetin, E. (2021). Uncertainties involved in Turkey’s migration management: The case of Syrians under temporary protection. *DPCE Online*, 45(4), 5175-5189. <https://doi.org/10.57660/dpceonline.2020.1207>
- Constitution of the Republic of Turkey (Türkiye Cumhuriyeti Anayasası), Resmî Gazete No. 17863, Art. 57 (1982).
- Dam, A. (2023). *Adaptable housing during crisis: Sustainable transition from tents to permanent accommodations* (Master’s thesis). Linnaeus University, Växjö. <https://www.diva-portal.org/smash/get/diva2:1790269/FULLTEXT01.pdf>

- de Rooij, B., Wascher, D., & Paulissen, M. (2017). *Sustainable design principles for refugee camps* (Report). Wageningen University & Research.
- Dinç, G., & Gök, B. N. (2024). Post-earthquake urban planning in Türkiye: Evaluating disaster refuge systems in Hatay and Istanbul. *Mimarlık Bilimleri ve Uygulamaları Dergisi*, 9(2), 1044-1057. <https://doi.org/10.30785/mbud.1573206>
- Directive (EU) 2024/1346 of the European Parliament and of the Council, Article 19 (2024).
- Disaster and Emergency Management Presidency Law, No. 5902 (Official Gazette No. 27261, 2009).
- Dittmer, C., & Lorenz, D. F. (2021). Disaster situation and humanitarian emergency – In-between responses to the refugee crisis in Germany. *International Migration*, 59(1), 96-112. <https://doi.org/10.1111/imig.12679>
- Dudek, V., Razum, O., & Sauzet, O. (2022). Association between housing and health of refugees and asylum seekers in Germany. *BMC Public Health*, 22(1), 1-9. <https://doi.org/10.1186/s12889-021-12458-1>
- Engelmann, C. (2021). De jure temporary, de facto permanent: Shelters for people experiencing homelessness in Germany. https://www.feantsa.org/files/Observatory/Journals/Volume-15/V15-1/EJH_15-1_Web.pdf#page=109
- Eranil, M., Kan Kılıç, D., & Ada, B. (2024). Converging the needs of earthquake survivors: A temporary housing design proposal. In A. A. Karadağ & Ş. Ertaş Beşir (eds.), *Earthquake resistant cities and disaster management* (pp. 451-515). Iksad Publications.
- Eraslan, A. (2024). Between transience and permanence: Forced migration experience of Hatay residents. *Uluslararası Kıbrıs Üniversitesi Fen-Edebiyat Fakültesi*, (20), 1235-1234. <https://doi.org/10.22559/folklor.3821>
- Federal Building Code (Baugesetzbuch – BauGB), §§ 1, 1a (2009).
- Federal Ministry of the Interior. (2023). Continuing to assist people affected by the earthquake in Turkey. <https://www.bmi.bund.de/SharedDocs/pressemitteilung/EN/2023/05/hilfe-erdbebenopfer.html>
- Fransen, S., Werntges, A., Hunns, A., Sirenko, M., & Comes, T. (2023). Refugee settlements are highly exposed to extreme weather conditions. *Proceedings of the National Academy of Sciences*, 121(3), e2206189120. <https://doi.org/10.1073/pnas.2206189120>
- Gedik, E. (2024). The impact of the 1946 and 1966 earthquakes on migration and social change: A case study of Varto (Türkiye). *Folklor/Edebiyat*, 30(118), 1183-1208. <https://doi.org/10.22559/folklor.3813>
- Giyik, C. (2024). 6 Şubat 2023 depremi sonrası geçici barınma uygulamaları: Gaziantep Nurdagi örneği. *Doğal Afetler ve Çevre Dergisi*, 10(1), 113-124. <https://doi.org/10.21324/dacd.1357076>
- Greiving, S., Kruse, P., Othmer, F., Fleischhauer, M., & Fuchs, M. (2023). Implementation of risk-based approaches in urban land use planning—The example of the city of Erfstadt, Germany. *Sustainability*, 15(21), Article 15340. <https://doi.org/10.3390/su152115340>

- Gruhl, H., Brehm, J., Ghosh, A., Breidenbach, P., & aus dem Moore, N. (2025). Adjusting to the new normal: River flood risk and the real estate market. *Environmental and Resource Economics*, 88(12), 2331-2356. <https://doi.org/10.1007/s10640-025-00995-x>
- Güneş, E. B. (2023). *Assessing the climate vulnerabilities of Syrian immigrants living in Istanbul from a climate justice perspective* (Master's thesis). Middle East Technical University, Ankara. https://www.researchgate.net/publication/376029483_Assessing_the_Climate_Vulnerabilities_of_Syrian_Immigrants_Living_in_Istanbul_from_a_Climate_Justice_Perspective
- Güngör, Ö., Günneç, D., Salman, S., & Yücel, E. (2024). Simulation of migration paths using agent-based modeling: The case of Syrian refugees en route to Turkey. *Socio-Economic Planning Sciences*, 96, 102089. <https://doi.org/10.1016/j.seps.2024.102089>
- Haliloğlu Kahraman, Z. E. (2024). Earthquake hazard and risk profiling for Syrian refugees at country, city, and neighbourhood levels. *International Journal of Disaster Risk Reduction*, 115, 105018. <https://doi.org/10.2139/ssrn.4926908>
- Hamburg Building Code (Hamburgische Bauordnung – HBauO), §§ 48–49 (2005).
- Hartwig, M. G. (2024). Climate guardians: Navigating the future in the 2021 German climate verdict and constitutional landscape. *Politics and Governance*, 12, Article 7857. <https://doi.org/10.17645/pag.7857>
- Hermansson, H. (2016). Disaster response in Turkey. *Administration & Society*, 51(7), 1-37. <https://doi.org/10.1177/0095399716680058>
- International Federation of Red Cross and Red Crescent Societies and Shelter Research Unit. (2016). Guidelines on emergency sheltering for refugees in Germany. United Nations High Commissioner for Refugees.
- International Federation of Red Cross and Red Crescent Societies (IFRC). (2021). *Displacement in a changing climate*. <https://www.ifrc.org/sites/default/files/2021-11/2021-Climate-Displacement-Report-Final.pdf>
- Jaafari, M. L. (2023). *Here to stay or move away? Investigating the impact of climate change-related natural disasters on migration decisions* (Master's thesis). University of Chicago, Chicago. <https://doi.org/10.6082/uchicago.6037>
- Kienzler, S., Pech, I., Kreibich, H., Müller, M., & Thielen, A. H. (2015). After the extreme flood in 2002. *Natural Hazards and Earth System Sciences*, 15, 505-526. <https://doi.org/10.5194/nhess-15-505-2015>
- Kosyakova, Y., Brücker, H., Ette, A., Grabka, M. M., Niehues, W., Rother, N., Spieß, C. K., Zinn, S., Bujard, M., Cardozo Silva, A. R., Décieux, J. P., Maddox, A., Milewski, N., Sauer, L., Schmitz, S., Schwanhäuser, S., Siegert, M., Steinhauer, H., & Tanis, K. (2023). Ukrainian refugees in Germany: Evidence from a large representative survey. *Comparative Population Studies*, 48, 395-424. <https://doi.org/10.12765/CPoS-2023-16>
- Kreichauf, R. (2018). From forced migration to forced arrival. *Comparative Migration Studies*, 6(1). <https://doi.org/10.1186/s40878-017-0069-8>

- Kuru, A., Özkök, M. K., Özyetgin Altun, A., & Bege, B. (2024). Afet iskân alanlarının mekânsal uygunluklarının değerlendirilmesi. *Türk Deprem Araştırma Dergisi*, 6(1), 251-270. <https://doi.org/10.46464/tdad.1457433>
- Landesamt für Flüchtlingsangelegenheiten. (2022, August 19). 47. Infoschreiben an die Unterkünfte des LAF [Information letter]. Senatsverwaltung für Integration, Arbeit und Soziales.
- Laubenthal, B. (2015). *Refugees welcome? Federalism and asylum policies in Germany* (Working paper). University of Konstanz.
- Law on Foreigners and International Protection, No. 6458 (Official Gazette No. 28615, 2013).
- Luyten, K. (2024). *Temporary Protection Directive* (PE 762.373). European Parliamentary Research Service. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/762373/EPRS_BRI\(2024\)762373_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/762373/EPRS_BRI(2024)762373_EN.pdf)
- Martens, J. (2024). *Management of climate-related hazards in Germany through adaptive social protection* (Working paper No. 2024/03). University of Duisburg-Essen.
- Moench, M., Khan, F., MacClune, K., Amman, C., Tran, P., & Hawley, K. (2015). Transforming vulnerability. *Climate and Development*, 9(1), 22-35. <https://doi.org/10.1080/17565529.2015.1067592>
- Molina Metzger, S., Friedrich, W., & Braedt, C. (2016). *Guidelines on emergency sheltering for refugees in Germany* (Report). United Nations High Commissioner for Refugees.
- Neubauer et al. v. Germany*, 1 BvR 2656/18 (Federal Constitutional Court of Germany, 2021).
- Nur, N., & Sethman, A. (2016). Migration and mobilisation for the right to housing in Rome. In P. Mudu & S. Chattopadhyay (eds.), *Migration, squatting and radical autonomy* (pp. 78-92). Routledge.
- Öcal, A. (2021). Disaster management in Turkey: A spatial approach. *International Journal of Disaster Risk Management*, 3(1), 15-22. <https://doi.org/10.18485/ijdrm.2021.3.1.2>
- Odersky, M., & Löffler, M. (2024). Differential exposure to climate change. *The Journal of Economic Inequality*, 22(3), 551-576. <https://doi.org/10.1007/s10888-023-09605-6>
- Paterson, A., Matsumoto, T., & Özgüzel, C., et al. (2023). The territorial impact of the earthquakes in Türkiye (Report). OECD.
- Richter, S., Heumüller, E., & Lechner, U. (2010). *Concepts for command & control effectiveness* [Conference paper]. BLED eConference 2010, Bled, Slovenia. [https://domino.fov.um.si/proceedings.nsf/0/73f44e0184580b91c1257757003d0661/\\$FILE/28_Richter.pdf](https://domino.fov.um.si/proceedings.nsf/0/73f44e0184580b91c1257757003d0661/$FILE/28_Richter.pdf)
- Riemer, L., Rau, L., & Schalast, R. (2025). *Conditions in reception facilities – Germany* (Report). European Council on Refugees and Exiles.

- Ruhnke, S., Hertner, L., Gundacker, L., & Wagner, S. (2024). *Well-being of Syrian refugees in Turkey in the aftermath of the February 2023 earthquakes* (Report). Berliner Institut für Empirische Integrations- und Migrationsforschung.
- Sánchez, M., & Riosmena, F. (2021). Cambio climático global, ecología política y migración. *Revista de Estudios Sociales*, 76, 2-6. <https://doi.org/10.7440/res76.2021.01>
- Seifert, L., Kunz, N., & Gold, S. (2023). Sustainable innovations for humanitarian operations. *International Journal of Operations & Production Management*, 43(10), 1554-1586. <https://doi.org/10.1108/ijopm-05-2022-0302>
- Sevinin, E., Daniş, D., & Sert, D. (2023). Double displacement of refugees. *International Migration*, 61(4), 341-344. <https://doi.org/10.1111/imig.13171>
- Siğın, A., & Akyıldız, N. (2024). Effects of February 6, 2023 Kahramanmaraş earthquakes on housing preferences. *Journal of Economy Culture and Society*, 69, 1-14. <https://doi.org/10.26650/jecs2023-1344821>
- Sobczak-Szelc, K., Chulek, M., Espegren, A., Jenerowicz-Sanikowska, M., Gromny, E., Haarpaintner, J., Aleksandrowicz, S., & Starczewski, D. (2024). Navigating environmental fragility. *Environmental Development*, 52, 101101. <https://doi.org/10.1016/j.envdev.2024.101101>
- Song, C., Atun, F., Blanford, J. I., & Anthonj, C. (2026). Germany Ahr Valley flood 2021: A social and mental health perspective of older adults (65+) experiences. *Wellbeing, Space and Society*, 10, 100332. <https://doi.org/10.1016/j.wss.2025.100332>
- Sphere Association. (2018). *The Sphere handbook* (4th ed.). Sphere Association.
- Stazen, L. (2021). *The link between homelessness and migration* (Report). International Centre for Migration Policy Development.
- Stephen, L. J. (2013). *Syrian refugees and food insecurity in Iraq, Jordan and Turkey* (Report). World Food Programme.
- Tamura, K., Rafliana, I., & Kovacs, P. (2018). Formalizing the concept of build back better. *Journal of Disaster Research*, 13(7), 1187-1192. <https://doi.org/10.20965/jdr.2018.p1187>
- Tanis, K. (2022). *Residential trajectories of refugees in Germany* (Report Vol. 1–2022). Bundesamt für Migration und Flüchtlinge. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-84991-1>
- Temporary Protection Regulation, No. 2014/6883 (Official Gazette No. 29153, 2014).
- Tiryaki Yenilmez, D. (2023). Deprem ve göç ilişkisi üzerine bir değerlendirme. *Akademik Düşünce Dergisi*, 7, 39-52. <https://doi.org/10.53507/akademikdusunce.1282303>
- Truedinger, A. J., Jamshed, A., Sauter, H., & Birkmann, J. (2023). Adaptation after extreme flooding events: Moving or staying? The case of the Ahr Valley in Germany. *Sustainability*, 15(2), 1407. <https://doi.org/10.3390/su15021407>

- Tyagunov, S., Grünthal, G., Wahlström, R., Stempniewski, L., & Zschau, J. (2006). Seismic risk mapping for Germany. *Natural Hazards and Earth System Sciences*, 6(4), 573-586. <https://doi.org/10.5194/nhess-6-573-2006>
- United Nations High Commissioner for Refugees (UNHCR). (2026). Emergency shelter solutions and standards.
- United Nations High Commissioner for Refugees. (2024). *2023 post-earthquake population dynamics analysis* (Report).
- United Nations Office for Disaster Risk Reduction (UNDRR). (2015). *Sendai framework for disaster risk reduction 2015-2030*.
- United Nations Sustainable Development Group. (2022). Operationalizing leaving no one behind. <https://unsdg.un.org/sites/default/files/2022-04/Operationalizing%20LNOB%20-%20final%20with%20Annexes%20090422.pdf>
- Yalçın, D., Fahjan, Y., Eravcı, B., & Yanık, K. (2017). Afad-Red rapid earthquake damage and loss estimation software [Conference paper]. In 9th Congress of the Balkan Geophysical Society. European Association of Geoscientists & Engineers. <https://doi.org/10.3997/2214-4609.201702596>
- Yetiskin, E. (2025). Ignorance production in national disaster risk governance. *International Journal of Disaster Risk Reduction*, 116, 105114. <https://doi.org/10.1016/j.ijdr.2024.105114>
- Yolaçtı, S., & Gülten, A. (2024). Afet sonrası kullanılan geçici barınaklarda termal konfor. *IDA: International Design and Art Journal*, 6(1), 90-104. <https://idajournal.com/index.php/ida/article/download/275/98/1937>