


## Article

# An Examination of Temporary Shelter Units in Terms of Minimum Standards: The Case of the Kahramanmaraş Earthquake

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**Abstract:** Disasters can be defined as natural, technological, and human-induced events that cause loss of life and socio-economic impacts in societies and stop normal life. Türkiye faces many disasters. The loss of life and economic losses caused by these disasters vary according to the type of disaster. Earthquakes are the natural disasters that affect Türkiye the most. Described as the disaster of the century, the Kahramanmaraş Earthquakes occurred on 6 February 2023 at 04:17 and 13:24 Turkish time. These earthquakes, with epicenters in Pazarcık (Kahramanmaraş) and Elbistan (Kahramanmaraş) with magnitudes of Mw 7.7 and Mw 7.6, affected 11 provinces including Kahramanmaraş, Hatay, and Malatya, killing 50,399 people and damaging 1,279,727 buildings. One of the most significant challenges following earthquakes is the issue of housing, which is addressed through the implementation of temporary housing units. This study aimed to evaluate the temporary shelter areas created after the Kahramanmaraş Earthquakes within the framework of regulations and standards in Türkiye and internationally. The study data were collected through direct observation and participant observation. For this purpose, the “Vali Saim Çotur Tent City”, which is located in the central Onikişubat district of Kahramanmaraş and is the second largest tent city, was examined. As a result of the examination, it was concluded that the tent city did not comply with national and international standards. Based on the findings and results of this study, it is recommended that disaster plans are revised and training programs organized for practitioners in order to prevent similar mistakes in future disasters.

**Keywords:** disaster; disaster management; temporary shelters; earthquake; sphere project



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## 1. Introduction

Disasters can be defined as natural, technological, or human-induced events that exceed the coping capacity of a society, cause socio-economic loss and loss of life, and occur unexpectedly [1]. Although disasters occur unexpectedly and the exact day and time cannot be known in advance, they can be predicted by using data sources such as geographical features, historical records, and early warning systems. Although it is not possible to prevent disasters from occurring, it is possible to learn to live with disasters [2]. To minimize the negative impacts of disasters, disaster management should be risk oriented. Türkiye is a disaster-prone country and suffered the most damage from the earthquake disaster [3]. When the seismicity of Kahramanmaraş (the epicenter of the earthquake in the focus of the research) is examined historically, the region includes the

Eastern Anatolian Fault, the Cyprus Arc, and the Dead Sea Fault formed by the relative movements between the Arabia/Anatolia, Africa/Anatolia, and Arabia/Africa plates. All these intersections are located between Kahramanmaraş and Gölbaşı, as pointed out by the researchers. When earthquakes are analyzed chronologically, it is seen that there were many earthquakes of at least magnitude 7 starting in 131 BC and occurring up to 1872. According to historical records, a severe earthquake hit Kahramanmaraş on 29 November 1114, killing 40,000 people in the city and leaving no one able to help anyone. It was also reported that this earthquake affected the surrounding provinces and caused great destruction. Similarly, in an earthquake that took place on 29 November 1795, it was recorded that 75% of the buildings in the region were destroyed. However, it is known that the largest earthquake in the region between 1908 and 6 February 2023 was of magnitude 6.3. After such a long period of calm, it is hypothesized that there was an intense accumulation of energy in the region, and many studies, including the Provincial Risk Mitigation Plan (PRMP), indicate that an earthquake above magnitude 7 is expected in the region. Disaster scenarios in Kahramanmaraş PRMP are planned for a 7.5 magnitude earthquake [4].

In Kahramanmaraş province, which has such high seismicity, two earthquakes with a magnitude of Mw 7.7 and Mw 7.6 occurred on 6 February 2023, at 04:17 and 13:24, respectively, with their epicenters in Pazarcık (Kahramanmaraş) and Elbistan (Kahramanmaraş). These earthquakes affected 11 provinces in Eastern and Southeastern Anatolia. The first earthquake was more destructive in Kahramanmaraş and Hatay, and the second earthquake was more destructive in Malatya [5]. The biggest crisis experienced after these earthquakes was the housing problem caused by collapsed or heavily damaged buildings. Immediate resolution of a shelter crisis after a disaster is only possible through risk management plans made in advance. This study will examine Vali Saim Çotur Tent City, one of the tent cities in the center of Kahramanmaraş. Determining the locations of “Emergency Gathering Areas” and “Temporary Shelter Areas” to be used after a disaster and ensuring the adequacy of these areas, such as their distribution, size, and infrastructure features, are among the most vital issues for urban planning and disaster management. In cases where disaster and emergency management and urban planning are not functional, and therefore politically motivated, fragmented, and subjective decisions are made by central and/or local governments, there may be practices contrary to previous scientific/strategic studies on disasters and increases in the disaster risks in cities [6]. This study aimed to analyze the compliance of “Temporary Shelter Areas” with national and international criteria within the scope of field research.

Temporary shelter areas are basic shelter areas where the best possible living conditions are provided for disaster victims to shelter and live comfortably and humanely, albeit temporarily, after overcoming the initial turmoil of the disaster [7]. Basic infrastructure, such as electricity supply, water, sewage, and communications, must be installed in tent cities. Close proximity to markets, warehouses, etc. is required for the supply of food, drinks, and other essential supplies to shelters. The distances to health centers for medical interventions need to be assessed, as well as conditions related to construction permits, such as whether the areas to be built are public or private property. In addition, geographical features such as proximity to water resources and transportation networks, morphological features of the area, climatic features, hydrographic features, soil characteristics, vegetation, and proximity to surrounding structures are among the factors that must be considered in determining the locations of tent cities [8]. Temporary sheltering outside earthquake zones means the short-term accommodation of earthquake victims in public buildings or specially established camps. Collective temporary accommodation in earthquake zones includes the accommodation of disaster victims in temporary camps close to their regions. In these camps, a separate unit can be allocated to each family or collective dormitories can

be used [9]. Temporary dwellings are specially built structures for earthquake victims [10]. In temporary accommodation solutions, flexible designs that can be used for different purposes in the future should be preferred. Factors such as the ability of users to make arrangements according to their needs, comfort, safety, privacy, sufficient living space, and heat and sound insulation should be taken into consideration. In addition, simple construction systems that provide easy installation and dismantling should be used. If the construction of permanent housing is delayed it is important to design temporary accommodation units suitable for long-term use [11]. Tents are the most widely used temporary accommodation units after natural disasters both in our country and around the world. Provided by non-governmental organisations, associations, and governments, tents have been used in disasters such as the 1999 Marmara Earthquake, the 2018 Ordu Flood, and the 2020 Izmir and Elazığ Earthquakes in Türkiye. Elsewhere in the world, it has been preferred as a temporary shelter solution after disasters such as the 2008 China Earthquake, and the 2010 Haiti and Chile Earthquakes [12]. After the 7.0 magnitude Haiti Earthquake that occurred on 12 January 2010, disaster victims were placed in temporary shelters made of tents and plastic. However, due to economic inadequacies, this temporary sheltering process, which was initially planned to last for a few months, continued for 7 years [13]. In Türkiye, Article 10 of Law No. 5902 on temporary shelter assigns the AFAD Presidency the task of “providing temporary settlement in disaster and emergency zones, and carrying out treatment, food, worship, social and psychological support services for the victims”. The “Directive on the Establishment, Management and Operation of Temporary Sheltering Centers” is based on Article 91 of Law No. 6458 on Foreigners and International Protection and Article 37 of the Temporary Protection Regulation and entered into force upon the Council of Ministers Decision No. 2014/6683 dated 13 October 2014 and published in the Official Gazette No. 29153 dated 22 October 2014. It is one of the important documents covering national level standards for the establishment and operation of temporary sheltering areas after disasters.

The Sphere document, which includes international standards for temporary shelters, was developed in 1997 by a group of NGOs and the Red Cross/Red Crescent Movement as a guide to developing general minimum standards in key areas of humanitarian assistance. Its technical divisions include water supply, sanitation and hygiene promotion, food safety and nutrition, shelter, settlement and non-foodstuffs, and health activities [14].

### *Problem Statement*

The main issue addressed in this study is the failure to establish temporary shelter units that meet national and international standards for providing humane living conditions after the earthquakes. Additionally, the current temporary shelter solutions do not adequately meet sustainability principles and fail to provide comfortable living conditions for disaster survivors. In these units, various problems arise, including space limitations, security deficiencies, insulation issues (heat, sound, moisture, and fire), lack of privacy, difficulties in transportation and installation, and the inability to reuse the units. Furthermore, issues such as inadequate lighting, lack of clean water, sewage, and waterlogging can emerge due to infrastructure deficiencies. Delays in production and installation processes for temporary shelter units after disasters exacerbate hardships, especially during the winter months. Therefore, developing sustainable and practical solutions to improve post-disaster shelter provision processes is of great importance [15]. Common issues related to temporary housing include installation delays, lack of durable and long-lasting materials, insufficiently flexible designs, and unsustainable solutions. In addition, factors such as infrastructure deficiencies, site contamination, failure to reflect user needs in designs, and high public spending and resource consumption are also significant problems. Investments directed

towards permanent housing can negatively affect temporary shelter provision processes. Due to these negative characteristics, temporary shelters may not prove sufficient for use after a disaster [16]. In this study, in order to clarify the aforementioned problems and formulate hypotheses, the “Vali Saim Çotur Temporary Shelter Unit”, established after the Kahramanmaraş Earthquakes of 6 February 2023, has been examined. The people interviewed to evaluate the standards in the tent city were selected by random sampling method among the settlers on the current tent list. The study findings were shaped in light of the information provided by the disaster victims who agreed to contribute to the study. In addition, officials serving with different institutions in the region (health tent officials, logistics tent officials, and registration personnel) were recruited. The reason for selecting this unit is that it is one of the largest temporary shelter units established in the region after the earthquakes.

## 2. Method

Regarding temporary shelter in Türkiye, Decree No. 4 of the Presidency of the Republic of Türkiye assigned the AFAD General Directorate of Housing and Construction Works with the task of “providing temporary shelter in disaster and emergency zones and carrying out services related to the urgent needs of disaster victims such as treatment, food, and housing”. The “Directive on the Establishment, Management and Operation of Temporary Sheltering Centers”, prepared jointly by the AFAD and the Directorate General of Migration Management, based on Article 91 of the Law No. 6458 on Foreigners and International Protection and Article 37 of the Temporary Protection Regulation, which entered into force upon the Council of Ministers Decision No. 2014/6683 dated 13 October 2014 and was published in the Official Gazette No. 29153 dated 22 October 2014, is one of the most important regulations and includes national-level standards for the establishment and operation of temporary shelter areas [17]. At the international level, the Sphere Project “Humanitarian Charter and Minimum Standards in Humanitarian Response” is a project that sets minimum standards for humanitarian aid in life-saving sectors (food, hygiene, water, sanitation, shelter, etc.) to individuals affected by disasters or conflict situations. The Sphere Project is based on two fundamental assumptions: the right of individuals affected by disaster or conflict to live in dignity and the need to take all possible measures to minimize their suffering [18].

This study aimed to evaluate the temporary shelter areas after the Kahramanmaraş Earthquakes within the framework of regulations and standards in Türkiye and internationally. After the earthquakes centered in Kahramanmaraş, the Kahramanmaraş Metropolitan Municipality shared with the public that there were 23 safe gathering, tent, and container city areas in the city [19]. In the present study, the Vali Saim Çotur Tent City area, which is one of the temporary shelter areas established in Kahramanmaraş Province, the epicenter of the earthquakes, was examined. This tent city is the second largest tent city in Kahramanmaraş Province, with 560 tents where approximately 6000 disaster victims are temporarily sheltered. All disaster victims are from the local community, otherwise they are not admitted to the temporary shelter units. The tent city area consists of 5 different residential sections, namely A, B, C, D, and Beşiktaş blocks. In addition to shelter tents, there are social and religious areas, education centers, health centers, food production and distribution areas, laundry areas, and Wi-Fi areas for communication. Regarding these characteristics, the researchers carried out detailed field observations in this tent city area using direct and participant observation. As a team, the researchers made evaluations of the minimum standards in Vali Saim Çotur Tent City for ten days between 20 March 2023 and 30 March 2023, interviewed the disaster victims sheltering in the tent city one by one, and revealed the status of meeting the standards. In addition, the researchers

interviewed officials from different institutions and disaster governors in the tent city area and determined the difficulties encountered in the processes of meeting the standards. The research team evaluated this tent city area based on the “Directive on the Establishment, Management and Operation of Temporary Sheltering Centers” [17]. Within the framework of Türkiye’s national legislation and the Sphere Project “Humanitarian Charter and Minimum Standards in Humanitarian Response” framework [18]., which is considered an international standard. The authors used the minimum standard charts they created within the framework of these two regulations to individually evaluate the tents and other components of the tent city areas in the entire tent city compound. In this regard, tents, social areas, and tent city components in Vali Saim Çotur Tent City were assessed in terms of the following standards:

- Minimum Standards for Water Supply, Sanitation, and Hygiene Promotion
- Minimum Standards in Food Safety and Nutrition
- Minimum Standards for Shelter, Settlement, and Non-Food Items
- Minimum Standards in Health Activities

### 3. Findings

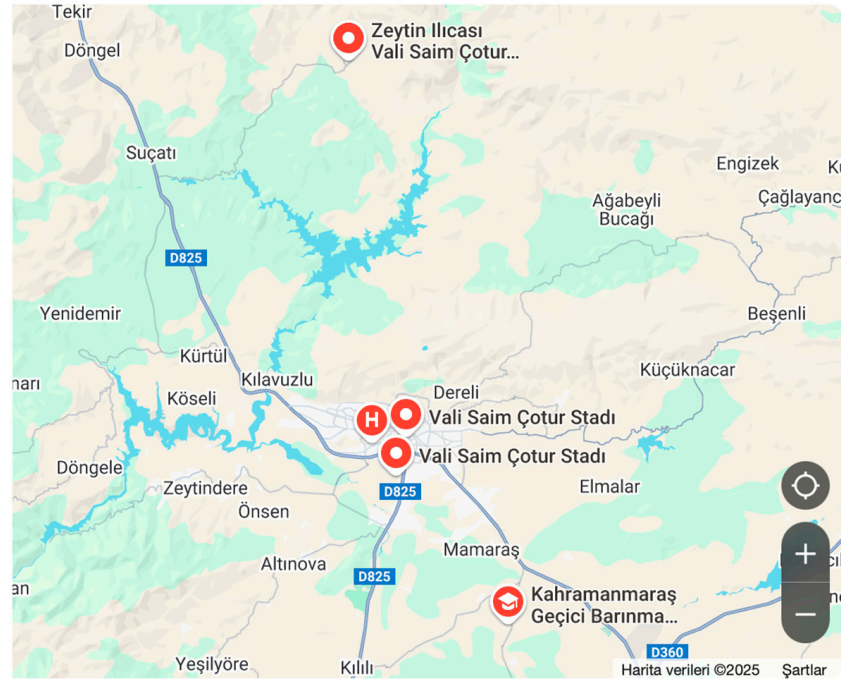
#### 3.1. Findings from Direct Field Observation and Participant Observation in Temporary Shelters

When the legislation on temporary shelter areas in Türkiye is examined, “Zoning Plans”, as defined in Zoning Law No. 3194, are considered as “documents prepared to provide a healthy structure to the physical environment that closely affects individual and family happiness and community life in human, society and environment relations, to direct the location choices and development actions of investments, and to determine the balance of protection and use of land most rationally”. In the Regulation on Spatial Construction, this issue is referred to in Article 10 of the Principles for Research and Analysis on the Construction of Spatial Plans, which states that “urban risk analyses or avoidance studies are conducted for settlements or built urban environments where disaster and other urban risks are high if deemed necessary”. In this regard, it can be seen that the environmental layout plans or spatial strategy plans prepared by the Ministry of Environment and Urbanization carry general provisions, and differences arise in regulation and implementation. The reason for this situation is that parcel-based plan amendments, which we have increasingly encountered since the beginning of the 2000s, have prevented holistic planning and top-scale plans and disaster plans prepared as a result of great efforts have been forced to become dysfunctional through amendments [7]. This situation reveals that gathering areas identified in scenarios prepared for before disasters can lose their gathering area characteristics due to parcel-based plan changes. In Türkiye, gathering and temporary shelter areas are generally determined by decisions taken after disasters. This situation makes it difficult to meet the standards mentioned in more detail in the upper heading, such as infrastructure and superstructure requirements, transportation facilities, and the disaster-prone nature of the selected region. Post-disaster temporary shelter areas should be included in zoning plans and spatial strategic plans and should not be affected by subsequent changes.

Kahramanmaraş municipality announced safe gathering areas in the city after the February 6 earthquake. These were 12 Şubat Stadium, Saim Çotur Stadium, Atatürk Park, between KAFUM and Hanefi Mahçiçek Stadium, Hanefi Mahçiçek Stadium, DSİ 20th Regional Directorate, Karacasu Campus, Batıpark Sports Hall, Aşar Campus, AFAD Service Building and Search and Rescue Unit location and adjacent area, Agricultural Research, Hobby Garden, next to the existing Container City, Yeniyurt Neighborhood, Türkoğlu TCDD(Turkish State Railways) Logistics Center Area, Pazarcık Narlı, Pazarcık Atatürk Park, Nurhak Kullar old municipality side, Göksun Yantepe, Elbistan State Hospital

west, Ekinözü Sports area, Afşin Sapling Park area, Çağlayancerit Bar Nos. 1 and 2 and Andırın Yeni Neighborhood [19].

In this study, the authors carried out field observations through direct and participant observations in the tent city established in Saim Çotur Stadium. The tent city consists of five blocks: A, B, C, D, and Beşiktaş. The total number of tents is 560 and about 6000 people are temporarily sheltering in the tent city. The service units in the tent city and a map are shown below (Figures 1–10 and Table 1).



**Figure 1.** Location of the tent city area [20].



**Figure 2.** Guidance and Research Center (Ministry of National Education).



**Figure 3.** (a–c) Red Crescent, (b) Ministry of Youth and Sports, (c) Ministry of Family and Social Services, and (a) community service center and children’s playground.



**Figure 4.** Event tent, theater and cinema watching (belonging to YBSM, a private arts center).

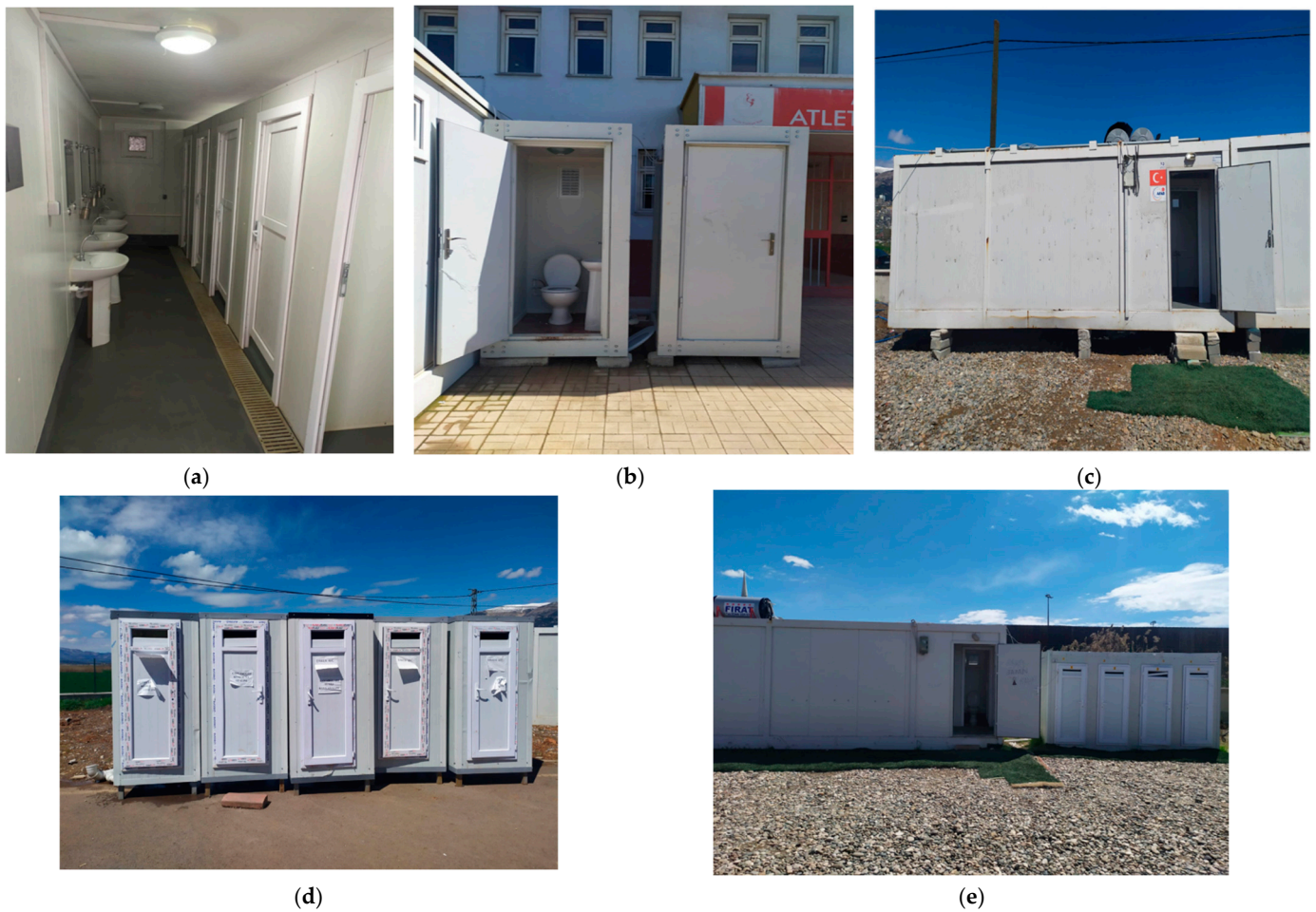


(a)



(b)

**Figure 5.** (a) AFAD cooking container. (b) Turkish Armed Forces cooking area.



**Figure 6.** (a–e) Temporary toilets (a,b,d,e) and showers (c–e) are set up in the tent city.



**Figure 7.** (a,b) Truck with 30 washing machines and 30 dryers for laundry (installed by a private company).



Figure 8. Free Wi-Fi hotspot from a local telecommunications company.



(a)



(b)

Figure 9. (a,b) Health services tent affiliated to the Ministry of Health (3 doctors, 2 nurses, 2 data entry staff, a psychologist every day, and 1 psychiatrist per week).



(a)



(b)

Figure 10. (a) Social market tent—clothing center. (b) Social market tent—market.

**Table 1.** Services provided in the Saim Çotur tent city. (The table was prepared by the researchers).

1	High-security measures: checkpoints at entrances and exits (by TAF and police)
2	Guidance and Research Center
3	Red Crescent and Ministry of Youth and Sports community service center
4	Ministry of Family and Social Services children's playground
5	Volleyball court
6	Event tent (theater and cinema)
7	Social arket tents (clothing center and market)
8	AFAD cooking container
9	Turkish armed forces food-making area
10	Masjid and cooking area belonging to the Presidency of Religious Affairs
11	Turkish Armed Forces eray cuisine
12	Truck with 30 washing machines and 30 dryers for laundry
13	Free Wi-Fi hotspot from a local telecommunications company
14	Health services tent (three doctors, two nurses, two data entry staff, a psychologist every day, and one psychiatrist per week)
15	Water dispensers in each block (with eight fountains)
16	47 WCs (four for disabled individuals) and 26 bathrooms

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### 3.2. Assessment of Temporary Shelter Areas According to National and International Minimum Standards

National and international standards are used in the creation and selection of temporary shelter areas. In this regard, according to the "Directive on the Establishment, Management, and Operation of Temporary Sheltering Centers", which is one of the national standards in Türkiye, the following issues are taken into consideration for the site selection of temporary shelter areas:

1. **Security of Temporary Shelter Areas:** Temporary shelter areas should be close to settlements to ensure protection against threats and dangers and to ensure control and coordination.
2. **Sufficiency:** These areas should have the necessary infrastructure (electricity, water, and sewerage networks), suitability for expansion, social facilities, sports facilities, centers for psychosocial support services, education areas, places of worship, course areas, etc. In addition, equipment, supplies, materials, and human resources required for the services to be provided in temporary shelter areas and for the uninterrupted execution of these services should be provided in line with minimum standards.
3. **Providing Physical Conditions:** For site selection, conditions such as ground suitability, slope, wind, and rainwater basin availability should be considered. In addition, in the establishment of settlement areas in the shelter center, the width of main and side roads, security, adequate capacity of temporary shelter units (closed area per person), suitability for climatic conditions, the distance between units, height (for containers), acceptable level of tools, equipment and materials per temporary shelter unit, as well as privacy should be considered [17].

In addition to the standards established at the national level, the standards established by many countries and non-governmental organizations to be used in disaster

and humanitarian aid processes within the scope of the “Sphere Project: Humanitarian Charter and Minimum Standards in Humanitarian Response” are evaluated under the following headings:

1. **Basic Humanitarian Standards:** These were shaped by nine commitments, including keywords such as relevance, effectiveness, accountability, capacity strengthening and governance orientation, complementarity, coordination and openness to improvement, supportiveness, equality, and fairness, which were developed in line with the ethical principles of humanity, non-discrimination, impartiality, and independence in humanitarian responses.
2. **Providing Water Supply, Sanitation, and Hygiene Support:** This includes standards covering water supply, hygiene promotion, vector control, excreta management, and solid waste management, as well as the promotion of a water sanitation and hygiene program during disease outbreaks and in healthcare settings. In this regard, it includes sanitation standards, as well as the provision of minimum water and hygiene items per settlement, household, and per capita.
3. **Food Security and Nutrition:** This includes standards that specify the access to, quality, and quantity of food security and assistance, as well as guidelines for infant and child nutrition, malnutrition management, livelihoods, and assessments for communities, families, and individuals.
4. **Housing and Settlement:** This is the section that includes aspects such as location, settlement planning, living space, household furnishings, technical support, protection of environmental areas (sustainability), and security of tenure, and where standards such as settlement, infrastructure, capacity, environment, transportation, and physical conditions are specified and these standards are explained in detail.
5. **Health:** This includes the health system, communicable and non-communicable diseases, child health, sexual health, reproductive health, injury and trauma care, mental health, and palliative care, and describes the minimum standards and important considerations for communities, families, and individuals [18]. The tables below present a checklist containing the criteria for tent cities, prepared by the internationally recognized Sphere Project and the AFAD Regulations on the Establishment, Management, and Operation of Temporary Shelter Centers. The checklist has been developed by the researchers taking into account the criteria outlined in the Sphere Project and the AFAD Regulations. The left columns of the tables contain the minimum standards, while the right columns present the data obtained from the field. The tables have been created by the authors and the checklist has been evaluated based on field observations, participant observations, and information gathered from earthquake survivors.

In Tables 2–5, the checklists created by the researchers are based on the standards outlined in the AFAD Regulation on the Establishment, Management, and Operation of Temporary Shelter Centers (2015) and the Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response (2018).

**Table 2.** Minimum standards for water supply, sanitation and hygiene promotion [17,18].

Minimum Standards for Water Supply, Sanitation and Hygiene Promotion		
No	Items	Description
1	The average amount of water for drinking, cooking, and personal hygiene is 7.5–15 L.	Sufficient water is provided for drinking, cooking, and personal hygiene.
2	The distance from the house to the nearest water source is a maximum of 500 m.	Four blocks have water dispensers, but each tent is not less than 500 m away.
3	The waiting time at a water source is no more than 30 min.	The waiting time does not exceed 30 min.
4	Every household has at least two 10–20 l clean water containers to ensure that there is always water at home.	Water containers can only be provided by personal means.
5	Water collection and storage containers have narrow throats and lids.	Water containers can only be provided by personal means.
6	There is at least one bathroom facility for every 100 people.	Although the number of tents is known, the exact number of people cannot be determined due to the constant circulation in and out of the tent city. However, during the interviews, it was determined that there was no waiting longer than 20 min on average for the bathroom.
7	There is a private bathroom for women.	There are separate WCs and bathrooms for men and women.
8	There are laundry areas.	Laundry is carried out by the employees of the Arçelik laundry truck in the tent city. Disaster victims deliver their clothes and receive them washed and dried.
9	There is enough water for bathing and laundry.	Sufficient water is available.
10	There is one toilet for every 20 people.	Although the number of tents is known, the exact number of people cannot be determined due to the constant circulation in and out of the tent city. However, during the interviews, it was determined that there was no waiting time for WCs longer than 10 min on average.
11	There are separate, internally keyed toilets in public areas such as markets, distribution centers, health centers, schools, etc.	It is not available.
12	Toilets are located no more than 50 m from houses.	In blocks A, B, C, D, and BEŞİKTAŞ, toilets are located more than 50 m away from the tents.
13	The use of toilets is according to household and/or gender. It should be suitable for use by the entire population, including children, the elderly, pregnant women, and people with disabilities. It should be situated in such a way that it does not pose a threat to users, especially women and girls, during the day and night. It should ensure privacy in accordance with the norms of the users.	The use of toilets is gender segregated. There are toilets for people with disabilities, but there are no toilets suitable for children, the elderly, and pregnant women. The tent city is protected by military law enforcement forces on a 24/7 basis. A curtain was constructed in front of the women's toilets for privacy.
17	It should be easy to use and kept clean so as not to harm the environment. Depending on the conditions, toilets should have enough water for hand washing or flushing.	Toilets have been provided in appropriate conditions. Adequate water and sanitation are provided.
18	Women should be given the necessary privacy to dispose of menstrual materials and wash menstrual diapers and linen.	There are trash cans in the toilets.
19	Fly and mosquito reproduction should be at a minimum level.	It has been reported that spraying is planned to prevent the reproduction of flies and mosquitoes.
22	All households should have access to waste bins that are emptied at least twice a week and should be no more than 100 m from public waste pits.	There are containers close to all blocks. However, they are placed according to the suitability of the environment without measuring the distance. A distance of 100 m is not considered. In addition, there is no protection around and on top of the containers and the containers are not prevented from being used with their lids open.
23	All waste generated by populations must be removed from the living environment daily or at least twice a week.	Unloading from containers is carried out daily.

Table 2. Cont.

Minimum Standards for Water Supply, Sanitation and Hygiene Promotion		
No	Items	Description
24	Where household waste is not buried on site, there should be at least 10 l garbage bins for every 100 households.	The number of containers placed close to the blocks is 4–5 pieces. This number is determined randomly and is increased according to need during use.
25	Controlled, safe solid waste disposal methods that cause minimal risk to the environment should be available.	None.
26	All medical wastes (including hazardous wastes such as glass, needles, and medicines) should be isolated and disposed of within the boundaries of the health facility in places with a properly designed and structured pit or ash pit at the bottom.	Medical waste is transported and taken to disposal facilities.

Table 3. Minimum standards in food safety and nutrition [17,18].

Minimum Standards in Food Safety and Nutrition		
No	ITEMS	Description
1	Food security meets the priority needs of all affected people who need assistance, does not dishonor them, and protects their dignity by giving them choices.	Tabldot meals are provided in the morning and evening through NGOs in the tent city. People line up in front of the food distribution tents to receive the food.
2	Households do not resort to negative strategies of struggle.	During the interviews, it was reported that there were also elderly people in the food queues and that conflicts arose because the elderly were not given any privileges. It is also known that there may be arguments due to waiting in line for a long time.
3	The choice of cash, food coupons, or a combination of these is determined by detailed analysis and evaluation.	There is no analysis of this situation.
4	Meeting nutritional requirements includes access to a range of foods such as fibrous foods (grains or roots), pulses (or animal products), and sources of fat (see Guidenotes 2–3 and 5).	It was learned that food support was provided through NGOs and military services and that food was prepared according to the available materials without any planning.
5	Most families (>90%) should have adequate access to iodized salt (see Guidance notes 2–4 and Annex 6: Dietary requirements).	No such service is provided.
6	2100 kcal/person/day, 10% total energy provided by protein, 17% total energy provided by fat, adequate micronutrient intake.	No calorie calculation is made.
10	The food distributed and prepared is in accordance with the religious and cultural norms of the society.	The ingredients used in the dishes and the way they are prepared also conform to the norms of the society.
11	Foods supplied are foods with short cooking times.	Meals are provided at the same time every day.
12	There is access to culturally valued foodstuffs (e.g., tea and spices).	Access is available.
13	Ensuring that all recipients have access to “fit for purpose” food. Traceability studies monitor the complaints of the entire target group and ensure that they are resolved	During the field observation and interview with the disaster victims, it was determined that the meals distributed were not suitable for people with chronic diseases, and the same meal was given to the elderly, sick, and children. However, 45 days after the earthquake, a separate menu was prepared for celiac patients who cannot consume gluten.
14	Foods do not pose a health risk	It was determined that the foods do not cause any health problems during the process, but the food is not inspected.

Table 3. Cont.

Minimum Standards in Food Safety and Nutrition		
No	ITEMS	Description
15	In terms of quality, the food complies with the quality standards and is nutritious. Quality tests for the distributed foods are carried out by the responsible institutions and organizations	No studies are conducted on the quality and nutritional value of food.
18	There are no religious, political, or divisive messages on food packages.	Food packages do not contain religious, political, or divisive messages.
19	Storage is provided in a dry and hygienic area. Stored foodstuffs should be protected from weather conditions and kept away from household chemicals or other residues. They must be secured against insects and rodents.	Storage conditions are suitable.
24	There are alternative distribution routes for people who have limited movement during distribution.	There is no alternative way.
25	Receivers must walk no more than 10 km to the distribution site.	Distribution areas are at a maximum distance of 1 km from receivers.
26	Availability of ration cards and notification of distribution locations with labels and/or signs.	Available.
27	Kitchens that provide hot meals are accessible.	Accessible.
28	Kitchens that provide hot meals are safe.	It is safe.
30	Kitchens that provide hot meals are established taking into account conditions such as cooking, water availability, and dining areas.	It was established by choosing the most suitable place in the area where the tent city is located. It is not known what conditions were taken into account.

Table 4. Minimum standards for shelter, settlement, and non-food items [17,18].

Minimum Standards for Shelter, Settlement, and Non-Food Items		
No	ITEMS	Description
1	The minimum indoor area per person of all affected individuals is 3.5 m <sup>2</sup> .	Tents were allocated to families considering the number of family members.
2	Water and sanitation facilities are available.	Access to fresh water is available.
3	Fuel or batch cooking facilities are available for cooking.	Although a camp cylinder is provided for cooking, there is no kitchen and no cooking area.
4	Health, solid waste disposal, school, and social facilities are available.	Health services are available, solid wastes are collected and transported daily, and tents are available for children of primary school age for play and educational purposes, but the number of teachers is insufficient.
5	Meeting places, recreation areas, and children's playgrounds are available.	Available.
6	Stables for livestock (far enough away from the living space) are available.	There is a coop with about five chickens next to a tent.
7	Space is available for culturally appropriate funerals, other rites, and worship.	Available.
8	Additional facilities are available to meet the needs of the target population.	Facilities are formed according to needs.

Table 4. Cont.

Minimum Standards for Shelter, Settlement, and Non-Food Items		
No	ITEMS	Description
9	All women, men, girls, and boys have at least two sets of clothes in appropriate sizes, suitable for culture, climate, and seasonal conditions.	Tents have been set up for clothing needs and people can meet their needs from here at certain times of the day.
10	All affected people have blankets, bedding materials, sleeping bags, mattresses, and mosquito nets for proper sleep.	Although tents are provided with blankets and pillows in proportion to the number of individuals, there are deficiencies due to the removal of these materials by those leaving the tent city and the change in the number of individuals in the tent.
11	Each household or group of four or five people has two family-sized cooking pots with handles and lids, a worktop for food preparation, a kitchen knife, and two serving spoons.	It is not available.
12	All people affected by the disaster have dinner plates, forks, or other eating utensils, and a mug or a glass.	It is not available.
13	Access to materials such as stoves, fuel, artificial lighting, and other alternative fuels and candles is available.	It is not available.
14	The field slope is between 1% and 5%.	Information is not available
15	Public area per capita is 45 m <sup>2</sup> including facilities (min. 30 m <sup>2</sup> )	Settlement is provided without calculating the area.
16	A 30 m fire safety strip is available every 300 m	It is not available.

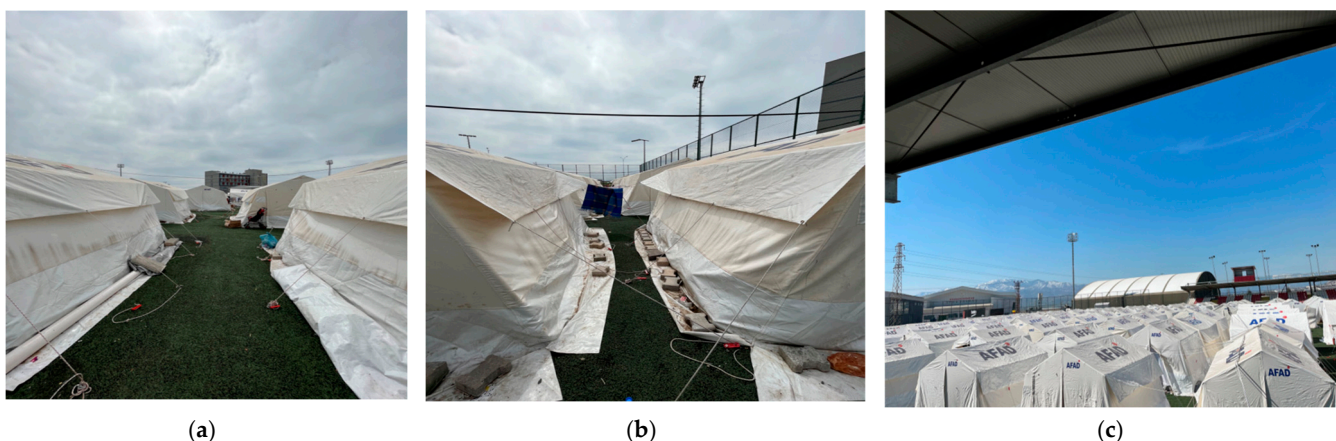
Table 5. Minimum standards in health activities [17,18].

Minimum Standards in Health Activities		
No	ITEMS	Description
1	One primary health unit/10,000 people.	There is one tent for examination and one tent for observation.
2	One health center/50,000 people.	
3	A county or rural hospital/250,000 people.	
4	>10 beds and maternity facility/10,000 people.	
5	There are at least 22 qualified health workers (medical doctors, nurses, and midwives)/10,000 people.	
6	At least one medical doctor/50,000 people.	Three medical doctors (one public health specialist).
7	At least one qualified nurse/10,000 people.	One nurse.
8	At least one midwife/10,000 people.	One midwife.
9	At least one community health worker/1000 people.	
10	One supervisor (guide supervisor)/10 home visitors and one senior supervisor.	
11	Clinicians care for a maximum of 50 patients per day.	
12	Constant access to appropriate medicines and consumables is available.	There are suitable medicines and consumables.
13	Access to primary health services is available.	Access is available.

Figures 11 and 12 were taken by the authors during field observations to show the distance between the tents.



**Figure 11.** Poultry in the tent city. All photos were taken by the authors during the fieldwork.



**Figure 12.** (a–c) Distance of tents in tent city. All photos were taken by the authors during the fieldwork.

When the disaster scenario specified in Kahramanmaraş PRMP was examined, it was seen that a scenario with a magnitude of Mw 7.5, which may affect Kahramanmaraş province, produced by the AFAD Earthquake Department using the AFAD-RED software, was used in risk analysis studies. AFAD-RED (AFAD Risk and Emergency Decision Support) is a software package developed by Türkiye's Disaster and Emergency Management Authority (AFAD) to assess, monitor, and manage risks related to natural and man-made disasters. It aims to provide a data-driven decision-making tool for disaster response by integrating various types of data, such as geographical information, disaster history, and real-time data, to facilitate more effective risk management and emergency planning [21]. While preparing the scenario, information such as the largest earthquake that can affect the city, the largest earthquake experienced in the past, the largest earthquake that the active fault in the region can produce, and the fault length magnitude relationship were used. Accordingly, the results of the AFAD-RED analysis are as follows:

- The Bahçelievler neighborhood and its surrounding neighborhoods (around the stadium and old Maraş) face the risk of earthquake liquefaction. It is considered that in the event of a major earthquake, almost all of the area in question will be affected. The presence of a private hospital in the same region is very important for the region. In the studies, it was determined that the majority of the buildings in the region were old but were built in accordance with the regulations.
- The risk of earthquake liquefaction is also defined for the Pazarcık and Narlı regions. Since the Kartalkaya Dam is also located in this region, it was predicted that in the event of a major earthquake, it would affect almost the entire region.
- It was predicted that a large part of the city would be affected as a result of a possible earthquake in Kahramanmaraş. The fact that the settlement in the region is built on weak ground and the access at the three main entrances to the city is provided by bridges makes it important to control the building safety in this region. The aged construction of the bridges at the Adana and Kayseri road entrances is a disadvantage. However, the recent construction of the bridge at the Gaziantep Road entrance is considered to be an advantageous situation.

The February 6 earthquake centered in Pazarcık justifies this scenario. After the earthquake, the number of buildings in Kahramanmaraş for which damage assessment studies were conducted was 57,087 and the number of heavily damaged or collapsed buildings that needed to be demolished urgently was 10,777 [22]. Although it was fortunate that the dam was not affected by the earthquake, the necessary reinforcement works should be carried out immediately in preparation for future disasters. It is known that many of the old buildings mentioned in the risk scenario have been damaged or demolished. It should not be ignored that risk scenarios are a part of disaster management and disaster management will be incomplete if the hazards identified in these scenarios are not eliminated. Disaster management should be considered as risk and crisis management. The most crucial step in risk management to reduce the destructive effects of disaster is the preparation phase. In this regard, successful preparation will only be achieved if preventive measures are taken according to the results of activities such as risk analysis and disaster scenarios.

#### 4. Discussion

In the case of Türkiye, it is seen that approaches to the problem of shelter are oriented towards emergency relief, rehabilitation, and reconstruction [23]. In this regard, during the emergency aid process, when the first shock of the disaster is experienced, various methods are used in the selection of temporary shelter areas and efforts are made to ensure national and international standards with many actors [18,24–26]. This study examines the temporary shelters established to meet the need for emergency aid after the Kahramanmaraş Earthquakes in 2023, which was defined as the disaster of the century, according to national and international standards. The design, establishment, and management of temporary shelter units after a disaster is very important. To minimize the negative and traumatic effects of a disaster, temporary shelter areas should be at least sufficient to meet the basic needs of the disaster victims, and keeping these conditions to at least a minimum level is a factor that will help minimize the negative economic effects of the disaster [23,27,28]. In this regard, while temporary shelter areas should have at least the minimum standards to meet the needs of both communities and individuals, it is necessary to create appropriate conditions for nutrition, shelter, and hygiene needs, for individuals and communities to continue their social lives and to provide rehabilitation services during the establishment of shelter areas [18,29]. In this regard, the standards of temporary shelter units and areas are established with the participation of various actors at national and international levels [18,30]. There are efforts to ensure that temporary shelter units built

after disasters around the world provide the minimum optimal conditions for disaster victims. In this regard, it is very important to manage the process from the site selection phase to the removal of temporary shelter areas.

The evaluations made for the temporary shelter areas and units established as a result of many disasters are as follows:

In a study conducted by Obyn et al. as a result of a flood in South Korea, the criteria identified for the livability of temporary shelter units were safety, health, sociability, culture, comfort, and vulnerable groups [31]. The temporary shelter units evaluated within the scope of the study were found to meet criteria such as security, sociability, and culture, but were found to be insufficient in terms of health, comfort, and vulnerable groups. In this disaster, where resources are insufficient due to the magnitude and impact area of the earthquake, a more effective management process will be possible in the future by prioritizing risk reduction activities.

The accessibility of temporary shelter areas is essential for the sustainability of their services. Studies conducted in different countries and disaster cases have discovered the following: In a study conducted by Cetin et al. in 2024 to evaluate 95 emergency gathering areas and four temporary shelter areas in Elazığ province, it was determined that the accessibility of temporary shelter areas in terms of number, capacity, and location was inadequate [32]. In a case study conducted by Malgarejo and Lakes of a river flood in Colombia, standards for the suitability of public infrastructure to be used for temporary shelter, such as humanitarian shelter suitability, analysis of geographical risks, and infrastructure accessibility, were identified [33]. The temporary shelter area included in the scope of the study was established in a stadium in the region. Although the stadium is a suitable site due to its proximity to the intercity bus terminal and highways, and the existing water, electricity, and sewerage infrastructure, it was found to be inadequate in terms of capacity for humanitarian assistance due to the high number of people affected by the disaster. Apart from this, no element that would pose a geographical risk around the area was detected.

Although temperature is a very crucial parameter in terms of human health and comfort, there are not enough fuel and heating materials available after emergencies in winter conditions due to reasons such as logistics and lack of resources [31,34]. Ensuring that temporary shelter units meet the seasonal conditions and that the temperature inside the units is at an optimum level is crucial to the health of individuals who are already disaster victims. In a study conducted with 1407 people living in shelters as a result of the Nepal earthquake in 2015, 80% of the participants stated their opinions about the temperature values of between 110 °C and 30 °C [35]. It is possible to encounter extreme temperatures in temporary shelter units, especially in summer and winter. The fact that the disaster which was examined within the scope of this study occurred in February 2023 in regions of the country where the coldest winter months passed caused the situation to become even more critical [36]. When the first 3 months after the earthquake in 2023 were examined (February, March, and April), it was determined that the average temperature in February in Kahramanmaraş province was at lower levels than previous years and in March it was between 0 °C and 7 °C, which is mainly considered to be in the very cold category [37,38]. Even though the air temperature increased in April, seasonal rainfall can still cause situations that can worsen living conditions inside the tent city [38]. The lack of access to materials such as stoves, fuel, artificial lighting, and other alternative fuels and candles, which are examined in Article 13 of the Minimum Standards for Shelter, Settlement and Non-Food Items, may have caused conditions to worsen in some households within the tent city. Data obtained from disaster survivors during field observations and measurements emphasized that individuals face difficulties in accessing basic needs (toilets,

showers, and food) and that primary healthcare services are insufficient in temporary shelter areas.

#### *Limitations and Strengths of the Study*

This study has some limitations. The study covers the second largest tent city area in Kahramanmaraş Province, where approximately 6000 disaster victims are sheltered. The findings and conclusions were evaluated only for this tent city. The inability to make generalizations to other provinces affected by the disaster is among the limitations of the study. Therefore, future studies to include tent cities established in different regions, which may provide more generalizable data. Another limitation of the study is that it was conducted in the first days after the disaster and therefore no assessment could be made on the provision of minimum standards in long-term sheltering processes after the disaster.

Despite the limitations mentioned, the strengths of the study are that the staff of different institutions involved in the study process provided impartial assistance to the researchers on the issues they needed. In addition, the researchers experienced the process by staying in the tent city area during the research period and had the opportunity to evaluate the minimum standards from experience. In the study, the visuals for these experiences were created by the research team. Finally, the strengths of the study include the fact that the disaster survivors personally informed the researchers about the minimum standards experienced in tent cities and the researchers had the opportunity to examine the tents individually.

## **5. Conclusions and Evaluation**

Since the region was going through a very long earthquake-free period, the people were unaware of a possible earthquake danger. This situation increases the size of the danger even more. Therefore, to minimize the loss of life and property in a possible earthquake, it is essential to carry out detailed ground surveys in residential areas and to evacuate structures in dangerous zones. In addition, earthquake activity and earthquake risk must be taken into account in the selection of places for new villages, towns, and cities to be developed and established. Earthquake-resistant buildings with correctly reinforced concrete and static calculations should be built on solid soils away from active faults. When the national and international criteria for temporary shelter areas and the temporary shelter areas established within the scope of the relevant disaster case were examined in detail, it was found that the relevant temporary shelter area did not meet all the conditions as it should within the scope of national and international standards. Since the disaster in question occurred as a result of two devastating earthquakes consecutively within a short period, affected a considerable population of 11 provinces of Türkiye, and Türkiye is still a crisis management-oriented country, even though it has taken initiatives towards disaster risk reduction policies, the extent of the destruction increased and, accordingly, the need for emergency shelter after the disaster increased. In this regard, there is a need for intense effort in site selection and the design of shelter units in national and international standards. It is considered that in countries with high disaster risk, the risks arising from post-disaster sheltering will be minimized if studies of site selection and sheltering units are carried out by considering standards of social, cultural, health, and geographical conditions before disasters at the central and local government level. Temporary housing units are designed to provide rapid shelter for disaster victims. In general, they include tents, prefabricated structures, container homes, and temporary shelters built on-site using regional materials. Common issues encountered in temporary housing units include a lack of privacy and security, limited infrastructure and hygiene facilities, the use of non-durable and unsustainable materials, and designs that fail to meet the socio-cultural

needs of disaster victims. For post-disaster housing solutions to be sustainable, they must be planned with economic, environmental, and social factors in mind. In this context, temporary housing units should be modular and flexible, allowing for expansion and transformation according to user needs. Additionally, to protect the environment, local materials should be used and natural and recyclable materials should be preferred in the construction process. Sustainable solutions such as solar panels, natural ventilation systems, and rainwater collection systems should be integrated. Designs that encourage the active participation of disaster victims in the housing process can enhance social cohesion [39]. Various temporary housing solutions have been implemented in Türkiye following past disasters. When examining the housing units established after the 1999 Marmara and 2023 Kahramanmaraş Earthquakes the following has been established: In Düzce, the Kiremitocağı Prefabricated Settlement, built after the 1999 Marmara earthquake, suffered structural deterioration due to prolonged use. Around the same time, the Kaynaşlı Paper Tube Houses in Düzce provided a low-cost, sustainable model using local materials. After the 2023 Kahramanmaraş Earthquakes, the Kalyon Container temporary housing unit in Gaziantep-İslahiye offered a rapid solution, yet transportation and storage costs were high. Meanwhile, the İslahiye Tent Settlement allowed for quick setup but failed to provide a sustainable long-term solution [40].

#### *The Role of Research*

In field research, researchers need to have knowledge and experience about the subject being researched in terms of the strengths of the study. In this regard, all three researchers in this study have bachelor's degrees in Emergency Aid and Disaster Management and master's degrees in Disaster Management. One of the researchers, Sevda DEMİRÖZ YILDIRIM, has a doctorate in disaster management. Researchers Zehra ASLAN and Kader DEMİRÖZ are continuing their doctorate education in the field of disaster management. All the researchers have published many scientific studies in the fields of disaster management, disaster education, disadvantaged groups in disasters, disaster resilience, and emergency health services.

**Author Contributions:** Conceptualization, Z.A. and K.D.; methodology, Z.A., K.D. and S.D.Y.; software, Z.A., K.D. and S.D.Y.; validation, Z.A., K.D. and S.D.Y.; formal analysis, Z.A., K.D. and S.D.Y.; investigation, Z.A. and K.D.; resources, S.D.Y.; data curation, Z.A.; writing—original draft preparation, Z.A., K.D. and S.D.Y.; writing—review and editing, Z.A., K.D. and S.D.Y.; visualization, Z.A., K.D. and S.D.Y.; supervision, Z.A., K.D. and S.D.Y.; project administration, Z.A., K.D. and S.D.Y.; funding acquisition, Z.A., K.D. and S.D.Y. All authors have read and agreed to the published version of the manuscript.

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**Institutional Review Board Statement:** Approval dated 5 March 2023 and numbered E-18457941-050.99-83601 was obtained from the Artvin Çoruh University Ethics Committee for the suitability of the data collection tools to be used in the study and for the initiation of the study. During the study process, research and publication ethics were followed.

**Informed Consent Statement:** This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Artvin Çoruh University. In order to carry out field observations, verbal permission was obtained from the responsible authority of the Vali Saim Çotur Temporary Shelter Unit after presenting the ethics committee approval. The observations were conducted within this framework. During the observation process, no interview forms or questionnaires were administered, and no direct interviews were conducted with individuals residing in the tents; only the environmental conditions and the general state of the tents were observed. Permission to view the interior of the tents was obtained verbally from the tent occupants.

**Data Availability Statement:** All data generated or analyzed during this study are included in this published article. For further inquiries regarding the details of the study, readers are encouraged to contact the authors via email.

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