EARTHQUAKE RISK PERCEPTION, COMMUNICATION AND MITIGATION STRATEGIES ACROSS EUROPE

Piero Farabollini, Francesca Romana Lugeri, Silvia Mugnano Editors











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Editors





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3. Turkey's Earthquake History and Institution Based Earthquake Reduction Policies and Strategies

Alper Uzun¹, Burak Oğlakci²

Abstract

Being one of the most powerful natural disasters, earthquakes are still one of the most serious dangers in the world regardless of whether development levels of countries are high or low. Turkey is a young country and is distinguished as one with high seismic risk due to its tectonic structure. The current risk of an earthquake varies from region to region due to differences in tectonic structures. Turkey, is located in the Alpine Himalayan seismic belt, one of the most active earthquake zones of the earth. The Northern Anatolia, East Anatolia, and Western Anatolian Fault lines are major fault lines in Turkey and constitute the basis of the distribution of earthquake events.

When seismic data is analyzed together with maps of earthquake, it seems like an obvious and important fact of Turkey. At this point, the extent to which the earthquake issue take part in the state and government policies and the level of awareness about the earthquake is the main problem of this research. By considering the relevant institutions, the extent to which the earthquake was included in the natural disaster plans of these institutions was Regulations issued investigated. at various times regarding the aforementioned disaster risk in Turkey are available; however, these laws mostly focus on the post-disaster rehabilitation processes. It can be said that Turkey has not been successful in producing policies and strategies to reduce earthquake risks.

Keywords: Earthquake History, Reduction Policies, DEMP, Turkey.

¹ Corresponding author; Balıkesir University, Faculty of Arts and Sciences, Geography Department, Balıkesir, Turkey, e-mail: auzun@balikesir.edu.tr.

² Balıkesir University, Institute of Social Sciences, Geography Department, Balıkesir, Turkey, e-mail: burakoglakci42@gmail.com.

1. Introduction

Natural disasters are still one of the most serious dangers in the modern world, despite the advanced technology and the means of civilization. Natural disasters are a social phenomenon as well as a natural phenomenon. Even if earthquakes, which are one of the major natural disasters, cannot be prevented, the tangible and intangible damages they may cause can be minimized. In accomplishing this, individuals and the society have some duties, however, the main responsibility belong to the public institutions and organizations.

Turkey is a country that has often been faced with natural disasters and has suffered several heavy economic and non-economic losses due to its tectonic, seismic, topographic, and climatic structure. From the establishment of the Republic of Turkey to today, earthquakes have been an unchangeable reality with the frequency of occurring, its effect, and results.

Turkey is a young country and is distinguished one with high seismic risk due to its tectonic structure. The current earthquake risk differs from region to region due to its tectonic structure (Özkul and Karaman, 2007). Located in the Alpine-Himalayan belt, Turkey is under the influence of the North Anatolian Fault, the East Anatolian Fault, the West Anatolia Horst-Graben system and many active faults. In 2018, 485 faults and segments were identified in the current active fault map prepared by the Turkey Mineral Research & Exploration General Directorate. 92% of the country, 95% of the population, 98% of the big industrial centers and 93% of the dams are located in the dangerous earthquake zones (Karamanoğlu and Ulay, 2017: 186). This data reveals the fact that Turkey could face the danger of a devastating earthquake at any moment.

Since the establishment of the Republic of Turkey, the country has experienced many large scale and powerful earthquakes. The first one was the Great Erzincan Earthquake. On December 26th 1939, in the eastern part of the North Anatolian Fault Zone, a 7.9 sized earthquake hit Erzincan. This earthquake in Turkey was the largest that had occurred since 1668. According to official figures; 32.968 people lost their lives and 116.720 buildings were destroyed. On August 17th 1999, the Marmara Earthquake whose center was Kocaeli (Gölcük) hit with a magnitude of 7.4 (Disaster and Emergency Management Presidency- DEMP, 2019a). According to official information, 17.480 people were killed, 23.781 people were injured, 285.211 houses and 42.902 workplaces were damaged (TBMM, 2010; DEMP, 2019a). Another major earthquake in the same year (1999) hit Düzce on November 12 and 710

people lost their lives, 2.679 were injured and thousands ended up homeless. Another earthquake with severe consequences for Turkey was the 2011 Van earthquake. This earthquake, which was measured as 7.2, caused destruction due to the existing state of the buildings of the region, 644 people died and 1.966 people were injured (DEMP, 2019a).

On average, Turkey experiences at least one earthquake every year, ranging in magnitude from 5 to 6 (DEMP, 2019b). Earthquakes with devastating effects are causing great damage both to nature and to human life. This natural disaster brings with it a number of sociological and psychological problems, which are difficult to solve. These examples and statistics reveal that Turkey's earthquake history should be well analyzed. In addition, preparedness against earthquakes, institutional policies to reduce the destructive effects of earthquakes and awareness on earthquakes are very important.

The concept of disaster management is valid for all disaster types. The main task of disaster management is to reduce the loss of life and property and to protect the nation from natural or human-factor disasters. In doing so, a comprehensive risk-based disaster and emergency management system is required, including preparedness, protection, response, recovery, harm reduction (Kadıoğlu, 2008). Recently, modern disaster management has emphasized the importance of disaster prevention as well as disaster preparedness. What is done in preparation for the disaster affects the amount of loss of life and property that will occur at the time of the disaster. Disaster management is handled in three stages before, during and after a disaster. It has been observed that the work before the disaster was as important as the interventions during the disaster. Therefore, the distinction between "Crisis Management" and "Risk Management" needs to be carefully addressed and emphasized.

Risk management means investigating the qualities of these negativities and identifying and implementing effective measures that can taken beforehand in order to minimize the harm and negativity that may occur after the disasters. Crisis management covers the activities to be taken quickly in order to determine the problems that occur in the event of a disaster and to make the necessary decisions to overcome the problem with the least damage in the shortest time. Crisis management is unsuccessful where risk management has been neglected. That is, crisis management applied alone is reactive, uncoordinated, aimless, ineffective, ill-timed and it does not give confidence and it is a management style that causes a disaster to turn into a catastrophe (Kadıoğlu, 2008). In addition to the irreversible consequences of loss of life and property, macroeconomic losses and national wealth losses also pose significant threats to the country's future. Even if an earthquake in the future cannot be prevented, the losses can be reduced to a minimum by safeguard and preparation measures. What is important at this point is the extent of the preparedness of the society as well as how much the managers take the earthquake and other natural disasters into their agendas. To what extent earthquake disaster and awareness level of earthquakes take place in government and state policies constitutes the fundamental problem and focus of this study. The study covers the prevention and risk management studies to be done before an earthquake occurs.

2. Method

In this study, a literature review on the subject was made and then this content was subjected to content analysis. The year 1923, which is the founding year of the Turkish Republic, was chosen as a starting date to reveal Turkey's earthquake history and form maps with data regarding earthquakes. Evidence of earthquakes that took place in Turkey between 1923 and 2018, was taken from various institutions, inventories and databases (Table 1). Related data (EM-DAT, 2019; DEMP, 2019b; ATAG, 2019; USGS, 2019) were entered into a geographic information systems environment. Analysis and visualization of these data have been conducted in a geographical information systems environment. At specified intervals, the institutional structure and legislation focusing on the results and impact of earthquake in Turkey were examined. A comprehensive content analysis have been made on regulations enacted and institutions established after earthquakes. These regulations were published and institutional structures were established in Turkey mostly after major earthquakes. In this direction, policies and strategies for possible earthquakes in Turkey have been revealed. The current status of the legal regulations and institutional structures mentioned and how much they have reflected on the implementation since their publicationestablishment are discussed.

Data source (national and international)	Data		
Emergency Event Database (EM-DAT)	Btw 1923-2018 natural disaster data		
Turkey Disaster and Emergency	Btw 1923-2018 natural disaster data		
Management Presidency (DEMP) - Turkey			
Disaster Information Base			
DEMP - 1900-20xx Earthquake Catalog	Btw 1923-2018 earthquake data		
Turkey Active Tectonics Research Group	Btw 1923-2009 earthquake data.		
(ATAG) - Geoscience Data Catalog			
United States Geological Survey	Btw 1923-2018 earthquake data.		
(USGS) - Earthquake Hazards Program	_		

Table 1 - Earthquake Data in Turkey between 1923 and 2018

3. Findings

3.1. Turkey's Earthquake History

The data regarding natural disasters that occurred in Turkey between 1923-2018 were first obtained from an international institution, the Emergency Event Database (EM-DAT). As shown in Table 2, there is data about 109 natural disasters that took place in Turkey in the EM-DAT database at the specified time (Table 2). These disasters are earthquakes, floods, epidemic outbreaks, storms, landslides, high temperatures and fires (natural). The earthquake has been the prominent disaster among them.

Table 2 - Natural disasters that took place in Turkey, according to the EM-DAT database (1923-2018)

Earthqua	Floo	Epide	Stor	Landsli	High	Fir
kes	ds	mic	ms	des	Temperat	es
		Outbreaks			ures	(Natur
						al)
45	26	7	8	12	7	4

The data presented by DEMP, the only competent authority for disaster and emergency related to Turkey, were examined. When the data provided by the Turkey Disaster Information Base, which is associated with DEMP (Figure 1), there are 7.456 data for natural disasters in Turkey.



Figure 1 - Total distribution of natural disasters in Turkey between 1923 and 2018 (by city).

Among the 7.456 natural disasters in Turkey, earthquakes were the most common disaster. Occurring 1.903 times between the years 1923-2018. The cities where the earthquakes occurred most were İzmir, Balıkesir, Van, and Muğla. In addition, earthquakes are concentrated in areas of densely populated cities in Turkey (Figure 2).



Figure 2 - Earthquakes between 1923-2018 according to Turkey Disaster Information Base data (by city).

DEMP's other database offering earthquake data is the 1900-20xx Earthquake Catalog. The catalog has data on earthquakes occurring with over 4.0 magnitude. According to this catalog, 1.543 earthquakes occurred in Turkey at the specified time interval. The map generated by these data presented in dot format with X and Y coordinates is shown in Figure 3.



Figure 3 - Earthquakes between 1923-2018 (By 1900 - 20xx Earthquake Catalog).

The Active Tectonics Research Group in Turkey has prepared the *Geoscience Data Catalog*. This catalog presents data for Turkey and the surrounding area from 2100 B.C to 2009 A.D. Data covering the period 1923-2009 was taken from this catalog and the map of this data was formed. (Figure 4). There are 3.702 earthquakes in the catalog at the specified time period. These earthquake's data are located in North Anatolia, West and East Anatolia fault lines which are important for Turkey's geological structure.



Figure 4 - Earthquakes between 1923-2009 (By Geosciences data catalog).

Data for earthquakes in Turkey was also obtained via the United States Geological Survey Earthquake Hazards Program provided by United States Geological Survey (USGS). According to this, the number of earthquakes that occurred at the specified time interval exceeding the magnitude of 4.5 is 835 (Figure 5.)



Figure 5 - Earthquakes between 1923-2018 (by USGS).

3.2. Legal and Corporate Structure on Earthquake in Turkey

Policies related to natural disasters in Turkey were first started to be prepared after the 1939 great Erzincan earthquake. The Law No. 7269 on "Assistance to be Taken Due to the Measures Against Disasters Regarding Public Life", issued in 1959, aimed to eliminate the legal gap on the subject. In its content, the pre- and post-disaster processes were discussed. The legal regulations regarding disasters continued in 1988 with "Emergency Regulation on Disaster Relief Organizations and Planning Principles" which was issued in order to ensure the fastest access to the disaster area and provide the most effective intervention.

In Turkey the Marmara Earthquake (August 17th 1999) is seen as a milestone in the field of disaster management and coordination. This earthquake, which caused great loss of lives and extensive damage, put forward the obligation of revising disaster management in Turkey. To deal with disasters, the General Directorate of Civil Defence was established under the Ministry of Interior and the General Directorate of Disaster Affairs was established under the Ministry of Public Works and Settlement, and finally the Turkey Prime Ministry Emergency Management General Directorate was established. In 2009 law number 5902, the Disaster and Emergency Management Presidency affiliated to the Prime Ministry was established and the authorities and responsibilities were gathered under one roof.

3.2.1 Compulsory Earthquake Insurance and Turkish Natural Catastrophe Insurance Pool (TCIP)

After the Marmara Earthquake on August 17th 1999, the supposedlychanged perception of the state on natural disasters and earthquakes also affected the development of insurance activities in this context. On November 25th 1999, the Decree Law No. 587 for, Compulsory Earthquake Insurance was enacted.

With the Decree Law No. 587, it became mandatory for house owners to have earthquake insurance and therefore TCIP which is a public legal entity was established to provide this insurance. In accordance with this Decree, the state aims to transfer some of its obligations to the insurance system in order to meet the losses that may occur after a disaster. Following the establishment period within 9 months, TCIP started to offer collaterals as of 27 September 2000 (Şahin and Pehlivan, 2007). In addition, the Decree-Law on

Compulsory Earthquake Insurance in 2012 was abolished with the Law on Disaster Insurance (Law No. 6305 Decree, 2012). TCIP policies in effect in Turkey is currently 9 million, and the insurance rate is 51% (Table 3). Total compensation payments of all years amounts to 187.245.120 TL and the total number of damages paid is 24.430 (TCIP, 2019). It shows a high proportion of insured homes in areas where both the population and earthquake risk are high (Table 3).

Geographical	Number of	Number	Policy	Insurance
regions of Turkey	dwellings	of insured	distribution	<i>rate</i> (%)
		housing	(%)	
Marmara	6.014.550	3.682.014	40,90	61,20
Central	3.332.500	1.588.595	17,60	47,70
Anatolia				
Aegean	2.616.350	1.350.825	15,00	51,60
Mediterranean	2.236.030	993.244	11,00	44,40
Black Sea	1.693.780	733.416	8,10	43,30
Southeastern	991.460	363.364	4,00	36,60
Eastern	777.020	294.180	3,30	37,90
Anatolia				
Total	17.661.690	9.005.638	%100	%51,00

Table 3 - TCIP Current insurance policy (By Region and Province, 2019)

3.2.2. 2004 Earthquake Council of Turkey

An Earthquake Council was held by the Ministry of Public Works and Settlement between September 29th 2004 and October 1st 2004. This has created a platform with wide participation in the Council. The Council was convened with the participation of representatives of various public institutions and organizations, universities, professional chambers, nongovernmental organizations and the private sector. The purpose of the meeting is to discuss what should be done about the earthquake and to determine the measures and decisions to be developed for implementation. 354 members of the Council were invited to the Earthquake Council and they discussed the following: Institutional Structuring, Legislation, Disaster Information System, Investigation of Existing Structures and Building Inspection, Construction Materials, Supply of Resources and Insurance Reports of Educational Commissions (Ministry of Public Works and Settlement, 2004).

3.2.3. Regulation on Structures to be built in Earthquake Regions (Earthquake Regulation)

The purpose of this regulation published in 2007 is to take the earthquake zones identified and announced in accordance with Article 2 of the Law No. 7269 in 1959, into account. It covers all buildings that will be re-built, changed and enlarged in these regions. In addition it determined the rules and minimum conditions for the evaluation and strengthening of earthquake-resistant design and construction of all types of buildings as well as the conditions of existing buildings before and after earthquakes.

3.2.4 Disaster Insurance Law No. 6305 of 2012

With the decree that became law on May 18th 2012, the Decree Law No. 587 published in 1999 was abolished. In 2012, the application of compulsory earthquake insurance was extended to cover disasters other than earthquakes. This law provided for expansion to be carried out on the dwellings subject to compulsory earthquake insurance. These are; the independent departments within the scope of the Property Ownership Law, the buildings which are registered as land on the deed, and privately-owned immovable properties, the independent sections in these buildings used for commercial purposes. With this law, the rate of compulsory earthquake insurance within the housing increased from 28% to 36% by 2013 (National Report for Turkey Habitat III, 2014: 18).

3.2.5 Law No: 6306 on the Transformation of Areas under Risk of Disaster and Related Legislation (Urban Transformation Act)

Disaster Act No. 7269 could not perform the desired response to the natural disasters that Turkey had to confront. Known to the public as the "Urban Transformation Law", this law moved the perception of disaster alleged to have changed after the 1999 Marmara Earthquake into a different dimension. The law No. 6306 gathered all the legal regulations enacted before it under one roof (Aydıner, 2014). In other words, for the first time as a country that is continuously seeking legal regulations after disaster has

occurred, a law was enacted which introduced more comprehensive regulations before disaster. The word risk which is not mentioned in Law No. 7269 is used forty-five times in the Law No. 6306 (Yavuzçehre and Aydıner, 2013).

The Urban Transformation Act has directed disaster perception to the processes prior to the disaster. In this context, Article 8 of the new law introduced important regulations about the prevention phase. The word 'mitigation' is clearly stated in the law and the Ministry and the Housing Development Administration are positioned as the authorized names of the process within the scope of the risk management statement. The Law No. 6306 has taken the legal arrangements before it to a new dimension (Aydıner, 2014).

A general urban transformation law eliminating the tradition of regulations after disaster put forward the risk management, established an important resource in terms of measures to be taken before the disaster, and aimed to involve the different actors in disaster management cycle.

In general, the mentioned laws and regulations are evaluated together. It's seen that 5 of these are in force and 2 of these are abolished (Table 4).

Year	No	Law-Regulation	Status
1959	7269	Assistance to be Taken Due to the Measures Against Disasters Regarding Public Life	In force
1988	-	Emergency Regulation on Disaster Relief Organizations and Planning Principles	In force
1999	587	Compulsory Earthquake Insurance	Be
			abolished
2007		Regulation on Structures to be Built in	Be
	-	Earthquake Regions (Earthquake Regulation)	abolished
2012	6305	Law on Disaster Insurance	In force
2012	6306	Transformation of Areas under Risk of	
		Disaster and Related Legislation (Urban	In force
		Transformation Act)	
2018	-	Turkey Building Earthquake Regulation	In force

Table 4 - Laws and regulations in force and be abolished.

3.3. Disaster and Emergency Management Presidency (DEMP) Foundation

Before the establishment of DEMP, the Turkey Emergency Management General Directorate, the General Directorate of Disaster Affairs, the General Directorate of Civil Defense and the Prime Ministry Crisis Management Center are institutions that were all active. In accordance with Law No. 5902 addressing the Organization and Duties of the Disaster and Emergency Management Presidency, the aforementioned institutions were closed down. Due to the fact that many actors and institutions are involved in disaster policies, the work must be coordinated by a single institution. For this reason, the necessary infrastructure for the establishment of DEMP was established.

DEMP has adopted the aim of preventing and mitigating disasters, intervening in disasters and rapidly completing the post-disaster improvement efforts. DEMP is a business-oriented, flexible and dynamic organization that provides cooperation between all institutions and organizations of the country directing, supporting, coordinating for planning. and effective implementation of all necessary activities. This institution is the only authorized institution for disasters and emergencies, and as an umbrella institution, it operates its activities in coordination with other ministries, nongovernmental organizations, the General Staff, Foreign Affairs, Ministry of Health, Transportation and Infrastructure, etc. in accordance with the nature and extent of the disaster and emergency (DEMP, 2019c). To this aim, the institution implemented a new disaster management model that changed the focus from "Crisis Management" to "Risk Management".

DEMP prepares and implements many action plans, strategies, programs and regulations for the pre-and post-disaster processes. The highlights of these are described one by one below.

3.3.1. National Earthquake Strategy and Action Plan (NESAP-2023)

In 2010, the Earthquake Advisory Board within DEMP started to work on the development of the Earthquake Strategy. In this process, some subcommissions were formed and the process was discussed and directed by many experts. The reports of the committees were presented to DEMP and each subcommittee set a target, strategy and action plan according to the area of interest (Aydıner, 2014). NESAP's general guidelines was formed from the commission reports to learn about earthquakes and to be able to cope with the effects of the earthquake due to safe settlement and construction. The Urban Transformation Act and Natural Catastrophe Insurance Law were entered into force within the scope of this plan, which was put into effect in 2012, and the National Earthquake Research Program was launched to support disaster risk reduction efforts. NESAP-2023 provides a sample study that includes strategic approaches and a series of actions aimed at minimizing loss due to earthquakes. The DEMP-RED (DEMP-Rapid Earthquake Damage and Loss Estimation Software) program which includes the reflection of the general situation of the disaster area and estimated damage is active. The New Earthquake Hazard Map regarding Turkey, and updated "Earthquake Directives" were simultaneously published in the official gazette in 2018 and will be applied in 2019.

3.3.2. National Earthquake Research Program (NERP)

This program launched in 2012 by DEMP aims to solve the problems in priority areas related to earthquake disasters and provide implementations with result-oriented technological advances. In addition, it aimed to develop institutional capacity, support scientific research, and use the resources effectively by transforming this research into projects which can be transferred to the participatory structure and application.

The objectives of the NERP 2023 are;

- Developing Knowledge of the Infrastructure of Earthquakes
- * Earthquake Hazard Analysis and Development of Hazard Maps
- * Provision of Earthquake Safe Settlement and Structure
- Protection of Historical and Cultural Heritage from Earthquakes

◆ Development of Training and Public Awareness Activities for Earthquakes.

3.3.3. Turkey Disaster Response Plan (TDRP)

This plan was prepared in 2014 in order to specify the interventions to be carried out after any kind of disaster and to determine the duties, authorities, and responsibilities among all ministries, institutions, and organizations related to the works to be performed. Within the scope of TDRP, 28 National Level Service Groups were completed in 2015 and 81 Provincial Disaster Response Plans were prepared in 2016.

The main partners working in coordination with TDRP are:

✤ Ministry of Interior

- * Ministry of Transport, Maritime Affairs, and Communication
- Ministry of Health
- Ministry of Energy and Natural Resources

- Ministry of Environment and Urbanization
- * Ministry of Family and Social Policies
- Ministry of Food, Agriculture, and Livestock
- ✤ Ministry of Finance
- Turkish Red Crescent

3.3.4. Turkey Building Earthquake Regulation

The purpose of this regulation, published in the Official Gazette dated March 18, 2018, by DEMP is to:

Determine necessary rules and minimum requirements to design and construct all official and private buildings that need to be rebuilt, be modified, and be enlarged wholly or partially owing to the effect of earthquakes and evaluate the performances of current buildings which are under the effect of earthquakes.

3.3.5. Disaster Management and Decision Support System

The Disaster Management and Decision Support System was developed by DEMP to monitor and manage disaster and emergency processes in an electronic environment and provide decision support to authorities. This is a system built on Geographic information systems, with decision support mechanisms that can effectively manage national resources in case of a disaster. The Turkey Disaster Response Plan that makes up the infrastructure of Disaster Management and Decision Support System is operating within the scope of disaster planning, intervention, and remediation processes.

3.3.6. Turkey Disaster Risk Reduction Plan

The preparations for this plan explaining which tasks will be done when, how and by whom, have started to determine disaster risks and avoid and reduce these risks by taking all measures. While addressing the disaster risks in the Turkey Disaster Risk Reduction Plan, all public institutions and organizations, universities, private sector, non-governmental organizations, media, family, and individuals are expected to come together for governance.

3.3.7. Turkey Disaster Management Strategy Document and Action Plan

This plan is seen as the as is of the disaster management system that will enable the mitigation, preparation, intervention and post-disaster improvement efforts to be carried out in case of a disaster. The preparation and development of this plan by DEMP continue.

4. Conclusion and Discussion

Turkey is a country with a very high risk and occurrence of earthquakes when we examine the earthquake history, data obtained from many inventories and institutions, maps and historical events created in line. On the map of active faults updated by the Turkey Mineral Research & Exploration General Directorate 485 faults and fault segments which are capable of producing earthquakes of 5.5 have been identified. This data reveals the possibility of a major earthquake at any moment in Turkey. For this reason, it is seen as a country that requires many policies and strategies that involve all actors before and after the disaster.

In Turkey, the establishment of institutional structures and the enactment of legal legislation for disasters are generally after major earthquakes. One of these regulations is the disaster Law No. 7269 of 1959, which became the regulatory law after the 1939 Erzincan earthquake. This law brings together the disaster regulations enacted before that date under one roof. However, while it is considered important in terms of the number of actors and the authority it gives to local government units, there has not been a law in power to involve different actors in the disaster management cycle. This law adopted disaster-related demolitions and regulated the way in which post-demolition intervention and construction processes can be carried out (Aydıner, 2014).

There are no differences in the legal and institutional arrangements during the interval between Erzincan earthquake in 1939 and Van Earthquake in 2011. In particular, most of the processes prior to the 1999 Marmara Earthquake often has focused on post-disaster processes and the response and rebuilding processes that could be described as two phases of the disaster management cycle.

The legal regulations put into effect after the 1999 Marmara Earthquake are quite numerous; a total of 38 laws and decrees, 28 decrees, 6 regulations, 17 communiqués, and 9 circulars (Daşkıran and Ak, 2015). Despite these numerous laws and regulations one cannot say that Turkey is successful and effective in disaster management policy if economic loss and non-economic damages are taken into consideration in the historical context.

One of Turkey's most vulnerable areas against natural disasters is the lack of implementation of risk reduction programs. After previous ignoring the avoidance phase which is one of the most important stages of disaster management, the introduction of Compulsory Earthquake Insurance and establishment of TCIP as an institution to manage this process was a significant development.

In this respect, it has been ensured that rights holders are included in the mitigation efforts through compulsory earthquake insurance. However, these laws and practices has not been seen sufficient at the point of loss reduction (Başbuğ Erkan, 2007). There are many problems concerning the Compulsory Earthquake Insurance and the functioning of the TCIP system, which was implemented after the 1999 Marmara Earthquake. In addition, healthy funds and budget items for disaster could not create. The Special Consumption Tax, introduced in 1999 to cover the damages of the Marmara Earthquake, was used for other purposes.

The problem must be addressed with multidisciplinary approaches in order to make the cities, which are growing rapidly and in an uncontrolled manner, ready for disasters. Therefore urban transformation projects should be handled within the scope of the social, economic, psychological, and physical environment. A potential Marmara earthquake, which scientists predict to be of a 7.4 magnitude in the case of a single break, will affect the whole Marmara region, especially Istanbul (Moriwaki, 2019). In urban transformation projects, priority should be given to places where disaster risk is high and to buildings to be demolished (TMMOB Chamber of Civil Engineers, 2017).

A large part existing buildings in Turkey are unlicensed and illegal; a large part of dwellings consists of buildings over 20 years-old; nearly half of them are uninhabitable and must be reinforced against earthquakes. In 2019, some buildings collapsed in 4 different districts of Istanbul without any natural disaster. For example, in the Kartal district on 21 February 2019, 21 people were killed and 14 were wounded in a building that suddenly collapsed. In the expert report prepared for the relevant building; it was determined that the concrete used in the construction was made of sea sand and the sand was not washed and sifted. Also, the building was authorized to have 7 floors, however it had 9 floors.

The concept of Urban Transformation Law works to in the logic of demolishing and building and is used as a means of income. Legislation changes including the concepts of disaster, risk, urban transformation, zoning, public lands have made Turkey an element of profit-rant by starting from cities (TMMOB, 2017). According to Law No. 6306, the transformation has been handled only with its economic and physical dimensions, and the social problems that it will cause has been ignored. This law, which was issued after the Van earthquake in 2011 and which been stated that Turkey would solve the earthquake problem, stands out with many deficiencies and application problems. No effective work has been carried out on this law and the current plans have not been finalized.

In 2018, with the provisional article 16, which was added to the Zoning Law No: 3194, the Law of Zoning Pardon (Peace) enacted. In accordance with the provisions of this article, Regulation on Procedures and Principles for Granting Building Registration Certificate were issued (Pamukoğlu, 2018). The law, which provides for issuing a building registration certificate for a fee calculated in certain circumstances and has 11 million applications, covers structures made before December 31st 2017. Elimination of the conflict of citizens with the state, recording the buildings constructed in violation of zoning plans, unlicensed or contradictory to the annexes of permits are aimed to be legitimized. In accordance with this Law, if a demolition decision has been taken and an administrative fine has been issued for a residence, these will be canceled. In parallel with these developments, structures that are not certain to have sufficient engineering services will be legalized. This situation leads to these questions: What will happen to the structures that are vulnerable? How will they be controlled?

Connecting the Earthquake Research Department, one of the expert institutions involved in earthquake management, to the Ministry of Interior, has started a separate discussion. It would be more appropriate to connect this institution to the Ministry of Mineral Research and Exploration, which is an expert body. According to the Chamber of Geological Engineer; there are also a number of shortcomings in the implementations of institutions such as Earthquake Advisory Board, NESAP and NERP. The first one is that the Earthquake Advisory Board, which has not been convened since 2011, has not carried out any studies to provide public information about earthquakes. The uncertainty about the progress of the studies carried out within the scope of the NESAP-2023 prepared by DEMP in recent years is shown as another problem.

Regulations issued at various times regarding the aforementioned disaster risk in Turkey are available; however, these laws mostly focus on the postdisaster rehabilitation process. It can be concluded that Turkey is not successful in producing policies and strategies regarding the reduction of risks of earthquake.

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Increasingly, socio-natural risks and disasters represent the result of an unsustainable interaction between human beings and environment. The current scientific debate has generally agreed on the idea that the impact of natural hazards needs to take into account the social vulnerabilities and exposures to risk of the affected population. The most recent earthquakes have unequivocally shown the complexity of the phenomena and their multi-scale dynamics. Indeed, the territory is the combination of natural, social and cultural environment and only by exploring its anatomy and physiology, it will be possible to manage and protect it in the best way.

This volume collects a quite wider range of national and international case studies, which investigate how socio-natural risks are perceived and communicated and which strategies the different communities are implementing to mitigate the seismic risk. This publication has been possible thanks to a fruitful discussion that some scholars had at the 36th General Assembly of the European Seismological Commission held in Malta from 2 to 7 September 2018.

Piero Farabollini, Ph.D. in Geomorphology (University of Perugia, Italy). He is Associate Professor of Geomorphology and Physical Geography at the University of Camerino (Italy), Earth Sciences Department and Coordinator of geological and geothematic field mapping and hydrogeological risk assessment projects. Previously he was coordinator of the Communication group of the National Council of Geologists and subsequently President of the Marche Association of Geologists. Currently he is Extraordinary Commissioner for Reconstruction after the Earthquake in Central Italy.

Francesca Romana Lugeri, geologist, sociologist, geographer (Sapienza University, Rome, Italy); Ph.D. in Environmental Sciences and Public Health (University of Camerino, Italy), she is researcher at ISPRA Institute for Environmental Protection and Research. Since 2016 she is Research Associate at the University of Camerino. Topics of current research projects are: unconventional scientific communication, dissemination, education; science popularization for risk consciousness and prevention; landscape analysis, geological and geothematic mapping, GIS developing.

Silvia Mugnano is Associate Professor of Urban Sociology and her research interests include housing, urban transformation, and socio-natural disaster studies. She is teaching nationally and internationally on tourism and local development, and she is intensively working on promoting the topic of socio-natural disasters in the sociological debate. Her recent publications on the topic include Territori Vulnerabili (FrancoAngeli, Milan, 2017) and a Special Issue on "Socio-Natural Disaster, resilience and vulnerability: the territorial perspective in Italian current debate" in Sociologia Urbana e Rurale (2016) and several articles among which "A New Normality for Residents and Tourists: How Can a Disaster Become a Tourist Resource?" (Springer, 2016).





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