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Efficient Spatial Organization for Occupants in Need: Innovative Spatial Solutions for Displaced and Vulnerable Groups

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Abstract

Natural disasters and conflicts not only cause physical damage to the environments in which people live but also deprive individuals of adequate shelter. As one of the most fundamental human rights, access to proper housing is of critical importance. In this context, this study investigates how the spatial organization of temporary shelter camps affects user satisfaction across various international contexts. A web-based documentary analysis method was applied to examine nine case study regions that were significantly affected by disasters and conflicts in the 21st century. These regions, Sri Lanka, the United States, Haiti, Turkey, Japan, Greece, the Philippines, Nepal, and Italy, were selected through purposive sampling, based on the severity of the disasters and their impact on local populations. Data were obtained through the review of academic literature, media archives, and institutional reports, with affected areas identified accordingly. Triangulated analyses within the reviewed academic sources provided valuable insights into the conditions of temporary camps. The findings reveal pervasive security vulnerabilities, insufficient user-focused assistance from local governments and civil society organisations, feeble spatial design, poor sanitation facilities, and restricted access to social infrastructure. These deficits adversely affect psychological well-being and community integration. The study indicates that temporary shelters created during catastrophes and wars must adhere to international humanitarian standards, integrate adaptable and sustainable spatial plans, and get backing from local authorities and the Sustainable Development Goals through user-centred interventions. The study is to provide a reference for future research and the efficient organisation of temporary shelter camps.

Keywords*:* Disasters & Conflict, Vulnerable groups, Disaster camp area, Temporary shelters, Spatial organization

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1. Introduction

Climate change has impacted the entire world, affecting quality of life, economies, atmospheric conditions, sea levels, and contributing to an increase in the frequency and severity of natural disasters. According to official reports published by the Intergovernmental Panel on Climate Change (IPCC), disasters are becoming more destructive as climate change intensifies, along with an increase in conflict. The IPCC has stated that the frequency and severity of disasters and conflicts could increase significantly in the 21st century, displacing millions of people and creating significant challenges for global housing systems. According to the Internal Displacement Monitoring Centre (IDMC), more than 43 million people were displaced by natural disasters in 2022 alone. This situation has resulted in

widespread housing crises and social unrest, underscoring the urgent need for effective temporary shelter solutions (Sukhwani, 2021)

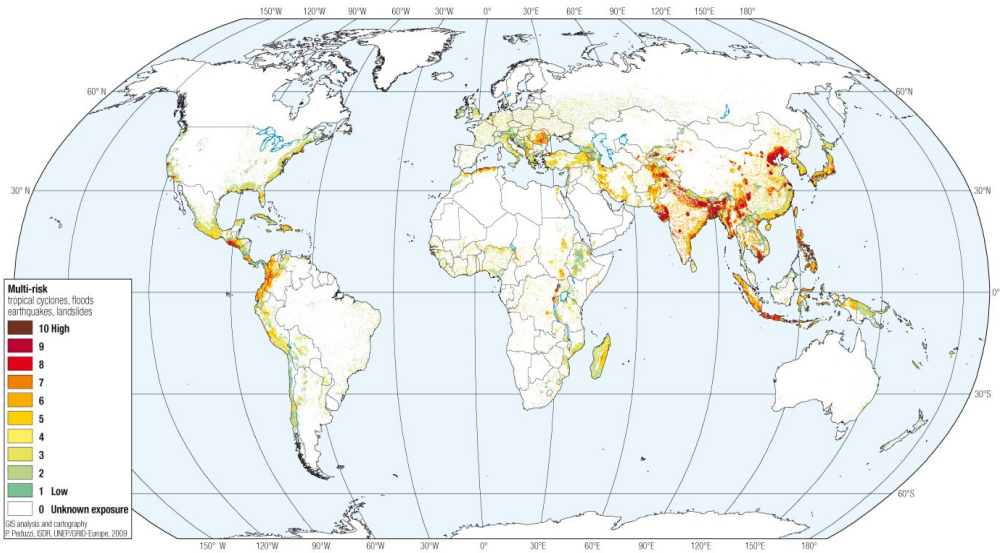


Figure 1. Global distribution of mortality risk from multiple hazards in 2010 (GIS Analysis by ISDR and UNEP in 2009).

Post-disaster emergency shelters are typically designed to provide rapid physical protection tents, for example, but often overlook crucial aspects such as spatial organization, user-centered design, psychological well-being, and social recovery. (Lizarralde, 2006) . However, temporary camps and shelters established in the aftermath of disasters play a vital role in meeting various spatial needs, ensuring safety, delivering hygiene infrastructure, supporting user satisfaction, and addressing the basic requirements of affected communities. (Aldrich, 2020) . The organization of such shelters, along with the quality of infrastructure and the services provided, has a direct impact on the satisfaction of disaster victims. (Safapour, 2021). Until the reconstruction process is complete, affected populations must be able to sustain their daily lives in temporary housing units that offer adequate protection and dignity. Yet, the organization of post-disaster camp areas is often hindered by infrastructural deficiencies, hygiene issues, security problems, and the absence of social spaces. (Mulligan, 2012).

Although there is a growing body of literature on post-disaster temporary housing, few studies have comparatively and empirically examined how the spatial organization of temporary accommodation affects user satisfaction across different geographical and cultural contexts. There is a noticeable gap in the literature regarding comprehensive, sample-based research that could inform future design and disaster management practices. This study aims to address this gap by analyzing nine international case studies: Sri Lanka, the United States, Haiti, Turkey, Japan, Greece, the Philippines, Nepal, and Italy, using a web-based documentary analysis approach. Academic studies, online surveys, and site analyses were examined to identify the advantages and disadvantages that influence user satisfaction in the spatial setup of temporary camps.

The central research question of this study is:

- How does the spatial organization of temporary shelters and camp areas established after disasters and conflicts affect the satisfaction of vulnerable populations?

The findings reveal that spatial configuration, the presence of social areas, hygiene infrastructure, and the adaptability of shelter units are key determinants of user satisfaction. (Barenstein, 2012). This study aims to contribute to the discourse on humanitarian architecture by offering insights into spatial planning, community safety, and user experiences. Furthermore, it proposes improvements to post-disaster shelter design and advocates for sustainable housing strategies in line with international humanitarian standards such as those outlined by the UNHCR and the United Nations Sustainable Development Goals. The study emphasizes the importance of involving local governments and civil society organizations in the planning and implementation of secure, adaptable, and user-centered temporary shelter environments.

2. Literature Review

Various disasters occur in the world and cause great damage. After the disaster, the affected people experience difficulties in being left without many needs, especially accommodation. (Saeed, 2021). The types of camps used according to the types of disasters generally vary according to the nature of the disaster, its impact, and the duration of the aid needed.

According to UNHCR (United Nations High Commissioner for Refugees), post-disaster shelter solutions are listed in Table 1.

Table 1. Short-term and long-term temporary shelter areas were established after the disaster (UNHCR, 2020).

TYPE OF SHELTERS	
Short-Term Shelters	**Long-Term Shelters**
Tents: They can be quickly set up and transported as soon as possible, after a disaster situation	These are houses established for the vulnerable in place of old houses or temporary camp areas, if appropriate infrastructure is provided.
Pre-fabricated shelters: Durable and bigger interior space, but may not be suitable for disaster because of the insulation	
Shelter Kits: Contain basic living materials, meet basic needs for the disaster period	
Communal Shelter Centers: Existing structures such as schools and gyms can be used as temporary shelters for vulnerable groups	

Various types of temporary shelters and shelter camp area measures are implemented according to different types of disasters. The first of these is shelters and shelter camps established after earthquakes. Such disasters affect individuals who face numerous challenges, and shelter becomes one of the most essential needs of the vulnerable during this period. (AFAD, 2023). To meet shelter needs after earthquakes, both short-term and long-term shelter camps are established. In the initial phase, tent camps are deployed as a quick and practical solution. Tents provide immediate shelter for the vulnerable in the aftermath of disasters and are ideal for temporary housing due to their portability and quick setup. (Thomson, 2009). However, they are limited in terms of long-term comfort and durability. Basic needs are met through these short-term, temporary accommodations. As time progresses and recovery and climate conditions become more significant, temporary container camps with better insulation and larger spaces are established. (Yazdani, 2020). Compared to tents, containers offer better insulation and security, providing a more comfortable environment, especially in winter conditions. (UNHCR, 2025) These structures are flexible in terms of spatial organization and can be rapidly deployed in disaster areas due to their portability.

The second type involves floods and inundations, which negatively impact both the terrain and local living environments. In such disasters, shelters must be safe and resistant to flooding, considering rising water levels and saturated ground conditions. (Rad, 2021). Elevated prefabricated structures should be used to provide safe living environments. These modular structures, which can be rapidly assembled and relocated, offer effective solutions in emergencies and can be adapted to accommodate families of different sizes. (Dayanır, 2022). Instead of hastily setting up emergency shelters, it is first necessary to identify appropriate land and then construct shelters based on the characteristics of the terrain and the severity of the disaster. (Biter, 2023).

Third, tsunamis are disasters that cause severe destruction and have long-term impacts. Tsunami disasters can be mitigated through increased disaster awareness and by implementing various education and awareness-raising programs. (UNDRR, 2012). After such events, temporary shelter areas should be established in safer zones away from the tsunami-affected coastline, ideally in elevated areas with stable ground conditions. (IFRC, 2015). The shelters and shelter areas established may serve multiple purposes for victims. Since tsunamis often occur following earthquakes, it is also important to establish social spaces that offer psychosocial support and help communities reintegrate into normal life.

Fourth, hurricanes and storms require durable temporary shelter solutions in affected regions due to severe weather conditions. As such, disasters may recur over extended periods, and the use of shelter structures that are resistant to wind and rain is important. Long-lasting, durable prefabricated and modular structures enable rapid assembly and serve as effective solutions to meet emergency housing needs after disasters. (Aras, 2024). These buildings are often preferred after a disaster due to their adaptability and durability. (İnan, 2012)

Finally, after man-made disasters (conflict and fire, etc.), various types of temporary camps are established to meet the shelter, medical, educational, and social needs of displaced victims. (Akyol, 2022). Temporary camps play a vital role in the social reintegration of displaced individuals and war victims, providing a wide range of services such as shelter, healthcare, and education. One of the most important factors to consider in the establishment of these temporary camps and shelters is sociocultural sensitivity. Since victims come from different countries and have different cultures, beliefs, gender norms, living standards, and languages, these differences should be considered in the design and organisation of shelters. (Rapoport, 1970).

3. Materials and Methods

This study employs a qualitative, web-based documentary analysis approach to examine the spatial organisation of temporary shelter camps established after disasters and conflicts, as well as their impact on user satisfaction. The study aims to identify the shared challenges and effective practices related to user satisfaction within camp areas across diverse geographical and cultural contexts. The analysis focuses on nine countries that were significantly affected by major large-scale disasters and humanitarian crises in the 21st century: Sri Lanka, the United States, Haiti, Turkey, Japan, Greece, the Philippines, Nepal, and Italy. Data were collected through a comprehensive web-based search strategy, targeting disasters that had a profound impact on populations worldwide throughout the 21st century. The sources include peer-reviewed journal articles, reports, and guidelines published by international organizations (such as UNHCR, IFRC, IDMC, WHO), news articles, visual documents (e.g., camp maps, photographs), and content published by governments on their official websites and social media platforms.

The study is limited to documented natural disasters and conflicts that occurred between 2000 and 2023, which had a global impact. Spatial and organizational data from post-disaster shelter areas (e.g., site layouts, unit sizes, access to services) and user satisfaction data (e.g., hygiene, safety, adaptability) are included in the scope of analysis. The transformation of temporary shelters into permanent settlements was interpreted through indirect indicators. Cultural characteristics and local socio-cultural contexts of the regions were also considered, as the study evaluates areas from various cultural settings. Ethical considerations in data interpretation were addressed to ensure dignified and accurate representation of displaced and vulnerable groups.

Following the analysis of nine disaster-affected regions, a framework analysis was conducted based on key dimensions identified in each area: Security measures (e.g., entry and exit controls, lighting, and surveillance zones), Spatial organization (e.g., density, layout, shelter proximity, and privacy), Infrastructure services (e.g., water supply, clean/dirty water separation, waste management), Social spaces (e.g., multipurpose areas, education, healthcare, worship, and recreation facilities) and Psychosocial aspects (e.g., presence of green spaces, stress, and well-being management). Findings derived from the analysis of different types of sources, including national journals, media reports, and survey results from local news outlets, were triangulated and incorporated into the study.

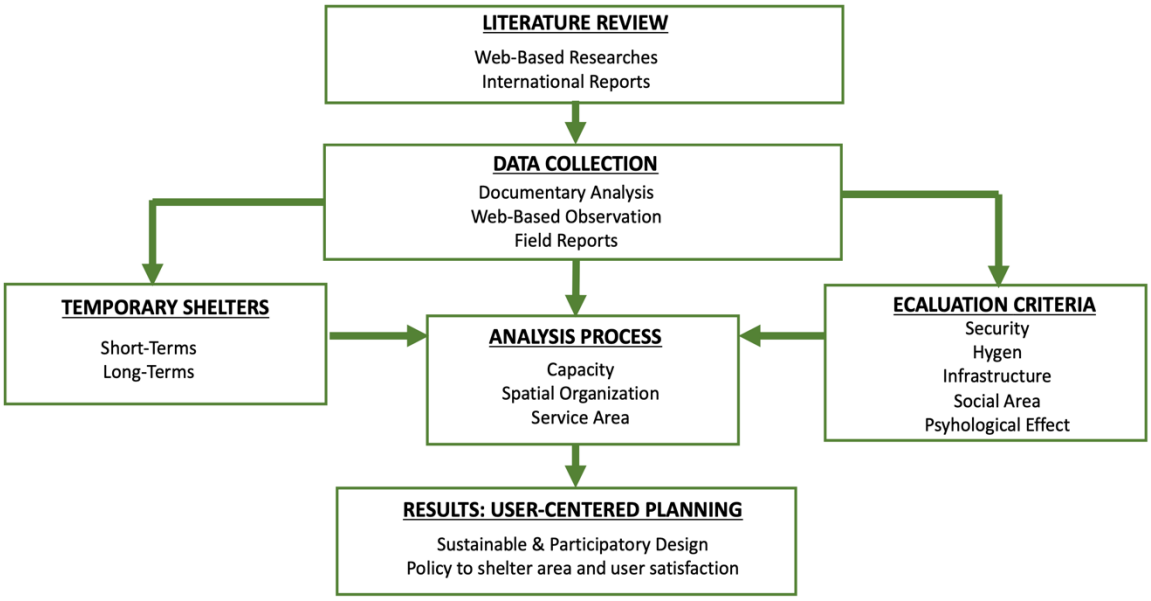


Figure 2. Methodological Framework of the Study.

4. Findings

People forced to flee disasters, conflicts, and persecution require life-saving assistance such as shelter, food, water, and medical care. (Da Silva, 2007). In such situations, users need temporary shelter environments where they can feel safe, easily access their basic needs, and begin to rebuild their lives in places they can temporarily call "home." (L'Étang, 2012). This section examines the spatial organization of shelters in nine case studies selected based on the diversity and impact of disasters in the 21st century. The analysis considers not only the physical characteristics of the shelter areas but also user experiences.

Although each case is embedded in distinct cultural lifestyles and local socio-cultural conditions, common challenges have been identified across the examined regions. These include inadequate infrastructure, limited user access to hygiene and sanitation services, spatial overcrowding, insufficient security measures, and the absence of designated social spaces. The study evaluates the impact of temporary camp environments on user satisfaction through a comparative analysis structured around these recurring themes.

4.1. Sri Lanka Region

Following the 2004 Indian Ocean earthquake, a massive tsunami struck coastal areas of Sri Lanka, causing widespread destruction and mass displacement. (Ratnasooriya, 2007). Immediately afterwards, displaced populations sought refuge in public buildings such as schools and places of worship. (Roberts, 2006). While these spaces provided immediate protection, they lacked the spatial organisation, privacy, and sanitation infrastructure necessary for long-term survival. (Tschirpig, 2022). Initially, short-term emergency shelters were established to meet basic needs. However, challenges related to unsuitable land use and limited accessibility negatively affected users. (Liu, 2005). As the situation evolved, authorities recognized the need to transition to longer-term camps built on higher ground to mitigate future risks and improve living standards. These new shelter sites were organized around shared spaces to enhance community interaction and social cohesion. Despite including basic domestic functions such as kitchens and bathrooms, many users reported dissatisfaction with construction quality and spatial planning. (L'Étang, 2012). Web-based analyses and satellite imagery revealed that spatial layouts were intentionally designed to provide enclosed zones that support privacy and security, particularly for women, and fostered stronger community bonds. (Roberts, 2006). However, critical gaps persisted. Many health facilities were damaged, and temporary health services deployed in early-stage camps failed to adequately meet regional needs. Similarly, water supply systems and sanitation units were severely compromised in the short-term shelters, prompting a reliance on international aid during the transition to more permanent solutions.

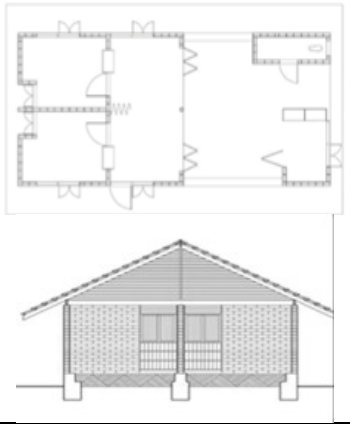
SRI LANKA REGION –TSUNAMI DISASTER		
		
26 December 2004 Indian Ocen Tsunami (UN News, 2004)	Post-Tsunami rehabilitation project, Kirinda post-disaster camp area (Ratnasooriya, 2007)	Kirinda post-disaster shelter organization (Dombek, 2016)

Table 2. Evaluation of the post-tsunami camp site established after the tsunami in the Sri-Lanka region

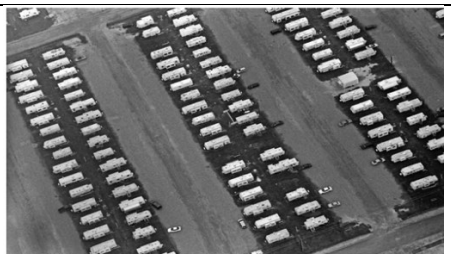
These shortcomings highlight the inherent tension between rapid shelter deployment and long-term sustainability. The Sri Lanka case demonstrates that early spatial decisions should be guided by the nature and scale of the disaster, appropriate land selection, and the implementation of infrastructure and safety systems from the outset. Integrating local governance with international shelter standards, such as those promoted by the IFRC and Sphere Project, can support more resilient and user-centered recovery strategies. Lessons from Sri Lanka underscore the importance of proactive planning and multisectoral coordination in enhancing user satisfaction and long-term recovery.

4.2. United States of America Region

In 2005, Hurricane Katrina caused devastating destruction in the New Orleans region of the United States. According to BBC News (2005), the country faced "one of the most complex urban displacement crises in recent history." While many victims relocated to other states until recovery efforts were initiated, economically disadvantaged populations remained within the disaster zone and were resettled in temporary shelters at Renaissance Village in Louisiana (Marler, 2024). These shelter units were provided by FEMA, which deployed mobile trailer homes across the site. (Aldrich D. P., 2015).

In the early stages, the spatial organization of the camp was perceived positively. The FEMA trailers provided basic amenities such as individual toilets, beds, and kitchen areas, offering a sense of privacy and comfort absent in many global emergency shelters. However, as time progressed, significant security gaps emerged. The absence of a consistent police presence and on-site security staff resulted in increased vulnerability, particularly for women and children. BBC News (2010) reported that the area became known as the "Toxic Trailer Zone," as individuals from outside the disaster population began occupying the shelters without regulation (Roberts, 2006). This uncontrolled influx and population mixing exposed the fragility of camp governance in urban post-disaster contexts, where spatial organization alone is insufficient without attention to broader socio-political dynamics. Despite the initial logistical success in deploying mobile units, the lack of integrated services such as healthcare, education, employment, and psychosocial support significantly limited user satisfaction.

Table 3. Evaluation of the post-hurricane camp site established after the hurricane in the USA region.

UNITED STATES AMERICA REGION – NEW ORLEANS HURRICANE DISASTER		
		
On 28 August 2005, After Hurricane Katrina in New Orleans (Ravilious, 2016)	Post-disaster camp area in Lousiana Renaissance Trailer Village (Ravilious, 2016)	In the Louisiana Renaissance Trailer Village Shelter Organization. Designed by FEMA (Aldrich D. P., 2020)

Analysis of this case reveals that FEMA's shelter model fell short of key Sustainable Development Goals (SDGs), particularly regarding inclusivity, adaptability, and participatory planning. Although the spatial layout was more organized compared to many international cases, the absence of long-term infrastructure and community support services undermined the overall effectiveness of the shelter program.

4.3. Haiti Region

In 2010, a powerful earthquake struck Haiti, resulting in massive destruction throughout the country. The disaster triggered one of the most devastating urban humanitarian crises in recent history. (L'Étang, 2012)). One of the most heavily affected areas was Port-au-Prince, where a large number of displaced individuals were relocated to temporary shelters established with the assistance of international aid organizations. One notable example was the conversion of the Petionville Golf Course into an emergency camp, intended to provide basic shelter and security services for victims. (L'Étang, 2012). Although the camp was established rapidly with international support, it soon exhibited critical weaknesses in spatial organization, service accessibility, and overall camp management. (Aslan, 2025). The green and relatively secluded location of the golf course initially offered a sense of psychological relief to many residents. However, satellite imagery and maps from that period (Table 3) reveal a disorganized and inconsistent spatial layout, with limited privacy and poor internal circulation. This lack of planning increased risks during emergencies and contributed to a general sense of insecurity and instability among camp occupants. (Da Silva, 2007).

The earthquake severely damaged existing infrastructure. Access to basic services such as clean water, sanitation, and waste management was insufficient. (Bliss, 2010). The shelter units did not follow any standard spatial typology commonly seen in container or tent settlements. Instead, they were arranged openly, lacking adequate privacy and internal service zones. Toilets and showers were located in communal zones, separate from the shelter units, increasing the risk of hygiene issues and exposure to gender-based violence. Moreover, there were no designated social or service areas for residents, and those suffering from trauma related to displacement, aftershocks, and uncertainty regarding long-term housing received no psychosocial support. (Risler, 2015). Due to the region's poverty and dense population, the Petionville site, though intended to support victims, also became a target for occupation by non-affected homeless populations. These individuals, who typically lived on the streets under normal circumstances, attempted to occupy or disrupt the shelters built for disaster victims, leading to further safety and governance issues. (Rahill, 2014).

Table 4. Evaluation of the post-earthquake camp site established after the earthquake in Haiti

HAITI REGION PORT-AU-PRINCE EARTHQUAKE DISASTER		
		
After the 12 January 2010 Haiti Earthquake in Port-Au-Prince, satellite view (Ramsay, 2025)	Displacement Camp Near Port-au-Prince Airport (Ramsay, 2025)	Post-Disaster Tent Shelter Organization in Haiti (GSC, 2020)

Despite the rapid provision of material aid by international organizations, web-based research indicates that the lack of spatial planning and the absence of participatory consultation with users resulted in a chaotic and unsustainable camp environment in Haiti. This case illustrates how humanitarian responses, while logistically effective in the short term, can fail to provide safe, functional, and psychologically supportive environments without coherent spatial strategies.

4.4. Turkey Region

In recent years, Turkey has experienced two major earthquakes: the 2011 Van earthquake and the 2023 Kahramanmaraş twin earthquakes. In both disasters, affected populations were severely impacted and forced to reside in temporary shelters for extended periods. (Barenstein, 2012). In the immediate aftermath, emergency shelter solutions were rapidly deployed in the form of tent cities to meet urgent housing needs. These were gradually replaced with more durable prefabricated and container units designed for mid- to long-term accommodation. (Mehdi, 2013). In both Van and Kahramanmaraş, emergency shelter areas revealed significant problems related to insulation and infrastructure. According to interviews conducted by the BBC with disaster victims, many camps were established on unsuitable terrain without proper consideration of climatic conditions, leaving residents vulnerable to extreme environmental exposure. (Journal, 2023). Despite a ten-year gap between the two disasters, many of the strategic shortcomings observed after the Van earthquake were repeated during the Kahramanmaraş response, suggesting a lack of structural progress in Turkey's post-disaster shelter planning.

One of the most critical challenges in both events was thermal comfort, particularly during winter. Inadequate insulation in tents and containers prompted the installation of wood-burning stoves inside the units as a heating solution. (Aslan, 2025). Although this provided short-term relief, it also introduced fire hazards. In several cases, internal stove use led to accidental fires within the shelters.

Table 5. Evaluation of the post-earthquake camp site established after the earthquake in Turkey

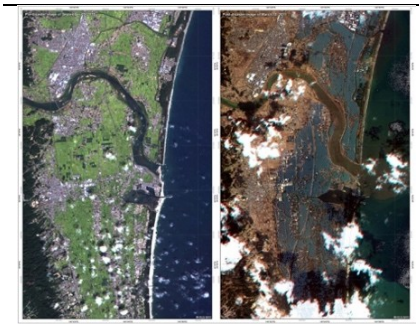
TURKEY REGION VAN-MARAŞ EARTHQUAKE DISASTER		
		
On 23 October 2011, Van (top) & 6 February 2023 Maraş (under) Earthquake in Turkey (Journal, 2023)	Post-Disaster Camp Area in Van (top) Post-Disaster shelters in Maraş City Center (under) (Journal, 2023; BBC, Italy earthquake: Wooden houses planned for survivors, 2016)	Post-Disaster shelter in Van (top) and Maraş (under) (Mehdi, 2013)

While social facilities and sanitation units were established in both regions by national disaster authorities such as AFAD, these were not always evenly distributed or accessible to all users. (Akyüz, 2011). The Turkey experience reveals the importance of site selection, risk mitigation, and climate-sensitive shelter planning in future emergency responses. The recurrence of similar problems across both disasters highlights the urgent need for improved institutional learning and user-centered shelter strategies.

4.5. Japan Region

In 2011, a powerful earthquake struck the Tōhoku region of Japan, triggering a devastating tsunami that led to widespread displacement and the destruction of entire settlements. (Ushizawa, 2013). Compared to other cases, Japan's disaster response was considered highly efficient in terms of logistics and infrastructure deployment. However, despite the rapid provision of temporary housing, significant deficiencies were observed in terms of psychosocial support and spatial organization. (Dahl, 2020).
The spatial arrangement of these camps comprised shelter units classified by household size: around 20 m² for individuals, 30 m² for couples, and 40 m² for families of four. Although this classification conformed to Sphere rules on minimum living space per individual, the lack of communal amenities and shared social spaces hindered the development of community ties and mutual assistance among residents (Saunders, 2004). The shelters were organised in tight configurations, and the dense arrangement inadequately accommodated the number of displaced individuals. As a result, cases of kodokushi (lonely death) began to develop within the camps. (Penta, 2016). This phenomenon was strongly linked to various spatial and social factors: the absence of communal amenities, the isolation of individuals with no common obligations, limited opportunities for social connection, and the psychological pressure imposed by confined areas. These circumstances led to increased stress and social isolation, especially among older individuals and those residing alone. (Ushizawa, 2013).

Table 6. Evaluation of the post-earthquake campsite established after the earthquake in Japan

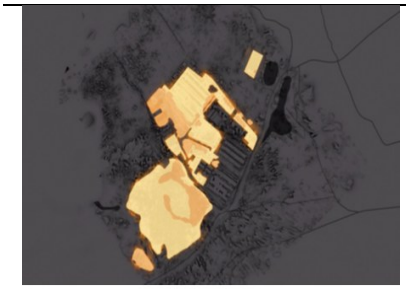
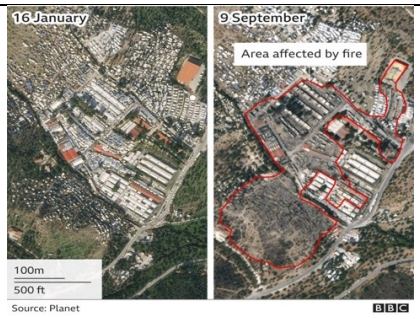
JAPAN REGION TOHOKU EARTHQUAKE DISASTER		
		
Tohoku Landscape Changed After 11 March 2011 Tohoku Earthquake (Global Peace)	Post-Disaster Short-Term Camp Area in Tohoku (Serrano, 2012)	Post-Disaster Shelter Interior Organization in Tohoku (Serrano, 2012)

While Japan's post-disaster shelter response met technical standards in terms of infrastructure quality and spatial efficiency, the case underscores the critical need to integrate psychosocial considerations and user satisfaction into shelter design. The lack of mental health support services and designated community spaces negatively impacted the well-being of residents and hindered the social recovery process. The Japan case illustrates that even in highly developed contexts, post-disaster shelter planning must go beyond physical safety and address the psychological and social needs of affected populations through participatory and adaptive design strategies.

4.6. Greece Region

Millions of people have been forced to leave their countries in search of safety in recent years due to ongoing international conflicts like the Israel-Palestine conflict and the Russia-Ukraine war. The Moria Refugee Camp in Greece was one of the biggest refugee camps to receive these displaced people. The government initially planned for the camp to house 3,000 people, but as time went on, the number of asylum seekers increased to over 20,000. Poor sanitation, restricted access to water and toilets, and hazardous living conditions were the results of this unchecked growth, which also caused serious spatial dysfunction, including the collapse of zoning, circulation routes, and basic infrastructure. The forced cohabitation of individuals from wildly disparate cultural backgrounds in a small area was a significant problem in the Moria camp. Built environments are influenced by the cultural values, beliefs, and symbols of their users, as highlighted by Rapoport (1970). Residents of Moria started reshaping areas to fit their own identities and norms, which frequently resulted in spatial conflict. The lack of private, safe spaces puts women and children at even higher risk of abuse and neglect. The camp also lacked shared social areas or facilities to provide psychosocial support. As a result, mental health deteriorated rapidly among residents, with humanitarian reports documenting widespread depression, suicidal ideation, and self-harm. (Van de Wiel, 2021)

Table 7. Evaluation of the Moria Refugee Camp area established after the fire in Moria

GREECE REGION MORIA REFUGEE CAMP FIRE DISASTER		
		
Areas affected by the fire at Moria Refugee Camp (MSF, 2020)	Moria Refugee Camp Area before and after (Smith, 2020)	Fire Demonstration in the Campsite (Smith, 2020)

The catastrophic fire that destroyed the camp in 2020 was reportedly triggered by clashes among culturally divided groups, one of which included individuals suffering from acute psychological distress. This event exemplifies the critical link between spatial planning, cultural sensitivity, and mental health in displacement contexts.

4.7. Philippines Region

In 2013, Typhoon Haiyan (locally known as Yolanda) displaced over 11 million people across the Philippines, with Tacloban and Yolanda among the hardest-hit regions. (Chan, 2013). In response, short-term shelter camps were rapidly established to prioritize emergency accommodation. (Lakeman, 2021). However, these camps lacked basic infrastructure, particularly sanitation, electricity, and water, resulting in widespread dissatisfaction among the displaced population.

Web-based analysis of photographs and reports revealed that shelters were limited to sleeping functions only, with no communal kitchens or social areas. The spatial layout did not support daily living needs or social interaction, which further isolated users and hindered recovery.

Table 8. Evaluation of the Yolanda Post-Disaster Camp area established after the Haiyan Typhoon in the Philippines

PHILIPPINES REGION HAIYAN TYPHOON DISASTER		
		
Haiyan Typhoon On 3 November 2013 Before-After Landscape in Yolanda (BBC, Typhoon Haiyan: Before and after the storm, 2013)	Yolanda Post-Disaster Camp Area 2013 (BBC, Typhoon Haiyan: Before and after the storm, 2013)	Yolanda Post-Disaster Tent (Bergman, 2014)

The Philippines case underscores two key deficiencies: the absence of international coordination and critical infrastructure support. These shortcomings highlight the vulnerability of post-disaster shelter responses when both global aid and local planning capacity are insufficient.

4.8. Italy Region

The 2016 earthquake in Pescara del Tronto caused severe destruction in a mountainous region, where difficult terrain significantly delayed the deployment of emergency shelters. (UNHCR, Shelter and Settlements: A UNHCR Handbook for Emergencies, 2022). Initial efforts involved the installation of tents and prefabricated units, but accessibility challenges limited the timely arrival of aid organizations and resources. (Brusa, 2021).

Temporary clinics and educational facilities were eventually provided through national assistance programs. However, the absence of adequate infrastructure and the harsh winter climate prolonged the recovery process and negatively affected user well-being. Although some measures were later taken to improve thermal protection in the camps, they came too late to prevent initial hardship.

Table 9. Evaluation of the Pescara del Tronto camp area established after the Earthquake in Italy

ITALY REGION PESCARA DEL TRONTO EARTHQUAKE DISASTER		
		
On 26 August 2016, the Italy Earthquake in Pescara del Tronto Before and After Situation (The Guardian)	In Pescara del Tronto Short-Term Camp Area (BBC, Italy earthquake: Wooden houses planned for survivors, 2016)	Pescara del Tronto Short Term Shelter with Victims (BBC, Italy earthquake: Wooden houses planned for survivors, 2016)

This case illustrates how terrain-sensitive planning and flexible shelter strategies are essential for effective disaster response. Delays in infrastructure and basic services highlight the need for adaptable designs that can function in remote, climate-exposed regions.

4.9. Nepal Region

Following the 2015 earthquake in Nepal, the affected region, particularly the Kathmandu area, suffered severe damage, displacing thousands of residents and creating an urgent need for temporary accommodation. Ratna Park was identified as a suitable location for the establishment of emergency shelters, and short-term camps were set up accordingly. (Adhikari, 2020). While essential services like clean water and healthcare were offered, there were notable security flaws, according to sources and survey results. In order to collect their belongings from damaged homes, many displaced people left the camp without authorisation at night, which resulted in unauthorised movement and a rise in theft incidents within the site.

The way the shelters were arranged in Ratna Park provided little comfort and insufficient necessities (Table 9). A chaotic and haphazard layout was exposed by mapping analyses and the absence of designated social areas. A general feeling of insecurity among users was exacerbated by the lack of lighting, surveillance, and controlled access points.

Table 10. Evaluation of the Ratna camp area established after the Kathmandu Earthquake in Nepal

NEPAL REGION KATMANDU EARTHQUAKE DISASTER		
		
On 25 April 2015, Kathmandu Earthquake in Nepal Before and After Situation (Channel4, 2015)	Ratna Post-Disaster Camp Area in Kathmandu (Adhikari, 2020)	In Ratna Post-Disaster Camp Area, Temporary Tent Organization (Channel4, 2015)

The Nepal case underscores the critical role of spatial layout, settlement order, and safety infrastructure in post-disaster shelter planning. The lack of sustained security measures and poor spatial organization extended the recovery process and contributed to the emergence of long-term instability within the temporary shelter environment.

5. Discussions

In the findings section, an examination of nine different international case studies involving various types of disasters revealed that the events significantly impacted users. Across these diverse temporary shelter areas established after disasters, a consistent pattern emerged regarding spatial organization and a common set of core challenges shaping user satisfaction. These nine cases spanning different geographical, cultural, and economic contexts highlight several recurring issues: lack of infrastructure following disasters, inadequate security measures in camp areas, insufficient communal spaces to provide psychological support, and the establishment of shelters on unsuitable land due to a lack of strategic planning.

The deficiencies identified through the analysis of these nine cases not only disrupt daily operations but also negatively affect users' long-term psychological well-being, community resilience, and the overall recovery process. Data were collected through web-based research, surveys, triangulation analyses, and interviews reported in news sources. A framework analysis was conducted, focusing on five key post-disaster concerns: security, spatial organization, infrastructure services, and social spaces, which are detailed in Table 10.

Table 11. Common Spatial & Social Challenges in Post-Disaster Temporary Shelter Camp Areas: A Framework Analysis of Nine International Cases

SECURITY MEASURES	Public areas (schools and religious buildings) are perceived to have security problems when used as shelters for long-term periods. The lack of perimeter fencing, lighting, and entry and exit control systems in post-disaster camps makes them vulnerable to theft and violence.
SPATIAL ORGANIZATION	There is a lack of privacy and spatial organization in shelter settlement areas. Due to the lack of prior site assessment and strategic planning, inappropriate land use negatively affects the livability of the area. In camp areas, the close placement of shelters and the inadequacy or poor functionality of basic service areas negatively impact user satisfaction.
INFRASTRUCTURE SERVICE	In both short- and long-term shelters established after disasters, water supply and sanitation systems were inadequate and could not be provided without the support of national aid organizations. Mobile toilets and temporary healthcare services set up in camp areas fail to meet user demands. There are also deficiencies in the interior spatial organization of the shelters. Integration with sustainable or adaptable infrastructure systems could not be achieved.
SOCIAL AREAS	In post-disaster camp areas, the lack of or poor planning of communal spaces has had a negative mental impact on users. The ground conditions of the camp locations have hindered the development of social infrastructure in short-term camps. There is no long-term planning for permanent social spaces following the phase of temporary camp settlements.
PSYCHOSOCIAL ASPECTS	Healthcare facilities established in camp areas failed to provide adequate support due to infrastructure limitations. Challenges arose due to the lack of support from the SDGs and national aid organizations. No formal psychosocial program was implemented to address trauma and emotional recovery.

Further insights from the nine case studies indicate that poorly planned camp layouts and the absence of secure access points pose serious risks to women and children. Reports of violence and theft have heightened feelings of insecurity among users, leading to adverse outcomes. Another significant factor is the reliability of infrastructure, including access to water, sanitation, and electricityHealth and general satisfaction in these camps have been directly impacted by problems like poor hygiene and uncomfortable temperatures in the shelters. The strict spatial uniformity and lack of social spaces have caused psychological isolation among users, even in technically developed nations with structurally sound shelters. This emphasises that without user-centred design, infrastructure is insufficient on its own. Social areas and community integration in camp areas are considered vitally important based on the data gathered. Social bonds have been eroded, and long-term living problems have resulted from the absence of communal kitchens, places of worship, or recreational spaces. The results highlight how important it is to plan shelter layouts and imply that adding specific green areas could improve psychological resilience and stability perception.
According to the discussion section, post-disaster camp areas' spatial organisation may be a key factor in determining user satisfaction and recovery results, rather than just being a logistical issue.

5. Conclusion

All parts of the world have been impacted by climate change, which has weakened economic stability, weather patterns, quality of life, and sea levels while also making disasters more frequent and severe. According to official IPCC studies, these impacts have made poverty and conflict worse. In response to these limitations, this study looks at how temporary shelter camps are arranged spatially and how that affects user satisfaction, which is a crucial component of post-disaster recovery. A web-based documentary research methodology was used to choose nine major disaster cases from the twenty-first century. Scholarly articles, news organisation interviews, mapping assessments, and user surveys were used in the analysis of these cases. The study finds consistent spatial and physical deficiencies in all

nine cases, despite the cases' diverse geographic, cultural, and economic backgrounds. These include poor sanitation infrastructure, limited access to drinking water, insufficient safety precautions, a lack of communal and social areas, inappropriate land selection, and a lack of psychosocial support. The study argues that user satisfaction and organisational effectiveness should be given top priority when designing shelter camps. Five key components that should guide future shelter design are outlined in the discussion section, which is supported by a framework analysis:

- Safety and Security: Camps must incorporate adequate fences, illumination, and regulated access and egress systems.
- Effective Spatial Planning: Configurations must facilitate convenient access to assistance services and accommodate climatic and environmental factors.
- Dependable Infrastructure: Water, sanitation, power, and drainage systems must be sustainable and integrated from the outset.
- Social and Community Spaces: Communal kitchens, places of worship, green parks, and educational institutions should be incorporated even in short-term planning.
- Psychosocial Services: The integration of mental health care and trauma-informed spatial design is essential in healing efforts.

To get improved results in future post-disaster interventions, it is imperative to conform to Sphere Standards, Sustainable Development Goals (SDGs), and UNHCR shelter criteria. Temporary shelters must extend beyond fulfilling physical requirements to encompass users' safety, dignity, and psychological well. Communities impacted must be incorporated into participatory planning processes to expedite rehabilitation, while adaptable and scalable designs must cater to diverse geographical situations. In the early stages, modular solutions provide swift implementation and flexibility in reaction to subsequent calamities or climatic variations. Furthermore, cooperation between national assistance organisations and local authorities is crucial for guaranteeing sustainable infrastructure and facilitating a seamless transition to permanent settlements.

As a result, temporary camps should not be conceived solely as emergency solutions, but as places conducive to recuperation. The efficacy of these shelters as healing environments or as sites of enduring distress is predominantly influenced by their spatial configuration and user-centric design.

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Data availability statement

All data generated or analysed during this study are included in this published article and its supplementary files.

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