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An overview of temporary housing management after the earthquakes in turkey in terms of disaster management

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Abstract

Interventions after earthquakes are very important for saving human life and returning the survivors to their normal lives. Earthquakes are one of the most devastating natural hazards and can have serious economic, social and environmental impacts. As a result of earthquakes from the past to the present, millions of people have been affected and lost their lives. Being prepared for disasters will provide an opportunity to prevent possible losses and will provide an idea about how to act in case of disaster. In this paper, post-disaster response and recovery situations in disaster management and rescue after earthquakes in Turkey are discussed. Disaster management situations after the Gölcük, Van, Elazığ, and İzmir earthquakes in Turkey were analyzed and presented in terms of natural disaster and emergency management. As a result of the study, there was an improvement in disaster relief and response situations depending on the years of earthquakes in Turkey. However, the recent earthquakes show that there is still a need to work on this issue.

1. Introduction

Today, the approach to the issue of disaster refers to the return of human life to old lives with quick and effective recovery efforts, which cause people's life to go out of their daily lives with unexpected events. This approach covers all recovery processes in the face of disasters and emphasizes the necessary steps for normalization. The definitions made about disasters do not differ over time, and this also shows that approaches to disasters and solution proposals have diversified (Mavi, 2020).

Natural disasters have caused the death of millions of people and great economic losses throughout the history of civilization. Most of the world's population lives in cities rather than rural areas. Therefore, natural disaster risks and losses are higher in urban areas. As our cities grow, the risks are increasing day by day. Therefore, it is an inevitable necessity to reduce the risk of natural disasters and to develop effective disaster management policies (Kemec et al., 2015).

People need shelter after major disasters. Victims may go to their second homes, if possible, or stay with a relative, their neighbors, or in their choice of shelter. Depending on the possibilities, different types of vehicles, caravans, containers, or tents can be converted into living quarters after a disaster. Assessing the shelter needs of survivors after severe earthquakes is one of the foremost challenges that emergency response teams have to face. It is very important to be able to estimate the number of victims who will require shelter temporarily according to the magnitude of the disaster and why these people should be placed in tent cities as soon as possible (Cicekdağı, 2021).

Therefore, in this study, Analysis and reviews of tents needed after the major earthquakes (Golcuk, Van, Elazig, and Izmir Earthquakes) in Turkey are presented. The framework used in the study is given in Figure 1. The conceptual framework of the paper is shown diagrammatically in Figure 1.

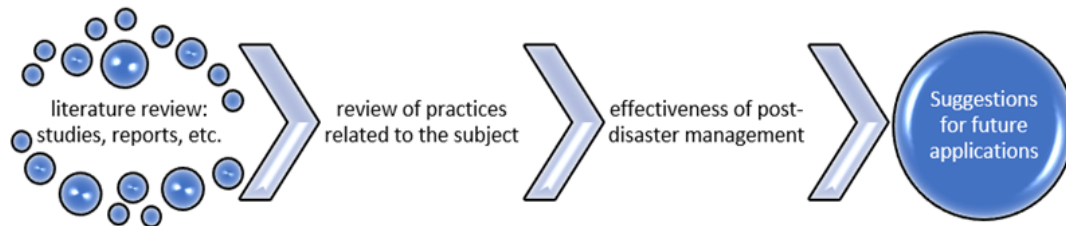


Figure 1. Conceptual framework

2. Earthquakes in Turkey

Earthquakes are a potential threat to the social and economic stability of many communities (Hassan et al, 2020). Turkey is one of the countries under significant earthquake risk. 95 percent of the total human population in Turkey is in the earthquake zone. In addition, 92% of the dams and 98% of the industrial facilities in Turkey are in the active earthquake zone. Due to their location, the buildings in these regions have been exposed to many earthquakes. Many of these structures were damaged or completely destroyed during earthquakes. In the last century, the number of earthquakes with a magnitude of 6 or more in Turkey is 56. The damages resulting from these earthquakes are quite high, such that; 0.8% of our national income is used every year to cover the damages after earthquakes (Usta and Bozdağ, 2021). Earthquakes that have caused significant loss of life and property in Turkey since 1990 are shown in Table 1.

Table 1. Earthquakes have caused significant loss of life and property in Turkey since 1990 (Platt and Drinkwater, 2016; Wikipedia, 2020).

Earthquake	Year	Deaths	Injured	Homeless	Affected Population	Loss USD million
Erzincan	1992	653	3850	95,000	250,000	750
Dinar	1995	94	240	40,000	120,000	100
Çorum-Amasya	1996	0	6	9000	17,000	30
Ceyhan-Adana	1998	145	1600	88,000	250,000	500
İzmit-Marmara	1999	17,480	43,953	675,000	15,000,000	13,000
Düzce	1999	763	4948	35,000	600,000	750
Afyon-Sultandağı	2002	42	327	30,000	222,000	96
Bingöl	2003	177	520	520	245,000	135
Elazığ	2010	51	137	3477	56,000	6
Kütahya-Simav	2011	3	122	8390	22,000	260
Van	2011	644	2300	180,000	1,000,000	1000
İzmir	2020	119	1,053	15,000	807,762	400

3. Disaster management

Natural disasters such as earthquakes and floods are events that can have a significant impact on people. These events can also have an influence upon the socioeconomic improvement of a region (Soulakellis et al., 2020).

If natural events cause human, socio-economic, cultural, physical, environmental, and political losses, it can be called a disaster (Erkan et al., 2015). The severity of the disaster situation and the duration after the disaster are closely related to the disaster management process (Alexander, 2012). If strong mitigation strategies are improved for existing hazards before an event occurs, the impact will be less severe and response and recovery phases will be smoother (Comfort and Haase, 2006).

Disaster management comprises four phases: response, recovery, mitigation, and preparedness are the phases of this cycle. Although there are no definite boundaries between disaster stages, the time scope of these stages also

varies according to disaster situations. The use of this cycle is effective in the development of disaster management strategies (Kemec et al., 2015; Soulakellis et al., 2020). The stages are shown in Figure 2.

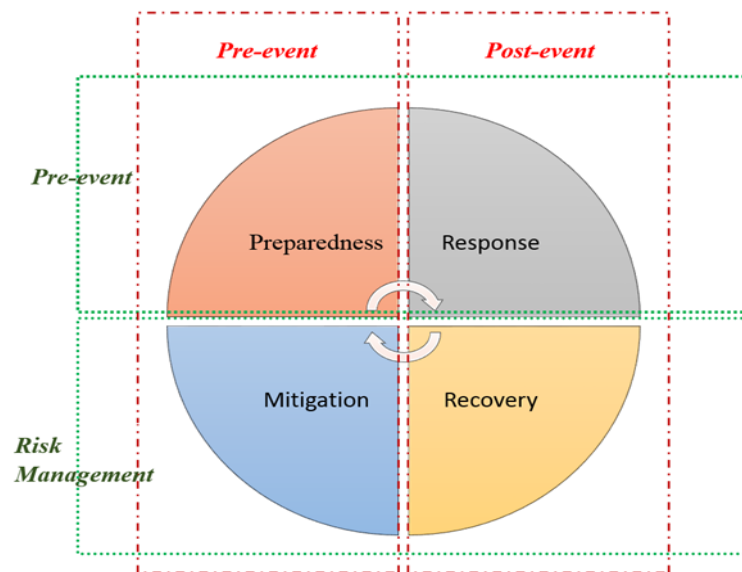


Figure 2. Disaster management cycle [2].

Planning how to respond in the event of a disaster is called the Preparedness phase. Being prepared can be defined as the state of being ready to respond to a disaster, crisis, or any other emergency in the field of emergency management. Preparedness, as well as a state of preparedness, is also a theme throughout most aspects of emergency management. The preparedness phase includes the following activities: (1) Planning, (2) Exercises, and training.

The response is an action taken just before, during, or just after a disaster or major emergency. Saving lives, minimizing property damage, and improving the onset of recovery from the incident is the goal of the responder. Recovery phases are accomplished with (1) alerts; (2) evacuation; and (3) sheltering methods.

The mitigation phase contains all events that prevent an emergency, reduce the likelihood of an emergency happening, or reduce the damaging effects of indispensable emergencies (Shaluf, 2008; FEMA, 2006).

The recovery phase aims to restore the life of the city, at the pre-destructive levels, as well as to reduce vulnerability in the future and it has a variable, time range according to the length of the short-term and long-term phases (Soulakellis et al., 2020). The recovery phase is achieved through the following ways: damage assessment; debris removal; and disaster assistance centers.

4. Disaster management in terms of Temporary Shelter

Anatolia has faced disasters that caused much loss of life and property from past to present. Earthquake is the most common disaster in our geography. Although our history of disaster management is quite old, the first regulation in this field was on September 14, 1509. After the Istanbul earthquake, which took place on this date and in which more than 13.000 lives were lost, the Ottoman Sultan of the period, Beyazıt II, issued an edict for disaster (Shaluf, 2008; Kemalöglü, 2015).

From the Ottoman to the present, the view of the administrations on disasters has always included the elimination of the damage, compensation, or reconstruction after the occurrence of the event, and the pre-disaster measures have not been given sufficient importance (FEMA, 2006; Aktel, 2010).

It can be said that Turkey is located in one of the most active earthquake and volcanic regions of the world. For this reason, disasters frequently occur in Turkey from the past to the present. By being prepared for the disaster situations in question, losses can be minimized. In this process, in addition to taking appropriate engineering designs and construction measures, pre-disaster and post-disaster management have a great impact on reducing losses (Kemaloğlu, 2015; Aktel, 2010; Ural, 2001; Aksu, 2000).

4.1 Gölcük earthquake

The Izmit earthquake, which occurred on August 17, 1999, near the city of Izmit in northwestern Turkey, is devastating. This earthquake is also called the Kocaeli earthquake or the Gölcük earthquake. Thousands of people died and many medium-sized towns and cities were destroyed by the earthquake.

The earthquake, which occurred on the northernmost strand of the North Anatolian fault system, occurred just after 03:00 local time. Thousands of buildings collapsed or were severely damaged, more than 17,000 people were killed and an estimated 500,000 people were left homeless. High casualty figures were reported in the Istanbul and districts of Gölcük, Derince, Darıca, and Sakarya (Adapazarı). The Turkish Red Crescent and the Turkish army have participated in the Rescue and relief efforts led by many international aid organizations (Aksu, 2000).

The Gölcük earthquake that occurred in 1999 first caused a moral and economic collapse, and then a nationwide awakening (Aksu, 2000; Aslan and İnce, 2019). An important lesson learned after this Earthquake was the importance of risk reduction and preparedness. To achieve this, new building regulations have been issued and the relevant legislation has been amended. Since rapid and unplanned urbanization is also seen as a risk factor, many new applications have been started in this area. There has been an increase in public and private sector disaster awareness and recognition of the important role of civil society. In response to the needs of traumatized survivors, gaps in health and medical services have also been filled through psychosocial support programs (Britannica, 2021; UNDRR, 2021).

The government has picked up the shelter needs of the community in three phases: Emergency shelter, Temporary housing, and Permanent housing. In the first phase, the need for shelter has been met by tents, and in the second phase, 40000 prefabricated temporary houses were distributed to those harmed by the earthquake with this allocation, the housing needs of 150000 earthquake victims were met. After the allocation, 30000 people continued to live in tents while 70000 people met their shelter needs by their own needs (Aslan and İnce, 2019; Gökmen and Öymen, 2003).

Disaster management in Turkey is highly centralized and hierarchical encourages local initiatives oppositely, restricts community participation, and occurs with ineffective communication and coordination. In the early days of the 1999 Kocaeli/Düzce earthquake, the lack of coordination led to serious problems, and it was understood that the rigid structure of the system was not a suited form. As a result, new operational attempts have been made to correct this situation (UNDRR, 2021; Mızrak, 2017).

4.2. Van earthquake

The Van province which is in the eastern part of Turkey was shaken by an earthquake of about 25 seconds on October 23, 2011, at 13:41 local time. (Gökmen and Öymen, 2003; Zare, 2014). In this earthquake, the sum of injured was 4,182, the sum of destroyed buildings was 2,265, the sum of moderately damaged houses was 10,000 and the sum of slightly damaged houses was 52,000 (Mızrak, 2017; Afad, 20114).

Local administrations and disaster management team organizations are quite significant in the application of the fastest and most active response to the district in disaster management. 2011 Van earthquake team organizational composition is shown in Figure 3.

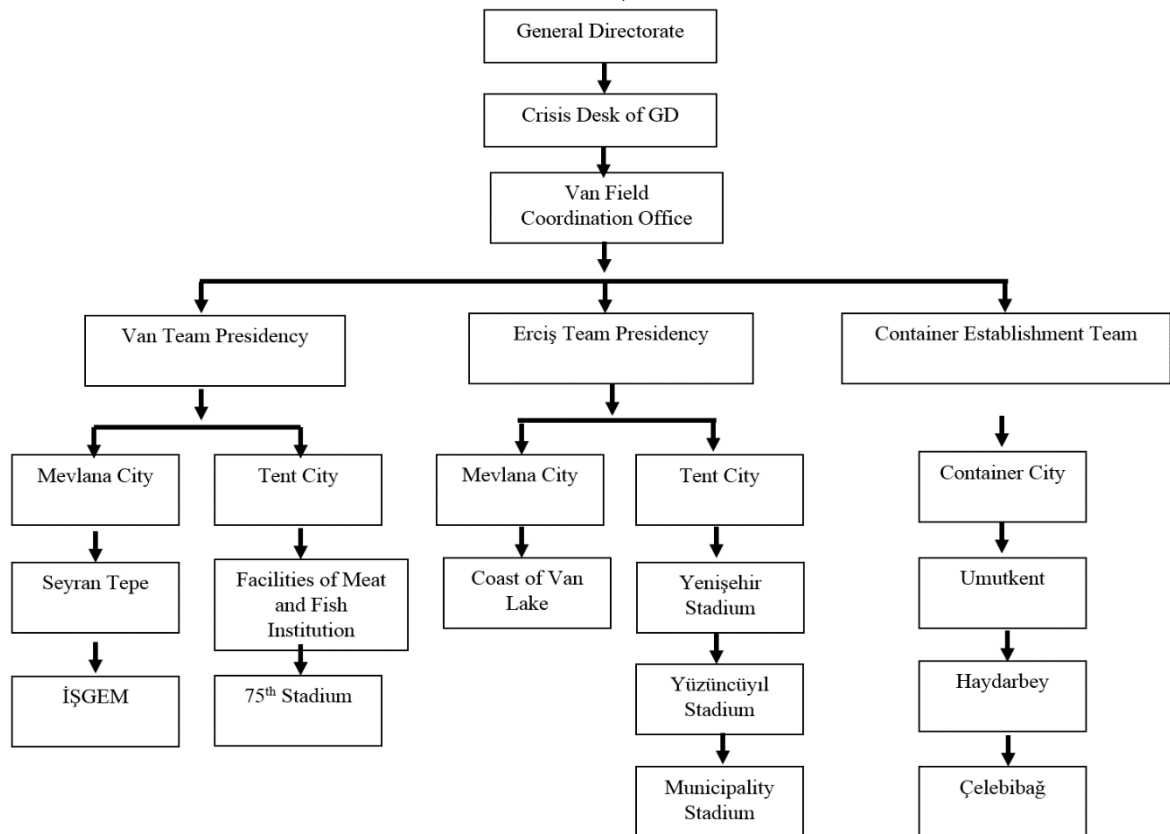


Figure 3. The Van earthquake team organization structure (UNDRR, 2021; Mızrak, 2017).

On October 23, 2600 tents, 7500 blankets, 100 ovens, sleeping bags, heaters, and food were provided for the earthquake victims. Turkish Red Crescent's crisis response groups set up two tent camps in a stadium in Erciş District. Two hundred and sixty families were placed in these camps. In addition, two windbreaks and two storage tents were set up to adopt individuals and store aid. Another tent camp with a capacity of 232 tents was established in the city center of Van. Until 21 November, 18000 people were identified in 12 tent cities in Erciş and Van. Turkish Red Crescent established three camps and a house in Erciş, four tent camps, and two Mevlana houses in Van center, including a camp and a house. In addition, the distribution of tents and Mevlana houses to the village residents continued. Red Crescent has placed 50,547 tents and 2,348 Mevlana houses and prepared shelters for 248,859 people and has planned contracts for 2,000 container houses (equipped with 21 m² bathroom, toilet and kitchen) for Van and Erciş. AFAD has ordered 20,000 containers to be built and by 30 November 2711 containers have been built, of which 2081 have been installed (Gokmen and Öymen, 2003; Zare, 2014).

4.3. Elazığ earthquake

On January 24, 2020, a 6.8 magnitude earthquake occurred at 20:55 local time in eastern Turkey, close to the Sivrice district of Elazığ province, causing extensive seismic damage to buildings (Zare, 2014; Cheloni and Akinci, 2020). The Elazığ earthquake caused damage in the southern provinces of Elazığ and Malatya, 41 people died and 1600 people were injured due to the severe earthquake. This earthquake was recorded as the largest EAF earthquake in more than a century (Afad, 2014; Pousse-Beltran et al., 2020).

After this earthquake, the earthquake victims were placed in mass shelters established in schools, sports centers, dormitories, and nursing homes in the region. In line with the needs determined by the Turkish Red Crescent local government center, 2,500 tents and Turkish Red Crescent teams 74,908 shelter materials were distributed. In addition to the collective shelter centers established in public buildings in Sivrice, tents were set up in the recreation area to create a capacity to accommodate more affected people (Cheloni and Akinci, 2020; Turkish Red Crescent, 2020).

4.4. İzmir earthquake

On Friday, October 30, 2020, an earthquake with a magnitude of 6.6 - 7.0 occurred in the west of İzmir. In the official statement of the Ministry of Interior Disaster and Emergency Management Presidency, it was stated that 1034 people were injured and 115 people lost their lives (Pousse-Beltran et al., 2020; IBC, 2020). A total of 3,020 tents have been set up in İzmir for the temporary housing needs of the victims (Turkish Red Crescent, 2020; Milliyet Newspaper, 2020).

Collective tent areas were quickly established as temporary settlement areas in the earthquake zone. The temporary settlement areas where the works were first started are the parks within the borders of Bayraklı and the collective tent areas established in the green areas by the İzmir Metropolitan Municipality (İzmir Tabib Odası). Temporary accommodation areas established in the region are shown in Table 2.

Table 2. Temporary accommodation areas in İzmir (IBC, 2020; İzmir Tabib Odası, 2020).

Temporary Settlements Within Bayraklı Municipality Limits		
Location	Institution	Tent
Öğretmenevi	İBB, AFAD DENİZLİ MERKEZ EFENDİBEL.	64
Bilal Çakırcalı Park	İBBBAYRAKLI	60
Bulent Kıvanc Park	İBB	38
Working Women's Park	İBB	7
Back Of Türk Telekom	İBB BAYRAKLI	0
Mill Cafe/ Migros Parking	İBB	13
Emek Mah 7248 Street	İBB	10
Martyr Hakan Ünsal Park	İBB	5
286stoakyeşilalan	İBB	9
Ahmet Taner Kışlalı Park	İBB	10
Semt Park	İBB MUĞLA BB	12
Zeki Muren Park	İBB	21
Baris Manco	İBB	10
Metin Oktay Park	İBB	4
Mansuraydın	İBB	2
Day Okçun Park	İBB	10
Türkan Saylan Park	İBB	15
Sımrna Square	AFAD	Preparations Are Continuing In A Wide Area
Temporary Settlements Within Bornova Municipal Limits		
Aşık Veysel Recreation Area	AFAD, İBB, Bornova, District Gendarmerie Commander	781
Bornova Stadium	AFAD, Bornova Municipality	210
Ege University Faculty Of Nursing Parking Park	AFAD	119
Temporary Settlement Areas Within Buca Municipal Limits		
Şirinyer	AFAD	220
Temporary Settlement Areas Within Konak Municipality		
Kültürpark Hall Number 1	İBB	Housing Area For 150 People

5. Results

Considering the results of the recent earthquakes in our country and the world; especially in seismic regions, high importance should be given to risk management and awareness. Each nation struggles to deal with disasters in its way, relying on their help in their international community. But aid from their international community is geared toward urgent needs. For this reason, there should be a consistent and correct strategy for vulnerable regions to reduce risks in the region against potential repetitive disasters.

Although natural disasters are unpredictable, possible risks can be minimized by preparing cities and even countries for disasters, taking necessary precautions together with laws and regulations, planning cities accordingly, and correct planning of disaster management. In addition, with good disaster planning, crisis management can be done easily in serious situations. This situation once again reveals the importance of studying the issue of disaster management. As a result, the lessons learned from each earthquake enable the system to be updated and create a safer and better living environment for the people affected by the disaster. Turkey has made

good progress in this regard since 1999, but there are still many precautions that should be taken. For example, the aftermath of the 1999 Earthquakes in disaster policies and management, Metropolitan Municipality Law No. 5216, Municipal Law No. 5393, Local Administrative Unions Law No. 5355, Law No. 5302 on Special Provincial Administration, Law No. 6306 on the transformation of Areas Under Disaster Risk and Public Financial Management No. 5018 and Control Laws have been enacted and some regulations have been amended (Tercan, 2018).

That is clearly seen that disaster management studies have not reached a sufficient level in losses after earthquakes in our country.

Studies have shown that earthquakes cannot be prevented, but the damage caused by earthquakes can be minimized, in other words, risk reduction can also reduce possible damages. Successful disaster management for earthquakes, like all disasters, is possible by establishing a disaster management systematic in which all stages are applied correctly and meeting the social, modern, and economic needs of our society and sustainable building targets.

In addition to all these, it is mentioned in the literature that one of the foremost factors in disasters crisis management is the communication network. After the disaster occurs, the recovery and rebuilding process requires a race against time, and in this process, social media is an important medium, especially for those who manage the disaster process and the public. For this reason, it is important to actively use social communication networks in disaster management.

In this context, disaster risk and intensity maps of the cities of Turkey should be prepared for contribution to future studies and disaster management. In addition, it is necessary to evaluate the risks in the country and to ensure social participation in global disaster management issues.

Contribution of authors

Authors have equal contribution in all the sections.

Conflicts of interest

The authors declared that there is no conflict of interest.

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