THESIS

HOW COMMUNITY INSTITUTIONS IN TURKEY ENGAGE IN DISASTER RISK REDUCTION: A CASE STUDY OF ISTANBUL AND ANTAKYA

Submitted by

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ABSTRACT

HOW COMMUNITY INSTITUTIONS IN TURKEY ENGAGE IN DISASTER RISK REDUCTION: A CASE STUDY OF ISTANBUL AND ANTAKYA

This thesis explores how different community institutions – government, education, healthcare, business, and grassroots organizations – in Turkey engage in disaster risk reduction (DRR) strategies and how each institution fosters a culture of resilience. The framework used in order to determine adequate DRR engagement is the Hyogo Framework for Action, which is the structure of resilience and preparedness created by the United Nations International Strategy for Disaster Reduction (UNISDR). The goal of the research is to understand the ways that DRR is integrated into the social organization of Turkey, using the cities of Istanbul and Antakya as the primary case study communities. The analyses of twenty-one interviews, as well as supplemental respondent surveys highlight primary themes informing how the five community institutions address seismic risk in Turkey. The current social organization of Turkey has key characteristics found in 'fatalistic' societies, or societies that are inherently reactive. However, the ways community institutions engage in DRR proves that Turkey is determined to shift their behavior from reactive to proactive. "A current state of unpreparedness" is how a respondent described the risk culture in Turkey today. Still, an examination of all of the interviews verifies that, despite the barriers, Turkey is slowly moving towards having a strong culture of resilience, and the social organization is gradually shifting to a more 'self-reliant' society.

ACKNOWLEDGEMENTS

First, I want to acknowledge the ability of leaders to change people. They are like sunlight; they help you grow in the most organic of ways, but still require **you** to do the "growing." They allow us to learn-for-ourselves the types of weather we thrive most in and give us time and space to figure out the "night" on our own – only to arise and join us again in the morning, should the night not have fared as enlightening, with only ourselves to guide us.

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Finally, for my continued sanity, I must thank the half-blood prince.

DEDICATION

I would like to dedicate this thesis to William Jr., Todd, and Nita Schilperoort. Through the storm, your light guided me back to shore. Your faith helped me endure the waves and seasickness. And it was not until my voyage was over that I realized the hull you sent me out in was the strongest in the seven seas. Thank you.

TABLE OF CONTENTS

ABSTRACT ii

DEDICATION iv

LIST OF TABLES vii

LIST OF FIGURES viii

ACRONYMS ix

CHAPTER 1: DISASTER RISK REDUCTION 2

INTRODUCTION TO THE RESEARCH 2
CASE STUDY AREA: TURKEY 4
Location 4
Government 5
Economy 6
Population 11
Seismic Risk 11
TARGET CITIES 13
Istanbul 14
Antakya 27
OVERVIEW OF THESIS 30

CHAPTER 2: LITERATURE REVIEW 31

UNITED NATIONS INTERNATIONAL STRATEGY FOR DISASTER REDUCTION 31
What is Disaster Risk Reduction (DRR)? 32
HYOGO FRAMEWORK FOR ACTION 39
DRR INSTITUTIONS 43
Government 45
Business 52
Education 55
Healthcare 56
Grassroots Organizations 58
DRR IN TURKEY 60
Shift from a 'Fatalistic' Society to a 'Risk/Self-Reliant' Society 61
Deficiencies in the Turkish Construction Industry and Building Stock 64
Governmental Decrees: Helpful Stepping Stones or Bureaucratic Impediments? 67
Public Education of DRR 70

CHAPTER 3: METHODOLOGY 73

RESEARCH QUESTIONS 73
MIXED METHODS APPROACH 74
Qualitative 75
Quantitative 76

RESEARCH SITES 77
DISASTER RISK REDUCTION COMMUNITY INSTITUTIONS 80
DATA COLLECTION 82
Interviews 82
Surveys 86
Literature 87
DATA ANALYSIS 88
METHODOLOGICAL CHALLENEGES AND LIMITATIONS 89

CHAPTER 4: CASE STUDY – ISTANBUL 92

CHAPTER 5: CASE STUDY – ANTAKYA 119

CHAPTER 6: QUANTITATIVE SURVEY ANALYSIS 136

CHAPTER 7: CONCLUSION 151

BIBLIOGRAPHY 161

LIST OF APPENDICES 168

LIST OF TABLES

2.1 Possible Risk Reduction Program Targets…….. 37

6.1 Barrier Response Counts and Percentages by City…….. 138

6.2 Resource Needs Response Counts and Percentages by City…….. 147

LIST OF FIGURES

1.1 Map of Turkey..... 5

1.2 GDP per Person in Turkey by Region..... 8

1.3 Distribution of Economic Activities in Turkey..... 9

1.4 Population Densities in Turkey, by Province..... 10

1.5 Earthquake Magnitude ≥ 4.0 in Turkey, 1900-2011..... 10

1.6 Tectonic Map of Turkey..... 13

1.7 Map of Turkey: Istanbul 14

1.8 Population Density of Istanbul in 2007..... 15

1.9 Most Likely Scenario – Number of Deaths by Borough..... 23

1.10 Worst-case Scenario – Number of Deaths by Borough..... 24

1.11 Most Likely Scenario – Number of Severely Damaged Buildings by Neighborhood..... 25

1.12 Worst-case Scenario – Number of Buildings Severely Damaged by District..... 26

1.13 Map of Turkey: Antakya..... 28

2.1 Causal Factors of Disasters..... 32

2.2 Petal's DRR Levels and Actions..... 38

2.3 Attributes of the Two Extreme Models of Strategy and Disaster Policy..... 62

ACRONYMS

CEI	Compulsory Earthquake Insurance
CIP	Community Impact Project
CSU	Colorado State University
DREAMS	Disaster Risk Educational Materials Content Management System
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EERI	Earthquake Engineering Research Institute
EMI	Earthquakes and Megacities Initiative
EQ	Earthquake
EQRR	Earthquake Risk Reduction
EU	European Union
GHI	GeoHazards International
GEM	Global Earthquake Model
GDP	Gross Domestic Product
HDI	Human Development Index
HFA	Hyogo Framework for Action
INSARAG	The International Search and Rescue Advisory Group
IMF	International Monetary Fund
IMM	Istanbul Metropolitan Municipality
ISDR	International Strategy for Disaster Reduction
ISMEP	Istanbul Seismic Risk Mitigation and Emergency Preparedness Project

JICA	Japan International Cooperation Agency
NGO	Non-Governmental Organization
PDC	Pacific Disaster Center
PHC	Primary Healthcare
S.E.E.	State Economy Enterprises
TCIP	Turkish Catastrophic Insurance Pool
UN	United Nations
USAID	United States Agency for International Development
UNISDR	United Nations International Strategy for Disaster Reduction
USGS	United States Geological Survey

It is therefore trying to show how disasters can be perceived within the broader patterns of society, and indeed how analyzing them in this way may provide a much more fruitful way of building policies, that can help to reduce disasters and mitigate hazards, while at the same time improving living standards and opportunities more generally.

-Ben Wisner, Piers Blaikie, Terry Cannon, and Ian Davis - *At Risk: Natural Hazards, People's Vulnerability, and Disasters*, 2nd Edition, 4

CHAPTER 1: DISASTER RISK REDUCTION

This thesis explores how different institutions—governments, schools, healthcare institutions, businesses, and grassroots organizations—understand and engage in disaster risk reduction (DRR) practices in Turkey. Through the analysis of qualitative interviews and survey data, this research specifically focuses on the capacity of community institutions in Istanbul and Antakya, Turkey, to implement the United Nations International Strategy for Disaster Reduction (UNISDR) framework of resilience and preparedness, which is the Hyogo Framework for Action (HFA). Survey data guides an understanding of the barriers and resource needs Turkish institutions have when trying to implement DRR. Primary themes found throughout qualitative interviews supplement the survey data by highlighting the reasons these institutions function at a particular capacity. A culmination of each institution's ability to support the Hyogo Framework helps inform the general structure of Turkey's DRR efforts and how community institutions in Turkey foster a culture of resilience.

INTRODUCTION TO THE RESEARCH

This thesis is one part of a larger study of DRR practices. I am a member of a team of engineers and social scientists who visited 11 cities with high seismic risk in seven countries to interview a variety of DRR professionals. The GeoHazards International-Colorado State University (GHI-CSU) project, which was funded by the Global Earthquake Model Foundation (GEM), focused on DRR activities in Bhutan, India, Indonesia, New Zealand, Peru, Turkey, and the United States. The target cities in the project included:

Antakya, Bandung, Chincha, Christchurch, Delhi, Guwahati, Istanbul, Lima, Padang, San Francisco, and Thimpu. In this thesis, I use the data gathered in Istanbul and Antakya, Turkey.

The project team began by first identifying first, vulnerable places that have high seismic risk. To do this, the team evaluated recency of earthquake (EQ) exposure, level of experience in EQ mitigation, as well as overall risk for seismic activity. Next, we identified locations with a range of vulnerable people due to social and economic factors including national income, population, national gross domestic product, ratings on the United Nations Human Development Index (HDI), average educational attainment, gender inequality indicators, and overall access to healthcare. Because we realized we could not approach the entire population in these target cities, the team decided to conduct key informant interviews with influential actors working in disaster risk reduction in several core community institutions. We only included community institutions that were actively working on earthquake preparedness, mitigation, and/or disaster risk reduction efforts so we could learn about what actions these organizations were taking to reduce risk, what barriers they face, and what they need to better carry out their roles and responsibilities. In the end, we included individuals in the final sample who had the power to influence decision-making within the organization, district, city, or region (see Appendix A and B for a more complete summary of the city and interviewee selection criteria).

Before the fieldwork for this project began, members of the team participated in a two-day methods training session in Palo Alto, California. The goal of this training session was to ensure consistency in the work as well as to articulate and clarify the expectations of each team member. During this workshop, we also reviewed several key research

instruments, including a fieldwork guide, interview guide, survey, and demographic questionnaire (see Appendix C, D, E and F). While I participated throughout each phase of the GHI-GEM project, my research and fieldwork were focused in Turkey.

CASE STUDY AREA: TURKEY

Location

Turkey is the 37th largest nation in the world, covering 783,562 square kilometers. It is located in the northeastern corner of the Mediterranean Sea, with Greece and Bulgaria bordering western Turkey and Syria, Iraq, Iran, Armenia, and Georgia border the east. Turkey's entire northern coastline is buttressed by the Black Sea while the Mediterranean meets the majority of the southern and western coastline. All of the land west of the Bosphorus River is considered to be on the continent of Europe and all of the land east of the Bosphorus River is on the continent of Asia (see Figure 1.1). Turkey has approximately 7,200 kilometers of coastline and is slightly larger than the state of Texas.

Figure 1.1. Map of Turkey

Government

Mustafa Kemal Ataturk founded the Turkish Republic on October 29, 1923. Turkey is a unitary state governed by the parliamentary democratic system. "The citizens exercise their sovereignty directly by the elections, and indirectly by means of the authoritative organizations… legislative, executive, and judiciary" (Ergunay et al. 2012, 2). The legislative branch is the Turkish Grand National Assembly, composed of 550 members of parliament elected directly by the citizens every five years. The executive branch is made up of the President of the Republic and the Council of Ministers. The Turkish Grand National Assembly elects the President every seven years and the President of the Republic appoints the Council of Ministers. Judicial power is used by means of the independent courts.

The country is divided up into 81 units, provinces, where appointed governors serve the institutions functions of the government. Each province is divided into districts, and

now there are over 850 districts in Turkey. Provinces, districts, and any settlement over 2,000 people elect a mayor every five years. "While appointed governors are the representatives of the state, the elected mayors are in charge of providing public services, such as drinking water, waste management, transportation, etc., to the citizens within the district" (Ergunay et al. 2012, 3).

Economy

Turkey has the 17th largest gross domestic product (GDP) globally ($1.053 trillion, in US, 2011 dollars) but only the 86th largest GDP per capita world-wide ($14,600, in US, 2011 dollars). Still, the economy in Turkey has grown rapidly as there is an influx of new residents migrating from rural to urban areas for industrial and service sector job opportunities. Still, approximately 25% of Turkey's employed workers work in agriculture. The aggressive privatization programs that started in the mid-1980's in order to integrate the Turkish economy with the global markets and to accelerate Turkey's accession into the European Union (EU) significantly decreased state involvement in basic industry, banking, transport and communication (Ertuna 1998; Kizil 2006). During the first decade of implementation, political, legal, and labor constraints limited the success of the transition from public to private enterprises (Ertuna 1998). At the end of the 1990's, private enterprises were the primary creator of jobs and national income (Kizil 2006). This shift from state economic enterprises (S.E.E) fueling the Turkish economy to successful privatization practices led to an emerging cadre of middle-class entrepreneurs that added dynamism to the economy, expanding production beyond the traditional textiles and clothing sectors (CIA 2012). This shift has also created a more significant standard-of-living

gap between the middle-class and the poor. The United Nations (UN) estimated that 16.9% of Turkish citizens were living below the poverty line in 2010. In 2011, 10.3% of the Turkish population was unemployed, making it the 112th highest unemployment rate worldwide.

In 2001, following a national financial crisis, Turkey adopted economic reforms as part of an International Monetary Fund (IMF) program. "The reforms strengthened the countries economic fundamentals and ushered in an era of strong growth – averaging more than 6% annually" (CIA 2012) until the global financial meltdown in 2008. Although Turkey experienced a marked economic slowdown due to the heightened risk perception and adverse effects of the global crisis on banks' funding facilities, Turkey's recovery from the 2008 global financial crisis was relatively rapid when compared to many other nations due to their well-regulated financial markets and banking system (Yörükoğlu).

Turkey has been striving for decades to become a member of the EU. However, because of their dependence on volatile, short-term investments to supplement their large trade deficit, their economy is seen as "vulnerable to destabilizing shifts in investor confidence" (CIA 2012). Despite their dependence on short-term investments, they are not as dependent on exports as many other emerging markets.

The service sector accounts for 63.9% of Turkey's annual GDP and industry accounts for 26.9%. Even though it employs 25% of the Turkish workforce, the agriculture industry accounts for only 9.2% of Turkey's annual GDP. Turkey's main agricultural products include tobacco, cotton, grain, olives, sugar beets, citrus, hazelnuts, and livestock. The most prevalent industries in Turkey are textiles, food processing, automotive, electronics, mining, steel, petroleum, construction, lumber, and paper. The UN estimates

that the industrial production rate of the nation was 8.5% in 2011. Bakir and Boduroglu (2004) claim that most of the industrial activity in Turkey occurs in one single area, the Marmara region, which is considered the most vulnerable region in Turkey for volatile seismic activity. Three-quarters (75%) of Turkey's profitable industries are located on the Northern and Eastern Anatolian Faults (see Figure 1.2 and 1.3). When Figures 1.2 - 1.5 are compared, they visually represent the areas most vulnerable to seismic activity, which approximately mirror the same areas that are most densely populated as well as the same areas that produce that highest per capita income for Turkey.

Figure 1.2 GDP per Person in Turkey, by Region

Figure 1.3 Distribution of Economic Activities in Turkey

Figure 1.4 Population Densities in Turkey, by Province

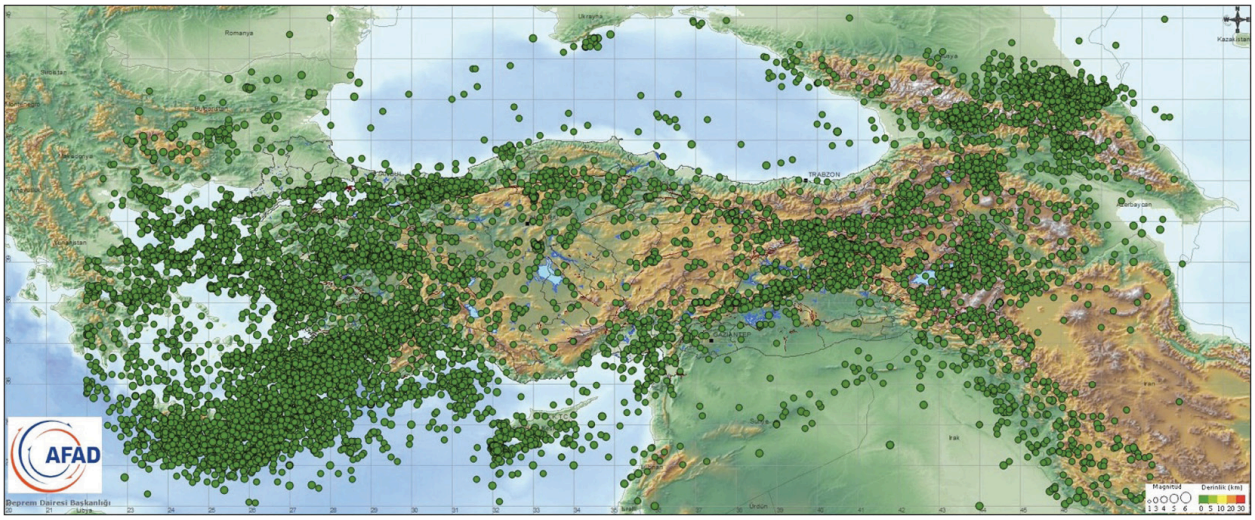

Figure 1.5 Earthquakes Magnitude ≥ 4.0 in Turkey, 1900-2011

Population

Turkey's population is estimated to be 79,749, 461 as of July 2012, according to the UN and the majority of people live in the provinces of Istanbul, Kocaeli, and Sakarya in the Marmara Region (Brinkhoff 2012) (see Figure 1.4). Turkey is the 17th most populated nation in the world. By 2050, Turkey's population is estimated to grow to 100,000,000, which would make it the largest nation in Europe by 30,000,000.

The two primary ethnicities are Turkish (70-75%) and Kurdish (18%), with approximately 12% of other minorities within its borders. The primary religion practiced is Islam, with 99.8% of all Turkish citizens being Sunni Muslims. The other 0.2% are reported to be Christians or Jews. The majority of the Turkish population is between the ages of 15 - 64 years old (~67.1%). The youth of the nation make up its second largest age group, as 26.6% of the population is between the ages 0-14. The elderly, age 65 years and older, make up approximately 6.3% of the Turkish population. Approximately 87% of the population is literate and the average Turk attends school for 12 years.

Seismic Risk

Turkey's risk for seismic activity is extremely high: 92% of the nation's land is prone to EQ activity (Ural 2008), making earthquakes the most prevalent and dangerous hazard in Turkey. According to the national databases, from 1900-2011, more than 10,000 events with a magnitude larger than 4 have occurred (humans cannot feel seismic activity below magnitude 4.) The number of events that have resulted in disaster during the same period is significantly smaller, but the numbers are still in the hundreds (see Figure 1.5). These

events are due to the Northern Anatolian Fault, the Eastern Anatolian Fault, and the Hellenic Trench or Arc, which digresses into the Mediterranean Sea.

The Northern Anatolian fault is a 1,200-kilometer long right-lateral strike-slip fault and spans the northern part of Turkey from east to west. At the western end of the North Anatolian fault is the Marmara region, where the fault branches into a series of sub parallel fault systems. This series of faults is also the eastern most part of the Hellenic Arc, or the Hellenic Trench (Gulkan et al. 2002). There is also the Eastern Anatolian fault, which runs north to south (see Figure 1.6). Bakir and Boduroglu (2004a) note that 43% of the entire Turkish population, or approximately 34 million people, live in potentially catastrophic disaster regions (see Figure 1.4).

In the last decade, five earthquakes significantly affected urban areas in Turkey. A projected 20,000 people have died as a result, primarily through the collapse of residential buildings. Viewed within the context of deaths and injuries, earthquakes account for approximately 97% of the losses in Turkey (Ergunay et al. 2012). Approximately 70,000 buildings have been irreparably damaged and 20,000 destroyed. The estimated cost of the damage represented solely by the collapse of buildings is between 5 and 7 billion USD (Center 2005). Measured in terms of direct economic losses, natural disasters have accounted for 1% loss on average GNP, of which earthquakes account for 0.8% (Ergunay et al. 2012).

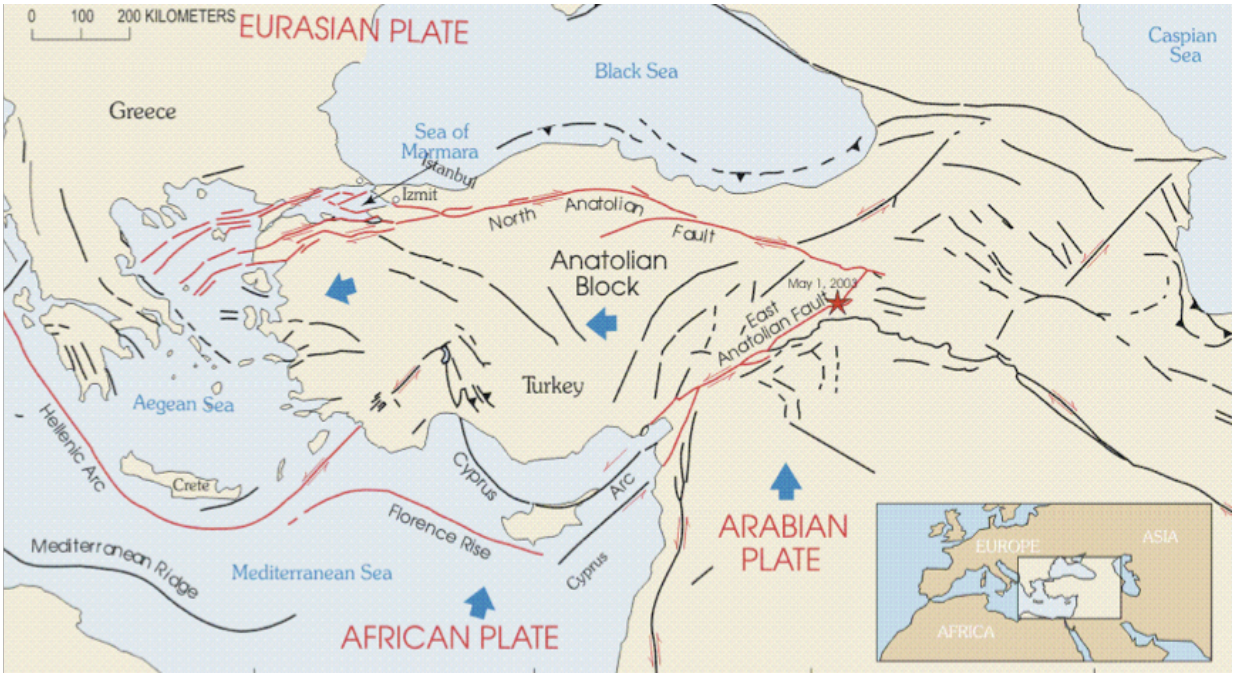

Figure 1.6 Tectonic Map of Turkey

TARGET CITIES

I focused on two cities in Turkey as the primary case study areas for this thesis: Istanbul and Antakya. These cities were selected based on the following criteria: 1) city size – one large (Istanbul) and one medium-sized city (Antakya) were selected drawing on World Bank population estimates; 2) the level of earthquake risk and how recently a large earthquake has affected them – Istanbul was last severely affected by a quake in 1999 and Antakya in 1998; and 3) the city chosen to do field work in had to have a safe, stable, and semi- to fully democratic government structure.

Istanbul

Istanbul, located in the northwestern corner of Turkey, is the 21st largest city in the world and the biggest metropolis in Turkey (Dursun 2010) (See Figure 1.7). It is also considered the third largest metropolitan area in Europe as it spans a total area of 5,343 square kilometers. In December 2010, the population of Istanbul was estimated at 13 million. On average, the rate of population growth is approximately 3.45%, primarily due to the influx of people from the surrounding rural areas (Municipality 2008) (See Figure 1.8). Istanbul is defined as the cultural, economic, and financial center of Turkey. It lies directly on the Bosphorus Strait, which connects the Sea of Marmara to the Black Sea, and is the only metropolis in the world that resides on two different continents (Europe and Asia) (See Figure 1.7).

Figure 1.7 Map of Turkey – Istanbul

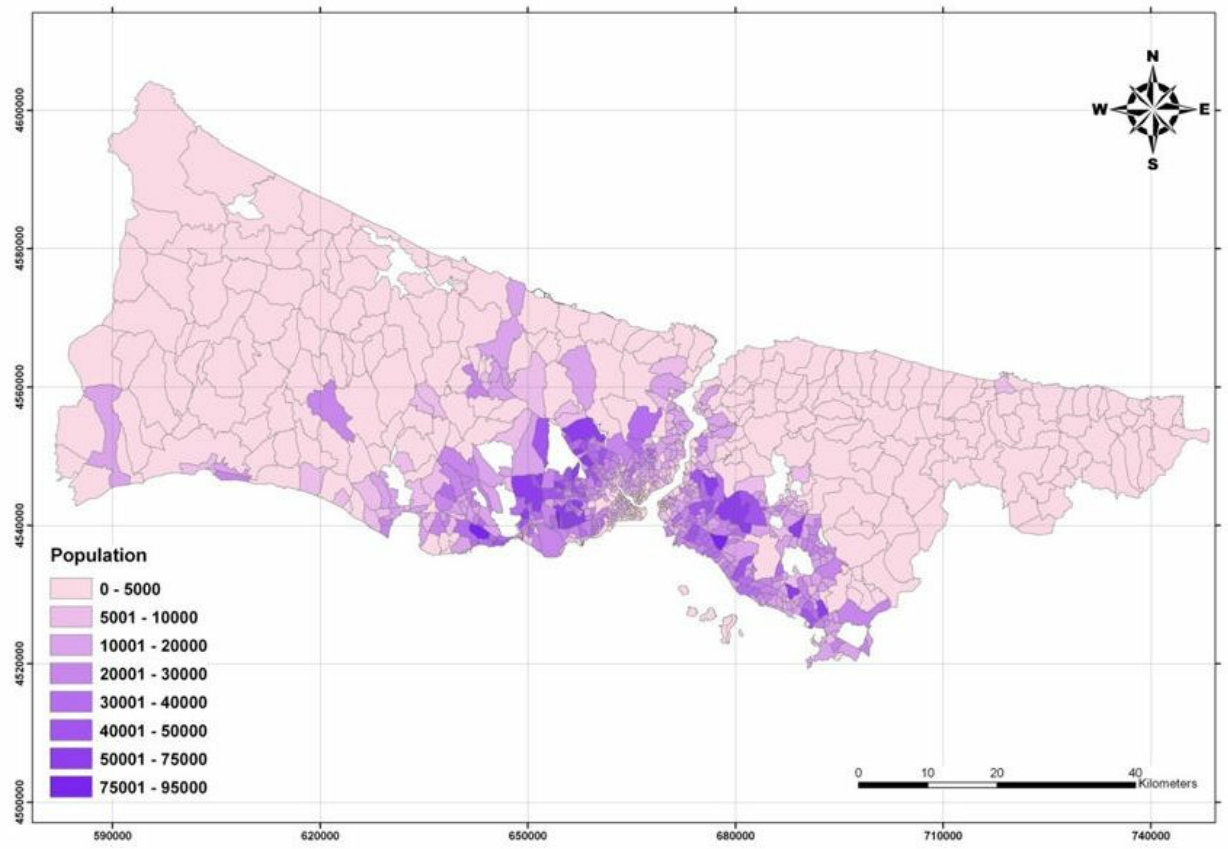

Figure 1.8 Population Density of Istanbul in 2007

Istanbul is situated atop the North Anatolian Fault, which has been responsible for some of the most deadly earthquakes in Turkish history. There is a record of an earthquake in 1509, which also caused a tsunami, killing 10,000 people and destroying over 100 historically significant buildings and religious centers (Erdik 2008). In 1999, the most recent deadly earthquake killed approximately 17,000 people in the Marmara Region. This event, and the losses it generated, made the citizens of Istanbul more aware of their vulnerability, as thousands of structures recently built to accommodate the city's rapidly increasing population collapsed. These structures were not sufficient to withstand an

earthquake because they were not constructed according to earthquake-safe building regulations (Revkin 2010). Looking towards the future, geologists and seismologists have predicted that there is a 60% chance that a 7.6 magnitude earthquake will occur in the Marmara region before 2030 (Traynor 2006). To maintain the safety of Istanbul's ever-increasing urban population density, earthquake-safe building regulations for the Marmara region have been improved upon and are now regularly enforced. Many of the government owned buildings have been retrofitted (schools, hospitals, government buildings), but the residential building stock in Istanbul is still considered a hazard.

The religion most practiced in Istanbul is Islam, with over 2,900 active mosques within the city (CIA 2011). The majority of Istanbul residents are Sunni Muslims while the next most populated religious community is the Alevi. Religious minorities include Greek Orthodox Christians, Armenian Christians, Syriac Oriental Orthodox Christians, Catholic Levantines, and Sephardic Jews (CIA 2011). Many districts in Istanbul are ethnically exclusive as there are sizable populations of Greeks, Levantines, Jews, and Armenians that reside in various parts of Istanbul.

Istanbul has always been and remains the center of Turkey's economic prosperity mostly because of its ideal location between international land and sea trade routes. Istanbul employs 20% of all of Turkey's industrial laborers and is the home to 38% of Turkey's industrial workspace (Dursun 2010). Istanbul and its surrounding provinces produce cotton, fruit, olive oil, silk, and tobacco. Food processing, textile production, oil products, rubber, metal ware, leather, pharmaceuticals, electronics, glass, machinery, automotive, transport vehicles, paper products, and alcoholic drinks are among the city's major industrial products (Trade 1923-2006). Istanbul generates 55% of Turkey's trade

revenue as well as 40% of all Turkish taxes. The cities' work force also produces 27.5% of Turkey's national product (CIA 2011).

Istanbul has over 35 public and private universities, many dating back to the 15th and 17th centuries. The city has many public and private hospitals, clinics, and laboratories as well as a number medical research centers. Many of these facilities have the latest in technologically advanced medical equipment, which has contributed to the recent upsurge in 'medical tourism' (Connel 2010). Istanbul has a vast and efficient public transportation system with a variety of transportation options available to the everyday citizen including ferries, sea buses, roads, highways, railways, trams, funiculars, light rail, bus rapid transit, and an underground metro system (which is continually undergoing updates and extensions).

To date, Istanbul's most destructive earthquake in terms of both economic and physical losses occurred on August 17, 1999. The epicenter of this quake was approximately 65 miles (106 km) east of Istanbul (see Figure 1.7). This event is typically referred to as the Kocaeli or Izmit Earthquake and was measured as a 7.6 magnitude on the 10-point Richter scale. Approximately 17,000 people died throughout the Marmara Region. Within the provinces in the Marmara Region, including Istanbul, Kocaeli, and Sakarya, the United States Geological Survey (USGS) estimated fiscal losses to be between 3 and 6.5 billion. Approximately 120,000 houses were damaged beyond repair and between 27,000 and 35,000 buildings needed to be demolished because of irreparable damage (Ansal 1999). One of the reasons the earthquake was so devastating was because of the poor quality of the building stock as well as the number of residents dependent on illegally built, squatter structures.

Structures built before 1999 were primarily constructed out of unreinforced masonry, unreinforced concrete, and reinforced concrete frames with masonry infills and designed only to meet the basic needs of the building inhabitants. Even today, the Earthquake Engineering Research Institute (EERI) estimates that 80% of Turkey's urban households live in mid-rise apartment blocks constructed of reinforced concrete with masonry infill and the masonry-blocks are rarely connected structurally to the reinforced concrete frame. These types of built structures do not perform well in seismic events because there is "insufficient lateral resistance in the framing system" (Gulkan et al. 2002) and weak first floors, which is another prevalent structural design issue that leads to increased losses in earthquakes. Additionally, insufficient construction materials and the prevalent use of unreinforced concrete are unable to withstand the lateral loads caused by ground shaking.

The Pacific Disaster Center (PDC) reports the rate of urban growth in Istanbul is resulting in incompatible land-use and a "planning system that incentivizes the development of informal and poor settlements in the city" (Initiative 2005, 15). This poorly built, aging infrastructure is the product of years spent using inappropriate materials and construction technologies as well as a significant lack of enforcement of building codes and standards. Without these fundamental precautions even the most minimal seismic protections to basic housing are absent and will result in catastrophic losses when earthquakes do occur.

The physical infrastructure and social structure of Istanbul have changed as a result of the large migration of rural citizens looking for employment. This rapid population growth led to an increased need for housing. This migration has transformed the city of

Istanbul into a bustling industrial city with the majority of its inhabitants living in "semi-squatter, multi-story buildings"(Dursun 2010, 2). Without permission or regard for federal building codes, poor migrants build built shoddy structures on land that does not belong to them. Besides the perceived benefit of avoiding the cost of engineers and contractors, Green (2006) reports that new residents prefer unauthorized construction and self-built structures because they actually decreased the resident's perception of their vulnerability to any sort of geological risk. However, in actuality, unauthorized construction increased the physical vulnerability of structures. Structural specifications are often inadequate, materials used are insufficient, cost-saving cheaper materials are made weaker, and often construction is never fully finished. The result is structurally insufficient buildings that do not meet code and that increase the vulnerability of the already overpopulated area.

Rapid industrialization brought thousands of the rural poor into the metropolis and a social gap between 'natives' and migrants was created. As of 2010, housing has been one of the biggest indicators of status in Istanbul (Dursun 2010). 'Native' residents tend to live in more suburban areas or in tunnel form buildings, which are compatible with seismic building codes and therefore safer for the residents. Istanbul's "wealthy elite (about 25%) lives in newly built suburbs and enjoys the sophistication of Istanbul's society" (Initiative 2005, 2). Migrant residents reside in structures they built illegally and by themselves, without the knowledge of an engineer, contractor, or seismologist about the appropriate considerations that need to be made in order to make their structure as safe as possible. These structures rarely comply with seismic building codes and are therefore more dangerous structures to live in than newer buildings that are built according to code.

Following the disastrous Kocaeli earthquake in 1999, the Istanbul Metropolitan Municipality (IMM) made drastic changes to the overall structure of their Risk Mitigation and Emergency Preparedness division in order to make Istanbul a disaster resistant city. The IMM initiated the Istanbul Seismic Risk Mitigation and Emergency Preparedness Project (ISMEP) to improve Istanbul's preparedness for a potential earthquake through a) enhancing institutional and technical capacity for disaster management and emergency response, b) strengthening critical public facilities for earthquake resistance, and c) supporting measures for better enforcement of building codes and land use plans (Cilingir 2010).

The majority of current earthquake regulations, legislation, awareness projects, as well as structural and non-structural mitigation took place in the months following the Kocaeli Earthquake of 1999. Indeed, the seismic performance of the building stock in Istanbul substantially improved after 2000 due to improved construction materials, building techniques, and enforcement regulations that in turn were possible as a result of increases awareness of risk as well as DRR practices. Minimal code compliance buildings were built before 1980, moderate code compliance buildings were built between 1980 and 2000, and maximum code compliance buildings were built after 2000. The primary deficiencies found in minimal and moderate code compliance buildings are weak material strength and lack of seismic design considerations (Cilingir 2010). Despite recent developments born out of the lessons learned from the Kocaeli earthquake, the majority of buildings in Istanbul are still masonry construction. Masonry construction is cheap even though it is not conducive to create structurally sound buildings. Steel, reinforced concrete framing, and reinforced concrete framing with shear walls are also used (Cilingir 2010).

As part of The Study on Disaster Prevention / Mitigation Basic Plan in Istanbul, Republic of Turkey, funded by the Japan International Cooperation Agency (JICA), the IMM conducted a variety of seismic scenarios using current data on social vulnerability indicators and disaster risk management models. The most likely scenario and the worst-case scenario were of most interest to the Municipality, so they decided to share these noteworthy areas of focus that would be seminal to decision-makers, investment opportunities and DRR; rates of death and damage to buildings (Erdik 2008).

These visual representations help to raise risk awareness through publicizing what will be one of the primary impacts of the disaster. They are also used for policy and decision-making purposes. Figure 1.9 provides a visual representation of the most likely scenario of deaths by borough. The majority of the deaths in the most likely scenario would occur in the western most part of the metropolis. It is important to note the population density of areas within the city (Figure 1.7) as compared to the number of estimated deaths that would occur. For example, 800 deaths estimated in a borough with a population of 80,000 would result in 1.0% of their population dead. However, should 800 deaths be estimated in a borough with a population of 10,000, the percentage of lives lost would be greater at 8.0%. This will give us a relative proportion of number of deaths per borough, providing a better understanding of the impact a seismic event would have on the city.

In the most likely scenario, the number of deaths is estimated to be the highest in the densely populated southern area directly off of the Bosphorus Straight on the European side (see red area in Figure 1.7). However, there are other locations that are equally dense in population if not more so, and the estimated number of deaths is significantly lower than in the red area. The number of deaths per borough increases in the worst-case scenario,

but the distribution of lives lost is relatively proportionate to the distribution of lives lost in the most likely scenario. However, the population density of the areas estimated to have the most deaths in the worst-case scenario is not near the red area. These areas are located in the western part of the city and are sparsely populated (see Figure 1.10).

The study also looked at the estimated number of severely damaged buildings in the most likely scenario (Figure 1.11) and the worst-case scenario (Figure 1.12). Both reflect losses to be highest in the sparsely populated areas that were estimated to also have the most deaths in the worst-case scenario, the western most parts of the city. Also, the number of estimated buildings to be severely damaged was greater in the middle of the city as well as the southeastern portion of the city. These are also areas that are sparsely populated compared to other areas in Istanbul. In the worst-case scenario representing the amount of severely damaged buildings, the increase is noticeable from the amount of damaged estimated in the most likely scenario, but still slight (compare Figure 1.11 and 1.12). This slight change in damage could have considerable effects on the types of actions decision-makers take when considering methods of DRR as well as where to focus DRR in Istanbul.

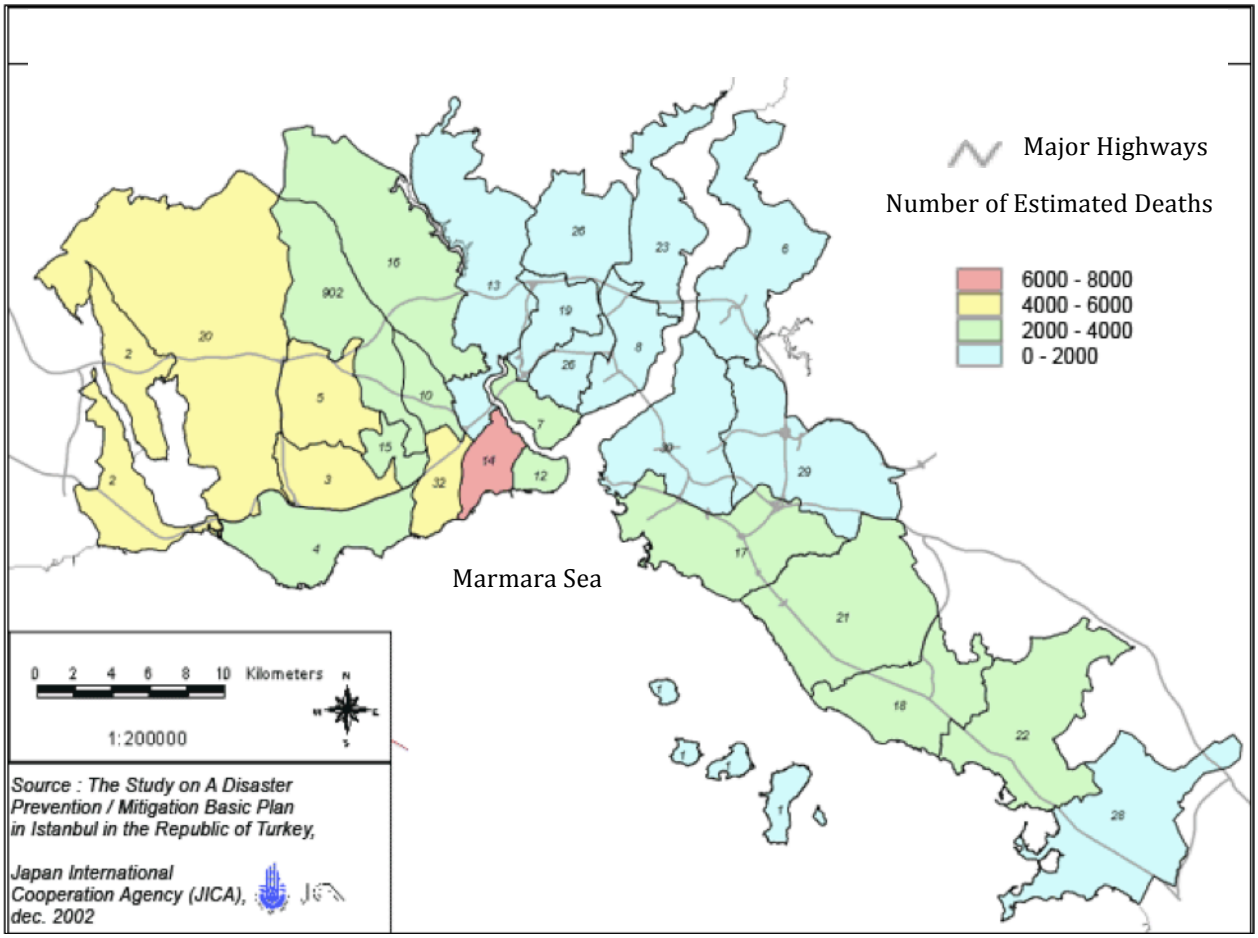

Figure 1.9 Most Likely Scenario – Number of Deaths by Borough

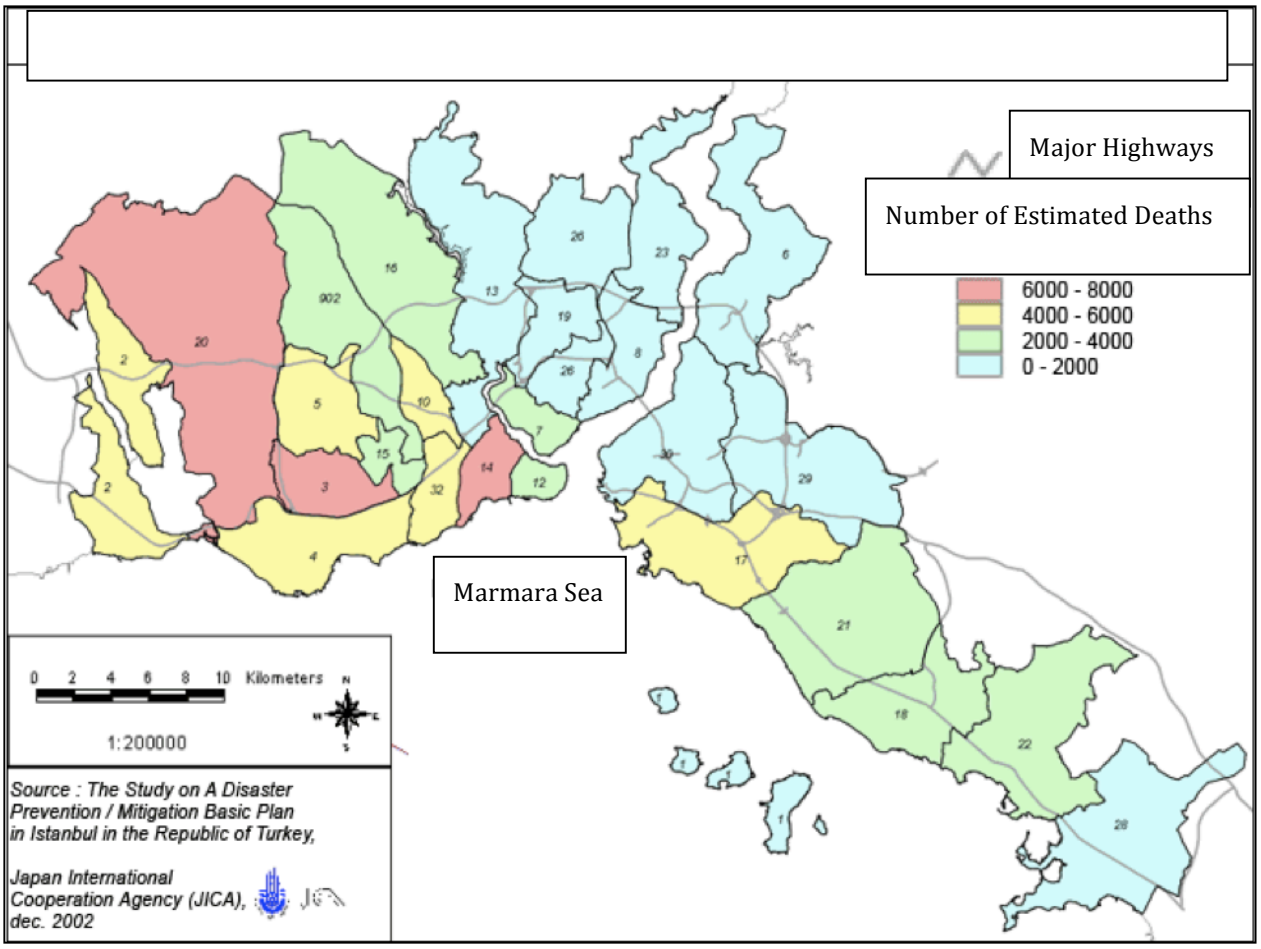

Figure 1.10 Worst-Case Scenario – Number of Deaths by Borough

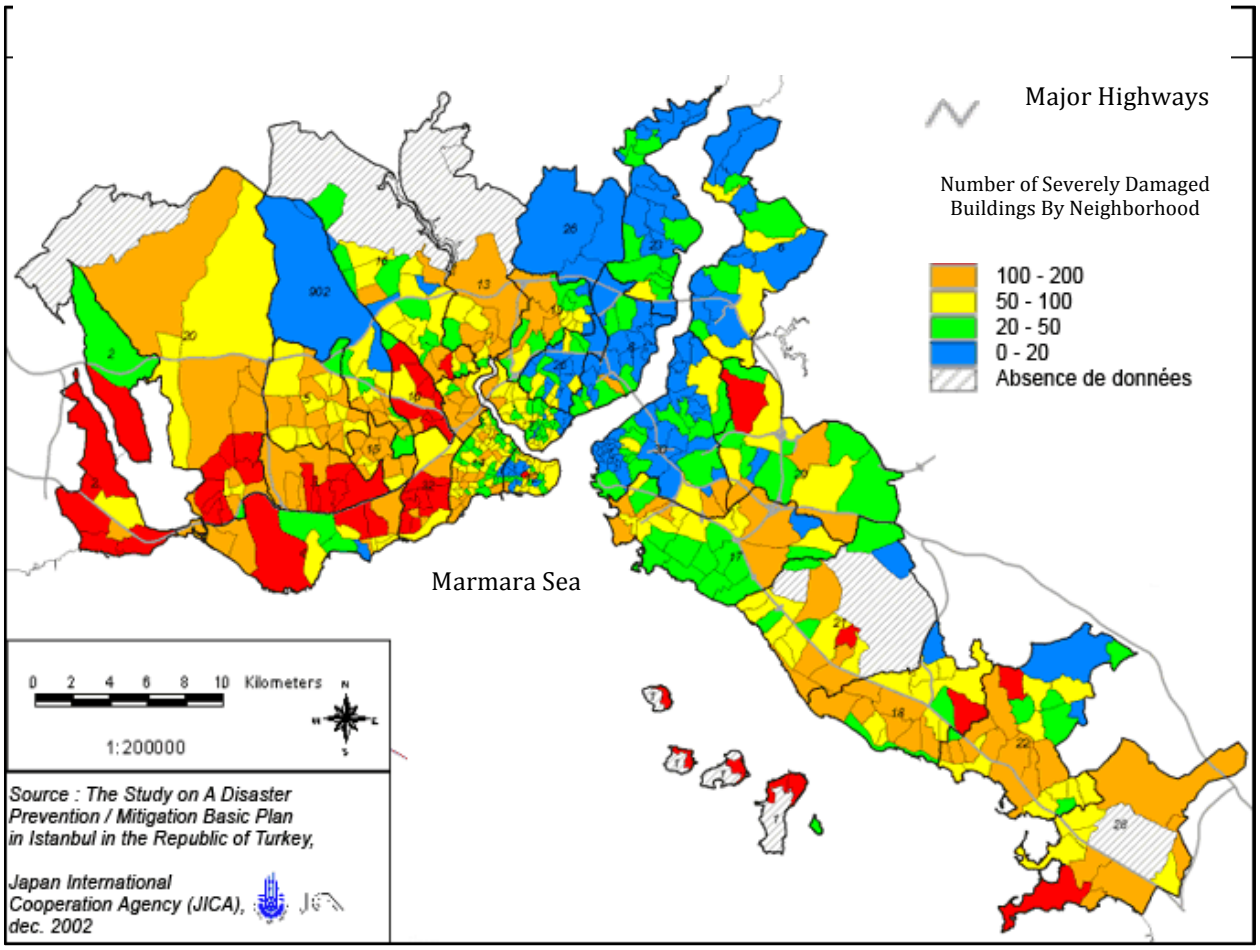

Figure 1.11 Most Likely Scenario – Number of Severely Damaged Buildings by Neighborhood

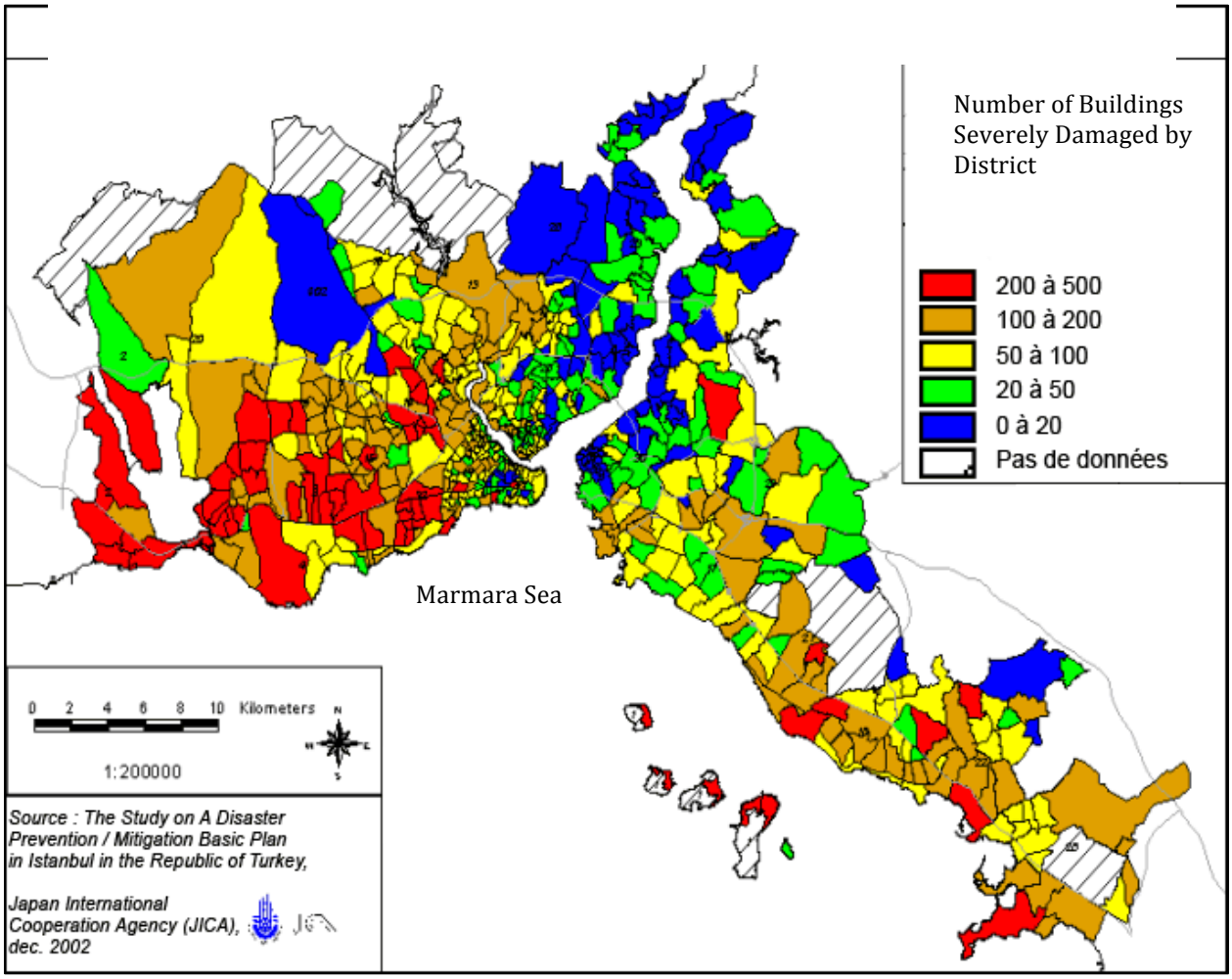

Figure 1.12 Worst-Case Scenario – Number of Buildings Severely Damaged by District

Population size, demographics, geography, cultural significance, construction practices and standards, and the dependency the rest of Turkey has on Istanbul makes it one of the most important places to study as well as implement DRR. As seen by the most likely earthquake scenario and the worst-case scenario measured by the IMM, both physical and economic losses will be substantial and devastating if critical structures and sectors for intervention are not identified and DRR is not implemented.

Antakya

The historical city of Antioch, modern day Antakya, is the provincial capital of the province of Hatay. Antakya has a population of approximately 215,000 people. Antakya is located in the southeastern corner of Turkey and borders Syria (see Figure 1.12). Due to its relative proximity to Syria, Antakya is more cosmopolitan than most other cities in Turkey, though when compared to Istanbul, Antakya seems severely rural. The two primary languages spoken in Antakya are Turkish and Arabic. The majority of the citizens of Antakya are Sunni Muslims but a substantial population identify as Alevis and Arab Nusayri Muslims. Antakya is considered a pilgrimage point for Christians and therefore is home to several small communities of Christians.

Mustafa Kemal is the only University in Antakya and has around 25,000 students. Antakya is known for its local products and traditions. The prominent local craft is soap scented with bay tree oil and the local sweet treat, kunefe, is hot white cheese doused in sweet syrup. Surrounding Antakya, the Nur Mountains to the north and Mount Keldag to the south are a rich source of green marble.

Figure 1.13 Map of Turkey – Antakya

The most recent and significant earthquake event that made the citizens of Hatay province aware of their earthquake risk and changed the way community institutions interact with DRR happened on June 27, 1998. An estimated 15,000 people in the province of Hatay were injured and 140 were killed as a result of the magnitude 6.2 event. Approximately 1,000 buildings were damaged beyond repair or collapsed during the EQ. Critical facilities in the Hatay province, three hospitals and six schools, were damaged beyond use (EERI 1998a). According to the Earthquake Engineering Research Institute (1998b), "… many of the structural failures happened because 'they use cinder block-filled joist floors... The resulting flat beams have little rotation/ energy absorption capacity. Added factors such as poor details, poor concrete quality, and the ever-present ground story shops compound the issue.'" Similar to Istanbul, weak materials and a lack of consideration for seismic construction and design were the two primary causes of building

damage and collapse. According to the detailed analysis provided by the Earthquake Engineering Research Institute (EERI) the causes of damage was attributed to one or a combination of the following (EERI 1998b):

- Soft first story (now an internationally known defect in design)
- Inadequate detailing and reinforcements of column-beam connections
- Design of strong beam/weak columns rather than strong-column weak beams
- Creation of short-columns due to infill walls or offset designs
- Unreinforced concrete and/or brick masonry piers or coupling beams
- Age of deteriorated buildings with little lateral load resistance
- Questionable quality of materials used (concrete, steel, mortar, brick, cinder block, river washed stone-masonry)
- Site effects, double resonance and soil-structure interaction of the five to ten-story buildings on alluvial with single story basements and no piles.

EERI also reported that a variety of building designs and structures failed primarily because of the location, characteristics, and the peak acceleration of ground motions of the June 27th event.

Unlike Istanbul, the Antakya Municipality does not have their own municipal laws dictating DRR participation and responsibility. However, they regulate their DRR and emergency response systems according to the national standards set forth by the Turkish government. Turkey's seismic code became a legalized provision in 1944 and annual updates are made to the code; however, the enforcement of those codes on the physical infrastructure have proven lax if not entirely absent (Gulkan 2002).

OVERVIEW OF THESIS

In Chapter 2, I review the literature regarding DRR policies, with a specific focus on earthquake risk reduction policies (EQRR) in Turkey. Next, I examine how the literature documented the role and signficance of five community institutions with regards to their strategies and influence in DRR. In Chapter 3, I describe the methodological approaches I used in order to gather and analyze data that would supplement my knowledge of DRR in Turkey. Chapters 4 and 5, which offer case studies of Istanbul and Antakya, respectively, include analyses of the five community institution's role in DRR and any supplemental data collected in the target cities. In Chapter 6, I analyze the survey questionnaire data and explain how the barriers and resources needs reported in the survey questionnaire help to understand how community institutions engage in DRR. Finally, in my conclusion, I summarize how the five community institutions engage in DRR, identify the primary barriers and resource needs that affect DRR participation, and present how this thesis may be used in the future.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews the literature regarding the United Nations International Strategy for Disaster Reduction (UNISDR), the Hyogo Framework for Action (HFA), and how community institutions (are recommended to) engage in disaster risk reduction (DRR) practices. In the subsequent pages, I explore what DRR means using the UN framework. Specifically, I focus on five key community institutions: 1) government, 2) business, 3) education, 4) healthcare, and 5) grassroots organizations. I then examine how these five community institutions in Turkey engage in DRR practices, with a special emphasis on reducing earthquake risk.

UNITED NATIONS INTERNATIONAL STRATEGY FOR DISASTER REDUCTION

The United Nations International Strategy for Disaster Reduction (UNISDR) is a global strategy "to engage a wide range of actors in a coordinated effort to reduce the risks of disasters and to build 'a culture of prevention' in society as part of sustainable development" (UNISDR 2011a, 1). The UNISDR designs and uses cooperative mechanisms (most recently, the biennial Global Platform for Disaster Risk Reduction), through which governments, intergovernmental organizations, international financial institutions, technical institutions and networks, non-governmental organizations, and civil society organizations interact, share information, and collaborate on risk reduction initiatives. Primarily, UNISDR coordinates the partnerships and leads a global DRR movement focused on meeting the objectives of the Hyogo Framework of Action (UNISDR 2011b).

What is Disaster Risk Reduction (DRR)?

The UN (2011) defines DRR as the practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters. There are many opinions with regards to what the causal factors of disasters are. The UN determines the causal factors, or "root causes," of disasters as the exposure to hazards, level of vulnerability of people and property, management of land and the environment, and level of preparedness for adverse events. I will use the model created by the Global Earthquake Model Foundation and explain the causal factors of disasters using the rhetoric of hazard, the exposure to the hazard, and the level of vulnerability or lack of capacity to cope.

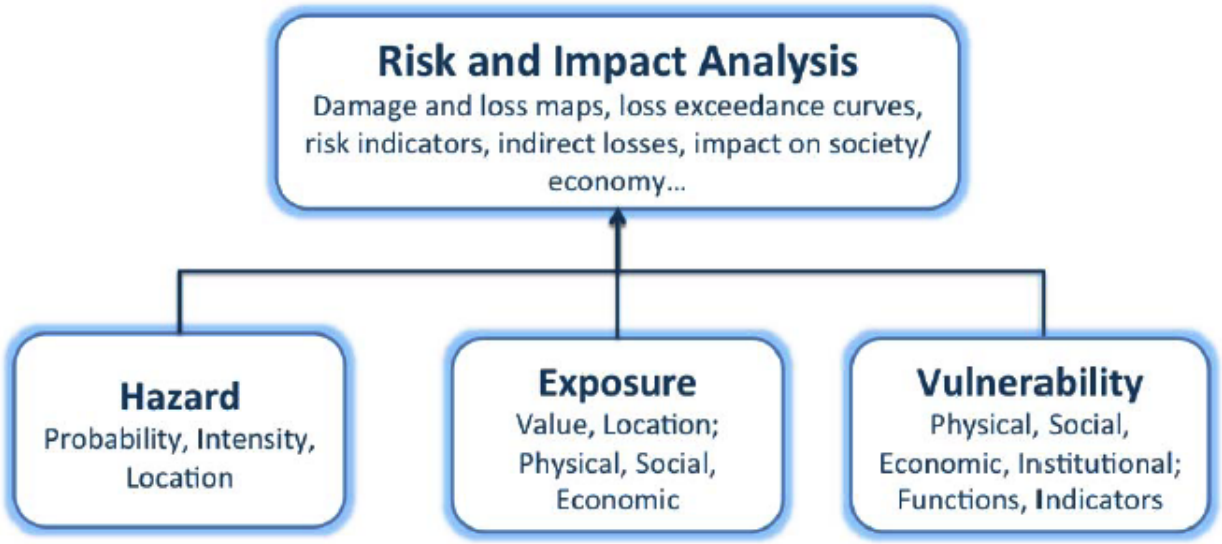

Figure 2.1. Causal Factors of Disasters

Hazard, Exposure, and Vulnerability

The three primary causal factors (hazard, exposure, vulnerability) are all measurements of variables that have an effect on a community's risk. Vulnerability is defined as the pre-event characteristics or qualities of a system (social, economic, environmental, etc) that creates the potential for harm. Adger (2006) explains that vulnerability is a function of exposure (who or what is at risk) and sensitivity (the degree to which people and places can be harmed). Wisner et al. (2006) explains that vulnerability is "… generated by social, economic, and political processes that influence how hazards affect people in varying ways and with differing intensities." The level of vulnerability generally refers to the capacity (or lack of capacity) of an individual, community, or society to cope with a hazardous event. For my purposes, vulnerability will refer to the probability of loss given a level of ground shaking for physical vulnerability and through indicators that envelop the socio-economic factors known to be the driving forces of disaster vulnerability. There are a multitude of indices and combination of variables used worldwide to measure vulnerability, although a 'best practice' index has yet to be determined. While considering the inherent weaknesses within systems that make them at risk, it is also essential to consider the modes of resilience.

As resilience has a variety of meanings to different fields of study, I will use Klein's (2003) definition, which has been supplemented by Burton (2011). Resilience is "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to and recover from the efforts of hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions." Where vulnerability broadly refers to the probability of loss, resilience can broadly be defined as

the probability of resistance to loss. The rhetoric and standards used to develop and measure resilience remain a challenge to quantify. "This is partially because there are few explicit sets of procedures within the existing literature that suggest how resilience should be quantified, how to compare communities with one another in terms of their resilience, or how to determine whether communities are becoming more resilient in the face of an imminent threat" (Burton 2011 – quoting Bruneau et al. 2003). Although no global index is available, there is a consensus among the disaster research community that resilience is a multi-faceted concept. Both vulnerability indicators and resilience indicators are considered when determining risk in a community.

A natural hazard is defined as a natural process or phenomenon that "may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage" (Burton 2011, 3). Different communities are susceptible to different kinds of natural hazards, and it is important to recognize the presence of a natural hazard in order to properly assess and analyze risk. For my purposes, 'hazard' refers to the probability of levels of ground shaking resulting from earthquakes within a given time span.

The level of exposure to a hazard can be determined by the potential for a hazard to intersect with human settlements and society. Exposure is essentially defined as the elements in hazard zones such as people, property, and systems that are subject to potential damage and loss. Exposure is one factor in exploring the level of vulnerability, as one can be exposed to a variety of hazards, but have different capacities to deal and therefore different levels of susceptibility. Measures of exposure can include the number of

people or types of resources and assets within a community. These types of variables have become associated with particular levels of vulnerability and can be used to quantify risks.

Possible Components of Risk Analysis

The variables that decision-makers consider in risk and impact analysis for disasters are wide-ranging and numerous. They are also highly contingent on local social, economic, political, cultural, and historical contexts, and therefore cannot be generalized across time and space. I will only discuss a few possible components of analyzing risks that are most relevant to a seismic hazard event.

Population growth is a component of analyzing risk because, in the context of Turkey, it is associated with overcrowded areas, cheap mass-produced housing, and unsafe living conditions for migrants and locals alike. Population growth also increases the number of landless families, the rural-urban migration rates, as well as the number of people looking for employment and living space. Urbanization of already overcrowded cities leaves migrants little choice but to occupy unsafe land, construct cheap, illegal, and unsafe homes, and work in dangerous environments.

The dynamism and the inequalities inherent in global economic processes also influence the level of vulnerability. Dependent relationships between the first world and third world which push the poor lower and raise the rich up further widens the varying capacities of communities to cope with a disaster event. While poverty and vulnerability have not been quantitatively linked, there is an assumption that increased poverty leads to a decreased coping capacity and therefore increases vulnerability (Wisner 2006).

Decision-Making

The hierarchy of the causal factors of disasters is unique to each community. Hazards that occur in different geological locations with different cultural traditions, standards of living, and social expectations makes 'best practices' or universal rules obsolete and makes DRR fundamentally contingent. It is in the communities' best interest to design their own DRR structure based on their particular causal factors, their culture, and their way of life. It is important that different livelihood strategies are taken into account because understanding or at least recognizing ways that different types of communities live will help us understand how other types of communities and cultures cope with hazards (Wisner 2006). Similarly, the way different communities view and analyze risks as well as what causes a disaster and their impacts can affect the modes and types of decision-making drastically.

Petal (2007) explains that causes of disasters can be perceived within broader patterns of society and can be assessed at three overlapping levels of social organization: 1) the micro level, or individuals and households, 2) the meso level, which comprises schools, businesses, local governments, faith-organizations, etc, and 3) the macro level, consisting of regional, national, and international policy making entities. Table 2.1 outlines the different levels of social organization and some of their specific targets when implementing DRR. In this research, I focused specifically on the meso level of social organization in Turkey.

Table 2.1: Possible Risk Reduction Program Targets

Micro Level	Meso Level	Macro Level
Children	Elementary and secondary schools	Policy makers: advocacy to move toward a "culture of disaster prevention"
Elderly	Colleges and universities	Policy makers: change building code standards
Women; pregnant women	Hospitals	Policy makers: change land-use planning regulations
Adults with disabilities; children with disabilities	Elder care facilities	Policy makers: make preparedness guidelines more socially inclusive
Low-income individuals	Businesses	Policy makers: include the public in mitigation planning decisions
Drug-addicted individuals	Government	
Homeless	Churches, mosques, and other faith-based organizations	
Incarcerated populations	Prisons and jails	
War veterans	Non-profits	
Renters	Media	
Homeowners		
Small business owners		
Non-profit volunteers and staff		
Faith-based leaders; faith-based congregations		
School administrators; teachers		
Government workers		
Healthcare staff: doctors, nurses, home health aides, EM medical technicians, ambulance drivers		

Peek et al. 2012

Petal (2007) also explains that there are three primary actions considered when conducting DRR. These are risk assessment and planning, physical protection, and response capacity development (Table 2.1). It is crucial to think of the different levels of social organization and the different actions taken in order to effectively create and enforce DRR. Understanding these fundamental characteristics of community institutions will help shape an understanding of their level of engagement and capacity in DRR.

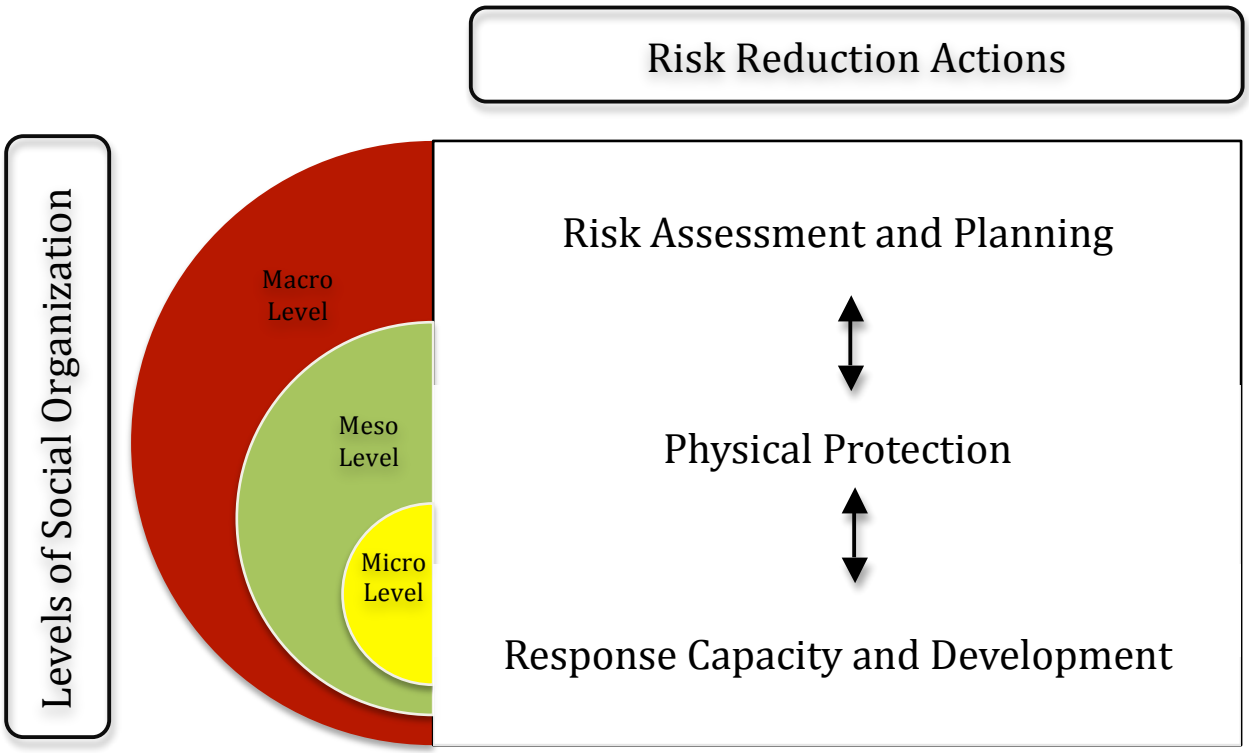

Figure 2.2. Petal's DRR Levels and Actions

The following are examples of how the fundamental characteristics of meso community institutions can shape their modes of engagement in DRR (across risk assessment and planning, physical protection, and response capacity and development). Government can implement legislation and policies dictating how far to build off of the shore of a hurricane swept beach; Schools can educate students about how they can protect themselves at school and at home; The private sector can advocate for DRR and therefore strengthen the resilience of their businesses; Healthcare facilities can be prepared for a high magnitude event, both in the availability of their services as well as in the accommodations they provide; Grassroots organizations can reach out to those who are unable to increase their coping capacity and provide them a safer location to live, a safer building in which to live, and mandate certain maintenance take place in order for the tenant to remain safe. There are a plethora of options that community institutions can take, at various levels, in order to implement the idea of reducing risk. By understanding the causal factors of disasters, a general level of risk can be assessed, which can inform community institution's decision-making and actions.

HYOGO FRAMEWORK FOR ACTION

A comprehensive approach to reduce disaster risks is established in the UN-endorsed Hyogo Framework for Action (HFA). Adopted in 2005, the HFA was developed to substantially reduce the losses to social, economic, and environmental assets of communities and countries from disasters (UNISDR 2009, 11). The HFA is the international blueprint for DRR and has been adopted by 162 UN member states, including Turkey. Its

overarching goal is “to build the resilience of nations and communities to disasters, [and] achieving substantive reduction of disaster losses by 2015” (Nkala et al. 2011, 69).

The HFA outlines five priorities to be addressed and acted upon in order for vulnerable communities to build and maintain resilience (Appendix G: Summary of HFA). The first priority set forth by the HFA is that DRR be a national and local priority and community institutions recognize their role and importance in the application of DRR. There are four key indicators that reveal whether this priority is being implemented (Childs 2009). First, national legal frameworks need to exist with DRR as a decentralized responsibility. Second, adequate resources must be available in order to effectively apply DRR. The third indicator is whether the local government is able to gain community support and participation, and accepts the decentralization of authority with regards to DRR decisions. The final indicator is the presence of coordination among different stakeholders from multi-levels of community institutions. During this analysis of the HFA throughout Europe, the UNISDR found that significant challenges with priority one included updating legal frameworks, coordinating across different levels of existing organizational structures, financial limitations, and disparity between the demand for and availability of DRR services and resources (Childs 2009).

The second priority dictates that communities must identify, assess, and monitor disaster risks and enhance early warning mechanisms. There are three core indicators that determine the efficacy of oversight and early warning systems (Childs 2009). One, current hazard and vulnerability data is available and is used to inform policy and provide risk assessments for key community institutions. Another indicator of priority two is the presence of technical systems that are available to different stakeholders across multi-

levels of community institutions. Third, the presence of early warning systems for all major hazards in the area and all risk assessments consider the implications of regional risks. The nations participating in the HFA in 2009-2011 were unable to dedicate financial resources to address all of the indicators of priority two of the HFA. However, national and local governments were able to integrate a regional approach in their risk assessments.

The third priority set forth by the HFA calls for the use of knowledge, innovation, and education to build a culture of safety and resilience throughout community institutions. Strengths and weaknesses were identified using four primary indicators (Childs 2009). One, the amount of disaster information and risk assessments available to all is measured to assess strength of DRR capacity. There is also a consideration made for whether there is open dialogue and information sharing between institutions. Two, thorough coverage of DRR, response and recovery strategies are used (to a measureable unreported extent) in school curricula, education materials, and training. Three, cost-benefit analysis and multi-risk assessments are developed in order to help indicate the extent to which the community is embracing a culture of resilience. The fourth indicator is measured by the existence of nationwide public awareness campaigns to encourage a culture of DRR. The UNISDR reports that all four indicators were achieved in the nations participating in the HFA between 2009 and 2011.

The overall reduction of risk is the fourth priority set forth by the HFA. There are five fundamental indicators of progress (Childs 2009). First, DRR must be a key consideration when creating land use, natural resource management, and climate change adaptation policies. Second, vulnerable populations most at risk are identified and policies targeting the most vulnerable are implemented. The third indicator is that policies that

reduce the vulnerability of the economy are developed. Fourth, DRR strategies and mechanisms must be incorporated into human settlement planning as well as response and recovery processes. Fifth, the impacts of potential risks of major development projects and infrastructure are assessed and taken into planning consideration. Progress has been limited with regards to the growth of these indicators and a lack of financial resources is reported as the primary barrier.

The fifth priority is for communities to strengthen disaster preparedness efforts and response strategies. There are four key indicators of growth and progress in community's preparedness and response strategies (Childs 2009). One, strong policy frameworks and technical and institutional capacities for DRR must exist. Two, all administrative levels have disaster preparedness plans as well as contingency plans. Three, financial resources need to be set aside and contingency strategies and mechanisms are functional to support effective response and recovery. The final indicator of the presence of the fifth priority of the HFA is that information sharing strategies and networks of support are in place. Financial resources were scarce in order for many of the institutions within the participating nations to ensure compliance with the HFA indicators (Childs 2009).

The goals of the UNISDR and the HFA are considered appropriate foundations on which to understand institutional DRR strategies and mechanisms in Turkey because Turkey is one of the primary locations in which the HFA is widely accepted by DRR institutions (Childs 2009). Turkey began the implementation of the Hyogo Framework by creating a 'Disaster and Emergency Management Presidency' under the Prime Ministry. This Presidency collaborates with other existing government departments, non-governmental organizations (NGO), universities, and the private sector in order to establish

and continually strengthen a national platform for DRR (Madji et al. 2011). These stakeholders concentrate primarily on reducing seismic risk in order to lower losses and to minimize costly actions during response and recovery. The UNISDR reports that Turkey implemented the HFA through a range of stakeholders across almost all levels of community institutions.

DRR INSTITUTIONS

In order to foster a culture of resilience, it is critical to engage all relevant parties and various institutions in DRR activities (UNISDR 2011). Yet, there is no standardized process from which to develop a culture of resilience. Much like other cultural factors, such as language, religion, and celebratory traditions, the development of resilience within a culture is contingent upon the specific temporal and spatial context of the culture. It is also important to note there is no holistically accepted methodology for assessing the roles and responsibilities of community institutions involved in DRR practices (Twigg 2004). However, I will use a framework that has been recognized worldwide as a sufficient standard with which to begin the DRR process. The UNISDR's framework, the HFA provides an adequate platform upon which DRR and a culture of resilience can be conceptualized, developed, and integrated into communities through various community institutions.

The UN enables interactions, learning, and cooperation through an interactive internet-based platform and open discourse among stakeholders. The stakeholders operate at all levels of social discourse (household, international, private, public) and affect livelihood and wellbeing by influencing access to assets as well as resources (Twigg 2004). Stakeholders can include governments and local authorities, organizations invested in

national or regional wellbeing, the private sector, science and technically based institutions, NGO's, civil society, and community-based organizations (UNISDR 2011b). In this thesis, I explore the roles and responsibilities of five different community institutions that engage in DRR in order to reduce earthquake risk in Turkey. Specifically, I focus on government, business, education, healthcare, and grassroots organizations.

The UNISDR has many priorities and engages in a variety of tactics with a variety of actors in order to increase the successfulness of DRR strategies and mechanisms worldwide. Ensuring safe communities and increasing coping capacity requires coordinated efforts by multiple actors through partnerships and networks across community hierarchies and knowledge centers in order to combine resources and expertise (UNISDR 2011a). Scholars agree that in order to organize and implement DRR measures effectively within a community, organizations must "seek to 'institutionalize' risk reduction by incorporating it throughout their thinking, structures, cultures, and operations" (Twigg 2004, 30). First, these organizations must understand and engage in risk reduction in a particular way before they are able to incorporate it throughout their rhetoric. This is why it is crucial to understand how different community institutions understand and engage in risk reduction in order to understand how communities foster a culture of resilience. Below, I summarize the five key community institutions and highlight how they implement DRR effectively within communities.

Government

Good governance is an important prerequisite for the long-term success of DRR efforts. The development and promotion of sound disaster related policies, legislation, and regulatory frameworks are crucial for creating and enabling an efficient atmosphere for DRR efforts and a culture of resilience. Governments are responsible for establishing the duties of community stakeholders before, during, and after a disaster. Yet, DRR practices are often undermined by a lack of investment in proper legislation. A lack in proper legislation worldwide also impairs the capacity of DRR professionals to enforce DRR strategies (UNISDR 2004, 18). The effectiveness of legislation further depends upon the capacity of local or national administrations, as well as the acceptance and recognition of rules and standards by civil society. The level of integration and enforcement of DRR policies at the local level can indicate legislative deficiencies and strengths (UNISDR 2007, 18).

Legislation provides an official justification for DRR and allocates major responsibilities and resources in legal form. Legislation should be comprehensive and adopt a multi-hazard approach involving multiple levels of the government and stakeholders (Mangroves For the Future 2008). In order to ensure the law has sufficient capacity for creation as well as implementation, "it is important that a vision for the implementations of the provisions of new laws is developed alongside the process of enactment of the law itself" (UNISDR 2007, 20).

While effective legislation is imperative at all levels of government, there are particular duties that are executed at different levels of government that ensure the most effective DRR engagement and implementation. I will first explore the role of the national

government in DRR. Then I will concentrate on how regional and local governments engage in DRR as well as what types of interests they hold when creating, implementing, and enforcing DRR legislation.

National Government

The characteristics of good governance – "participation, rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness, efficiency, accountability, and strategic vision" (UNISDR 2007, 20) – are as applicable to DRR as they are to any other effective, state controlled affair. Support from central government leaders and adequate funding is imperative to create and implement effective legislation. However, faith in the ability of the legislation to bring about positive change and the continued support, and therefore continued existence, of DRR legislation is contingent upon groups in addition to government; groups invested in the local community who have the power to influence, such as women's organizations and academia (UNISDR 2007, 20).

Transition from Command-and-Control Framework to a Developmental Framework

Historically, the federal government has been considered the "healer" (Balamir 2001a, 1). The national government only intervenes in social organization after a disaster, in order to heal a wound that has already been inflicted. Resources, legislation, and community groups are only established in order to respond directly to a disaster or to assist and supplement in long-term recovery. Over the past two decades (1990-2010), there has been a paradigm shift from "state as healer" to "state as protector" (Balamir 2001a, 1). The protective national government acts *before* the disaster occurs, preventing and shielding its population from the potential disaster. The majority of the governmental resources, public legislation, and community efforts are focused on structural and non-

structural mitigation as well as basic preparedness skills, tools, and knowledge. The idea is that by increasing the community's capacity to become resilient to disasters through mitigation efforts, there will be a reduction in the amount of resources needed for response and recovery.

The UN recognizes the importance of the focus of national governments to shift from 'response activities' to 'disaster risk reduction.' This involves a complete reconsideration of the roles and responsibilities of DRR actors as well as how the general population thinks about risks. The top-down centralized government structure has historically proven to be too rigid for DRR implementation, enforcement, and effectiveness. The top-down approach to DRR management has also proven ineffective at the regional and local levels, where the laws take shape and directly affect the community. In the shift from government as healer to government as protector, this structure must become more flexible, adaptive, inclusive, and consider the local level as a primary participant in decision-making (UNISDR 2007, 20). However, the UNISDR is aware that many national institutions still retain authority as well as the characteristics of an emergency management institution. A centralized power structure and failing to include the local government is a primary barricade for any possible shift in the cultural values of risk.

Strengthening the role of civil service

As mentioned earlier, not enough has been done to enhance the will and capacities of community institutions to be able to effectively implement the provisions of new laws and policies. The federal government can create many legislative mandates that can be carried out at the local level. However, without the input of local community institutions and local leaders, effective laws and policies that can be implemented and enforced locally

are easily misguided with regards to the scope of the community's capacity to cooperate with laws and policies. Therefore, national governments support and foster multi-level decision-making networks, which the literature suggests will help implement laws and policies so they have a practical as well as a theoretical purpose (UNISDR 2007). Members of civil society must also be active participants in order for the federal government's DRR responsibilities to ultimately be effective. Information sharing and decision-making that crosses all levels of the community must be used more in the creation of DRR laws (UNISDR 2008).

Additionally, it is widely recognized that there is a lack of professional DRR expertise and the knowledge that is publically shared often does not make sense to community members. Without DRR expertise that is comprehensible and accessible, civil society can fail to understand information, ignore the DRR practices because they are unintelligible, and ultimately stifle DRR implementation at the base/local level of society. DRR practices are unable to function in a comprehensive manner, across all community institutions.

Many nations draw from outdated information and past experience to gain a better understanding of hazards and global environmental risk (Berkes et al. 2000). Therefore, policy and decision making is too often based on historical precedent and 'folk wisdom' rather than present-day evidence of vulnerabilities and risk (Berkes et al. 2000). In this context, it is the responsibility of national governments to update DRR strategies, mechanisms, and practices so they are relevant to modern technology, knowledge, and social conventions. Government is also charged with creating a comprehensive but understandable and usable analyses of the data that is wrought from modern technology

and knowledge. This will help the public integrate their particular risk into their culture of preparedness and everyday habits as well as assist in informed decision-making for mitigation.

Preexisting structures and skills at the national level should help in the development of, but not dominate, legislation and institutional frameworks. As the UN is keen on DRR laws that have the capacity to be effective at the local level, setting up copies of the national structure at the regional and local level is a waste of resources and can often impede effective DRR at the local level (UNISDR 2007, 21).

Regional Government

National government must often consider that their policies could be relevant for one region of a country, but contradictory to another. The UN as well as the HFA recognizes that national legislation has regional implications. This reinforces the importance of cultivating partnerships as regional hazards can cross multiple national boundaries. "Regional dialogue and international cooperation can inform the process of formulation of national legislation to ensure that it also contributes towards reducing disaster risk at the regional level" (UNISDR 2007, 21). This also ensures that national boundaries do not impede DRR laws at the local level. It is important for regional communities to be involved in the decision-making process because they often have a more refined view of their regional needs than multiple national governments. Their rules and regulations are more specific and tend to supplement the national governments rules.

Continued dialogue between regional governments and their federal and local counterparts must establish a normalized rhetoric of risk and DRR. As the federal government establishes what risks are present, the regional government works with local

government authorities in order to establish how these risks are to be approached according to their community's specific characteristics as well as how they will execute the federal government's mandates. The regional government acts as both a decision-maker, acknowledging multiple approaches to DRR as well as a liaison between different regions and the federal and local governments.

Local Government

Local governmental involvement in DRR decision-making is imperative. The local government directly uses national and regional laws to direct their on-the-ground actions. Informed decision-making across multi-levels of government is important to ensure that laws and policies can be implemented as well as enforced throughout different sectors of the community at the local level. In the UNISDR's analysis of local governments and the lessons learned (2010), there are four major guidelines for local governments when implementing DRR.

1) The local government must play a central role in coordinating and sustaining a multi-level, multi-stakeholder platform to promote DRR in the community/region or for a specific hazard. The strong leadership of the local government is imperative to ensure the political momentum and support among stakeholders and civil society. A pre-determined local level coordinating structure that has an interest in the community's long-term wellbeing is useful when there is an ongoing participatory and multi-level/stakeholder dialogue. This coordinating structure also establishes a foundation for organized information sharing, transparency, and development of ideas from and to different levels (Nkala et al. 2011, 55).

2) The local government is responsible for engaging the local population with DRR

activities, linking their concerns with government priorities through active dialogue as well as providing community education and training. It is also critical to integrate DRR considerations into the norms of the culture.

3) The local government should strengthen their institutional capacities and implement practical DRR mechanisms. The UN considers local governments responsible for the long-term development and viability of the community/region, despite their risk, access to resources, etc. This suggests that local governments should institutionalize DRR in their everyday operations.

4) The local government is smaller in scale and therefore more flexible to change and innovate. It is more aptly positioned than a national government, given adequate resources, to develop and experiment with new tools and techniques, applying them to settings particular to their community and specific regional priorities.

"The local government is responsible for steering a long-term process to solve problems that threaten the local economy, community and environment" (Nkala et al., 2010, 55). Local vulnerability assessments serve to help local governments develop their approach to DRR. According to the UNISDR, local land management and regulation of urban development should be the duty of the local government. This includes enabling access to safe housing for the entire population, regulating urban development, properly citing and managing land, as well as providing safe infrastructure that has the capability to withstand potential risks.

The necessity for a central role of local governance in DRR is globally acknowledged. The primary protector of the citizens of a community is their local governments. However, the UNISDR argues that there remains a gap between rhetoric and reality that is expanding

and that existing financial and technical resources do not match local governments responsibilities (GAR 2011a; UNISDR 2011b).

All three major levels of government (federal, regional, and local) are important actors in DRR. The UN emphasizes, however, that the most effective DRR implementation and engagement results from a strong local government role. The local government relies on and uses the federal and regional governments, as they are also crucial to the success of DRR. Due to the spatial nature of hazards as well as the contingent characteristics of communities at risk, it is important that the local government provides leadership and fosters a culture of resilience by the normalization of DRR practices.

Business

The UNISDR and HFA dictate the responsibility of community protection to national, regional, and local governments. The UNISDR recognizes, though, that the private sector plays a crucial role in managing disaster risks and building resilience. The private sector shares both the consequences of these risks and a responsibility to act in reducing them. In most countries, the private sector is the primary generator of gross domestic product (GDP), employs the majority of the population, and is the dominant vehicle for innovation and investment. It also has the economic and human resources and organizational capabilities to provide solutions (UNISDR 2011a, 62).

To determine the efficacy of public-private partnerships, the UNISDR has measured the success of businesses that have developed partnerships mandated by the Private Sector Advisory Group, which creates robust and advantageous partnerships worldwide. These mandated partnerships coordinate action and decision-making at multiple levels of a

community's private sector structure. Partnership efficacy is measured by comparing the capacity of businesses and their success within the community with their level of cooperation and interaction with public-private DRR partnerships. Business capacity is also compared against the community's overall engagement and compliance with international DRR priorities as well as their capacity to manage risks. The UNISDR explains that communities that actively promote public-private partnerships have the ability to create policies related directly to addressing the root causes of 'non-resilient activity,' like mismanagement of land or a disregard for building regulations.

Although, overcoming a lack of trust is the first task within a partnership, especially a multi-level partnership, the most frequent mediator of trust and understanding is the shared common goal that both the private and public sector have. The shared goal between the public and private sector is enhancing DRR within the community and strengthening a culture of resilience. Businesses that advocate for DRR will profit from the success DRR activities and resources while the public will benefit through a heightened awareness of their risk and a strengthen capacity to cope. Partnerships create professional networks that strengthen the bonds between community institutions and promote working with other stakeholders in decision-making. When the public and private sectors have parallel goals, there are returns on investments. The UNISDR suggests that the barrier between the public and private sector can be weakened and a culture of resilience can be fostered through public-private partnerships united to reduce risk and increase coping capacity.

The private sector must also demonstrate the ability to "encourage, develop, and use financial risk-sharing mechanisms to ensure the resilience of facilities and communities to hazards and allocate adequate resources" (UNISDR 2011a, 64). When the private sector has

created a network of institutions that have investments within the community, they leverage private sector expertise and strengths to enhance resilience. Together, this fosters a mutual exchange and distribution of socio-economic cost-benefit analyses throughout multiple sectors of a community economy. This creates transparency within the private sector, which allows the public (and other businesses) to see opportunities where resilience building and DRR is a reliable economic strategy, with positive returns and competitive advantages. By sharing how much the community would benefit in the long run by implementing DRR, businesses become a stronger asset to the community. This further institutionalizes DRR in the thinking and culture of the community, improving resilience overall.

In 2011, the UNISDR called for businesses to enhance their collaboration with other businesses and to share their expertise and data with civil society. This is important because civil society often has limited access to programs, knowledge, and resources, which hinders the progress of instilling resilience as a fundamental aspect of culture. This also helps DRR to become institutionalized within the common thinking of a community. For example, compensatory insurance is one of the primary businesses involved directly in enhancing the resilience of all levels of at-risk communities. Its networks and partnerships are more limited than other economic endeavors because it is an unfamiliar business worldwide and therefore has restricted access to other economic enterprises (UNISDR 2011b). Increased interaction and fostering public-private partnerships would not only maximize the awareness of compensatory earthquake insurance within the community, but also would grow their business model and increase profits.

Education

The education sector of a community, according to the UNISDR and the first session of the Global Platform for Disaster Risk Reduction, is responsible for the "development and sharing of content and strategies for teaching DRR to children, in and out of school" (UNISDR 2007, 28). Schools—including administrators, teachers, and students—should act as centers for community-based DRR initiatives and should be responsible for the education of the greater community. Educational institutions are also responsible for the design and implementation of earthquake resistant school building construction, retrofitting for post-earthquake reconstruction programs, and disaster management plans in schools. Curriculum within individual schools is to integrate DRR into planning and regular school functions. Updated educational material for school children and civil society is more accessible to the public than technical government documents and reports and DRR training can more easily be provided through school curriculum. This helps build a culture of community resilience since children often take home information and then inform their parents and communities. Knowledge that youth bring home and take into their community may be the only exposure to disaster preparedness strategies for their parents and/or community.

Post-secondary programs, in a variety of different collegiate departments, have also been created in all different types of communities in order to increase the research and development capacity for the DRR community (UNISDR 2007). The UN also recognizes schools and the education sector as the primary provider of expertise with specific DRR training for engineers, local government officials, schoolteachers, and the extended community population.

The education sector acts as an innovator in DRR partnerships, capacity building, and knowledge sharing. Worldwide, steps are being taken to integrate DRR education into standard thinking practices and increasing educational opportunities for involvement in efforts in building community resilience (Mangroves for the Future 2008). International conferences and regional gatherings of experts in education and risk management have provided advocates with important opportunities for collaboration (UNISDR 2007). Governments (national, regional, and local) are also regularly encouraged to mainstream DRR into education at all levels (UNISDR 2007).

The UN reports that progress towards a culture of resiliency and promotion of DRR is modest within the education sector. DRR education is often a one-way process with outside experts talking and teaching. This approach is ineffective and should build on lessons learned from previous community experiences, present community skills, as well as information networks and multi-level dialogues at the local level.

Healthcare

Healthcare is an essential service for everyone, anywhere in the world. During disasters, the main responsibility of the healthcare sector—which can include public and private hospitals, nursing homes, and healthcare facilities, as well as lifeline facilities such as water treatment centers and grocery stores—is to save lives, provide urgent medical care, and reduce the risk of communicable diseases and other health risks. The operation of a healthcare facility during a disaster is imperative if these services are to be provided. The HFA states that one of their key goals in to make "hospitals safe from disasters by ensuring that all new hospitals are built with a level of resilience that strengthens their capacity to

remain functional in emergency and disaster situations and implement mitigation measures to reinforce existing health facilities" (UNISDR 2007, 32).

The UNISDR and many of the institutions considered stakeholders in the HFA assert that healthcare must have a pivotal role in disaster reduction planning and actual implementation at the local, national, and international levels for many reasons, including the protection of infrastructure and delivery of emergency medical services whenever and wherever needed (UNISDR 2011a).

The community-based health workforce is made up of healthcare professionals at the local/community level "who contribute to better health outcomes by promoting health and providing primary healthcare (PHC)" (UNISDR 2011a, 69). These workers usually live in the community they work in. This is an important consideration because healthcare worker's understanding of community, cultural, and linguistic details are locally unique. The community-based health workforce is important in the management of all phases of a hazard. "Their skills need to be recognized, revitalized and strengthened to manage emergencies in hazard-prone communities" (UNISDR 2007, 70).

Although healthcare is a primary and active institution in DRR, it is often not considered as a key stakeholder during planning nor is it accounted for during decision-making. Despite the contribution of the healthcare workforce in emergencies, this sector is rarely recognized as a key stakeholder or included in local and national DRR plans, strategies, or practices (UNISDR 2011a). When healthcare workers are not recognized in risk reduction strategies and mechanisms, their expertise and skills are neglected. Additionally, the absence of essential career experiential knowledge, such as issues of

gender inequality, homelessness, and the special needs population are, for the most part, forgotten (UNISDR 2011a, 70).

Strong, as opposed to substandard and underfunded, healthcare systems have a greater capacity to absorb the impact of emergency situations. The UNISDR (2011a) recognizes a plethora of critical healthcare roles and services that are key to the strength of DRR. Mitigating against key health related vulnerabilities, such as common illnesses, and increasing access to PHC for all creates a healthy population that can withstand disaster events better than a population in poor health. PHC can refer to education of basic family practices such as washing hands or access to basic antibiotics. "The health sector can also provide valuable input to national risk assessments through information on community health hazards such as epidemics or pandemics and vulnerabilities and capacities of the health system at all levels" (UNISDR 2011a, 71).

Another critical healthcare service involves contributing to or cooperating with preparedness plans such as risk assessments, risk awareness training and education, and advocating for emergency preparedness actions within individual households. Working with other institutions to provide PHC can reduce the vulnerability of loss in a community.

Grassroots Organizations

Decreased government funding has led to an increase in the need for grassroots organizations to take on many of the formerly government run DRR programs. Although governments are critically important to the DRR process and fostering a culture of resilience, with little funding and many social issues to deal with, governments may not have the resources or the capacity to be successful in implementing DRR (UNISDR 2007,

Nkala et al. 2011). Through this need as well as a recognition of the importance of fostering a culture of resilience, grassroots organizations have made substantial progress in DRR activities worldwide (UNISDR 2007, Nkala et al. 2011).

One of the more specific roles of communal grassroots organizations is to connect the community with local governments and other key stakeholders to create partnerships in order to implement the HFA. Grassroots organizations can be NGOs, faith based groups, women's rights groups, or local food cooperatives, just to name a few. One of their key resources is the social relationships they foster within and between local communities. Networks are also formed in and between grassroots organizations and, at times, they are possibly the most important voice to listen to when making decisions because of their own knowledge about their own community. This bottom-up approach uses the voices, skills, and resources of the local community to advocate for provisions that are locally acceptable and feasible. With grassroots organizations being the links in the networks of local communities, a bottom-up approach efficiently informs and educates regional and national decisions (Glover et al. 2005).

The development of local networks and building political and technical platforms using existing structures in a local community is a primary responsibility of grassroots organizations. Although, adequate legal and institutional frameworks are also recognized as an enabling factor of efficient and successful local DRR initiatives, the advocacy of grassroots organizations usually drives legislative and institutional considerations. Additionally, grassroots organizations target high-risk vulnerable populations and strive to change their access to resources, educational level, capacity to cope, and so forth.

Grassroots organizations provide the community with a network that acts as a safety net for their population. This fosters a healthier community with a higher standard of living. Community experiences worldwide have demonstrated that community-based grassroots organizations are key actors in the promotion and enforcement of DRR. Their efforts improve development outcomes in favor of the local community and increase the capacities of high-risk communities to cope with disasters independent of the regional or national bureaucracies (UNISDR 2007, 25). While grassroots organizations are not necessarily subject to the laws of the national government, as the local government might be, there is an important connection to be made between grassroots initiatives and national policies. There is a need to replicate these grassroots best practices in highly vulnerable urban settings where grassroots participation has proven to be less flexible and grassroots organizations have found preparedness rhetoric within urban communities difficult to scale up (UNISDR 2007). These communities are highly vulnerable and have a need to foster a bottom-up approach in order to increase their resilience.

DRR IN TURKEY

How risk is viewed in Turkey influences how the government structures legislation; how businesses model contingency plans; how schools structure curriculum; how hospitals prepare for an emergency event; how grassroots use their resources and interact within the community; and how resilience and risk awareness is standardized into the cultural rhetoric of the nation and local communities. Turkey approaches risk as a 'fatalistic' society would, responding to crises as they occur in lieu of preventing them altogether (Balamir 2001, 2002; Unlu et al. 2010).

In the following sections, I examine Turkey's earthquake risk reduction policies (EQRR) and legal framework to demonstrate Turkey's historical tendency to rely on 'fatalistic' methods when dealing with disaster risk management. Recently, however, there have been incremental efforts to restructure Turkey's DRR policies to meet the needs of a 'self-reliant/risk' society. The transition from a 'fatalistic' approach of social organization to a 'self-reliant/risk' approach demonstrates Turkey's desire to foster a culture of resilience and be a world leader in DRR.

Shift from a 'Fatalistic' Society to a 'Risk/Self-Reliant' Society

Balamir (2001, 1) explains that the 'fatalist' idea of social organization and the 'risk' idea "are two separate forms of social existence, and beyond differences in modes of administration, they stand as distinct attitudes towards social organization and life in total." (Figure 2.3) Instead of reducing risk and increasing coping mechanisms before earthquakes happen, Turkey's DRR policies have been more reactionary (Unlu et al., 2010). In lieu of planning for fatalities, Turkey's policies have a tendency to wait until there are fatalities to act. Therefore, many scholars claim that Turkey's 'fatalistic' approach to societal governance creates EQRR policies that are inherently inefficient, not cost-effective, and dangerous (Bakir 2004b; Balamir 2001; Erdik and Durukal 2007; Okay 2005; Unlu et al., 2010; Ural 2001). For the purposes of this thesis, I use the policies of the Turkish government and characteristics of Turkish community life, culture, and civil society as the foundation of Turkish social organization.

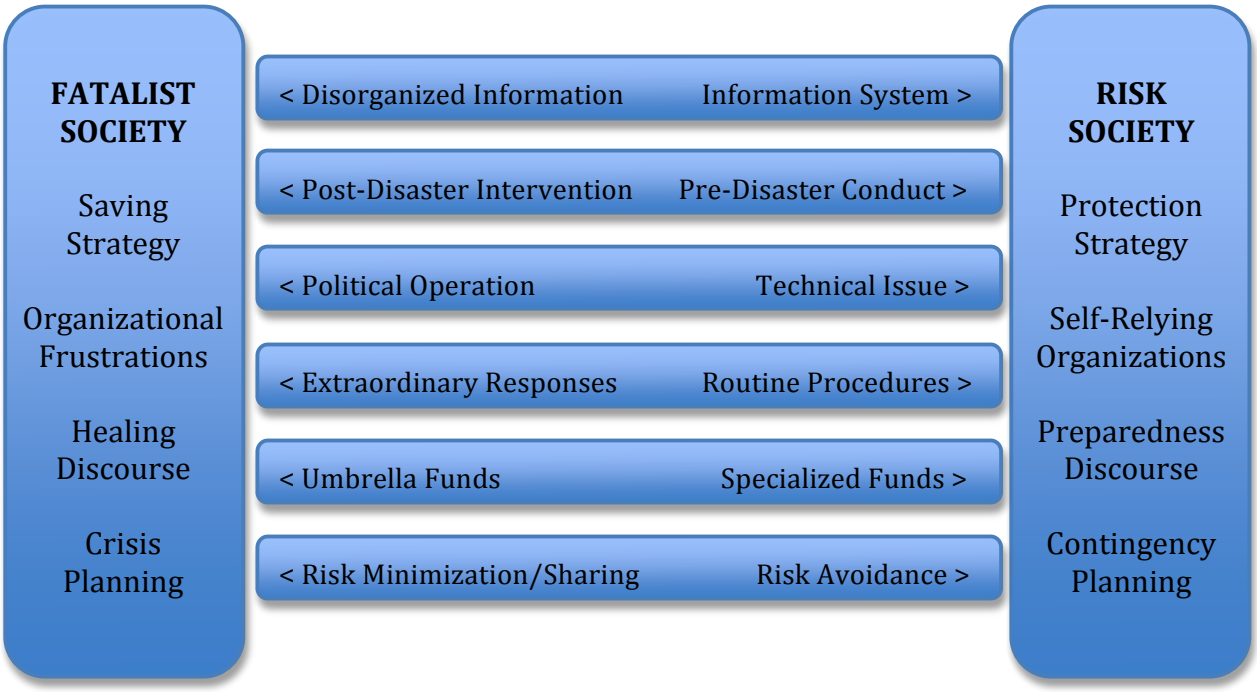

Figure 2.3 Attributes of the Two Extreme Models of Strategy in Disaster Policy

There are four primary characteristics of a fatalist society (Figure 2.3). First, this society exercises the strategy of saving, that which was not damaged, or loss. Second, there are often frustrations among organizational partnerships and third, this type of society has a discourse that focuses on repairing damages and recovering losses. Finally, a fatalist society focuses on planning for a crisis they assume will actually happen (Balamir 2001, 2002). These four characteristics have six primary indicators. 1) Information is often disorganized, 2) Intervention only happens after the disaster has already happened, 3) Operations are politicized while the actual issue goes unsolved, 4) Response procedures are considered a tremendous effort across the community, 5) Umbrella funds are used to help with economic as well as social recovery, and 6) Risk information is shared across multiple community institutions (Balamir 2001, 2002).

Balamir (2001, 2002) characterizes a risk society by four primary processes. First, the society has a strategy to protect from possible harm. Second, community institutions and successful organizations have mechanisms that allow them to be relatively self-reliant before, during, and after a disaster event. Third, the rhetoric used throughout the society is inherently 'preparedness' rhetoric, aimed more towards being prepared for an event and less being able to heal losses and damages after an event. Finally, a risk society does not plan for a crisis. Instead they plan for a future event that is possible but cannot be predicted with any absolute certainty (Balamir 2001, 2002). There are six fundamental indicators present in a risk society. 1) Information is organized and systematic, 2) Intervention is an on-going process that gradually happens before a disaster, 3) Issues are dealt within a technical capacity, with decision-makers using systematic but conditional processes, 4) Response procedures are considered as routine as any other emergency response procedure, 5) Excess funds allocated are set aside especially for the reason of DRR as well as response and recovery efforts (Balamir 2001, 2002).

There are characteristics of a fatalistic society that still very much dominate in the Turkish culture of DRR. However, Turkey has recently demonstrated the use of ideas and characteristics of a bourgeoning 'risk' society. For example after the earthquakes 1999, more effective and efficient buildings inspection and land-use regulations were established. Although they have not yet been implemented nation-wide, the acceptance of the principle strengths the DRR system for the future. This transition can bring the Turkish society to equilibrium, where they not only prepare for the risk, but they can respond and recover from it as well (Unlu et al. 2010).

Deficiencies in the Turkish Construction Industry and Building Stock

In addition to the social organization of Turkish society, there are other more structural and organizational components of current EQRR policies that contribute to increased risk and decreased coping capacity in Turkey. Most prevalent among these, despite the multitude of contractor/construction building and design codes, is a significant lack of enforcement and oversight that has created thousands of unsafe buildings and dangerous living conditions in Turkey (Ergunay et al. 2012)

Rapid population growth, migration from rural to urban areas, environmental negligence, and the massive demand for housing in Turkey's urban areas has caused uncontrolled and sub-standard construction projects (Okay 2005; Ural 2008). This continually exacerbates the vulnerability of at-risk populations who are forced to live in illegally built structures (Okay 2005). Additionally, current government policies and land-use restrictions tend to facilitate illegal settlements and unsafe building practices in metropolitan areas (Unlu et al. 2010, 170).

> "The legal framework does not contain a coherent statement on defining the responsibilities of the parties involved in the creation of buildings and other components of the built environment. The situation is fundamentally unchanged for institutional buildings… The Development Law falls short of protecting consumers in acquiring disaster-resistant houses. Municipalities perceive no political incentive for enforcing strict building construction supervision. Governorships do not usually have sufficiently qualified personnel to enforce the provisions of the Law within the wide areas for which they are responsible" (Ergunay et al. 2012, 4).

The widespread building damage from the earthquakes in 1999 served as unfortunate proof that the building stock in Turkey was severely inadequate, did not meet earthquake building design codes, and more importantly, was located on structurally weak alluvial soils, making even the most structurally sound building at risk of collapse during a seismic event (Balamir 2002). Land-use planning is not a priority in Turkey's conventional disaster policy rhetoric. Moreover, oversight and control of construction sites as well as the materials being used is minimal (Gulkan et al. 2002). There are only a few private companies that specialize in oversight and quality assurance. Even though the municipal governments are also responsible for regulating construction sites and materials, lack of funding and expertise has led to an unregulated construction industry with dangerously negligent practices. "We must underline the fact that an effective design and construction supervision system cannot be created through the creation of legal text alone. A well-educated and experienced manpower is required for its full realization. This should be supported further by such instruments as professional liability insurance, professional supervision, and licensing" (Ergunay et al. 2012, 2). However, there is no policy or piece of legislation that directly dictates admonishment if there is not oversight or quality assurance mechanisms present and/or if construction sites and materials do not meet Turkish building codes (Corbacioglu et al. 2006). "Elected local municipalities are where urban environments are planned and permits for most construction are issued, but unless codes and plans are adequately enforced, these become worthless documents that do not serve to protect the public they purport to serve" (Ergunay et al. 2012, 2). This demonstrates the ignorance of the 'fatalist' approach to social organization with regards to "insufficient coordination across multiple organizations from different jurisdictions and

sectors result[ing] in the failure of coordination and collective actions during emergencies" (Corbacioglu et al. 2005).

Misdirection and misuse of labor skills in Turkey's urban areas contribute greatly to a workforce that is inadequate for oversight and quality control (Okay 2005). Furthermore, "pardons for illegal construction impede the functioning of the system" (Sengezer and KoÁ 2005). Okay claims, "proper enforcement of building codes and standards remains the most critical challenge for Turkey to reduce the vulnerability of their building stock" (2005, 7). The three crucial elements lacking in the building and construction industry are: 1) accountability of public officials to reinforce safety rules and regulations, 2) transparency of building design plans, and 3) strict building construction supervision (Okay 2005; USGS 2011; Ergunay et al. 2012).

The deficit of information sharing between central government and provincial/district public, private, and non-profit organizations not only hinders the collaborative efforts possible during the disaster response and recovery phase, but provides an impenetrable stalemate when trying to execute mitigation and preparedness initiatives (Corbacioglu et al. 2006). In addition, "information available is largely produced through voluntary activities of separate research bodies and represents incompatible piles of data" (Balamir 2002, 41). The UNISDR emphasizes in most DRR documents that multi-level cross-organizational dialogue and decision-making are key components to effective DRR implementation and enforcement within a community. Unfortunately, the structure of Turkish bureaucracy is too rigid and does not allow for cross-organizational cooperation and integration (Okay 2005). Governorships and municipalities are often given similar responsibilities and cannot work together as the governorships are delegated by the

national government while local voters determine municipal leadership. “Experience to date has shown a lack of adequate coordination between central authorities and the provincial administrations during the critical period immediately following a natural disaster” (Ergunay et al. 2012, 2). There is also a significant misdistribution of resources between the governorships and municipalities since the municipality is only concerned with local issues and governorships are governed by an entity often thousands of miles away that manages thousands of other governorships. Responsibilities pre- and post-disaster are unclear and while many local governorships are given authority to handle risk and disaster management mechanisms, they are not given the resources to exercise this power (Bakir 2004a). Municipalities on the other hand do not have authority when managing risks, but have a plethora of resources.

Governmental Decrees: Helpful Stepping Stones or Bureaucratic Impediments?

There are Turkish decrees that address proper enforcement of building codes and standards (strengthening the power of the idea of the ‘self-reliant’ society), but the Pacific Disaster Center (PDC) and the Earthquakes and Megacities Initiative (EMI) have recognized weaknesses that prove these decrees to be more abstract and harmful than concrete and helpful (Initiative 2011).

Governmental decree 4708 requires construction supervision firms in Turkey to supervise and control construction. However, there is no legislation stipulating the education or experience of the engineers employed. The building supervision system in Turkey is highly centralized, as a commission consisting of five members located in the capital of Ankara provides all of the certificates for building supervision firms nationwide

(USGS 2011). Also, the decree has made the building supervision firms, contractors, laboratory staff testing the materials, and control engineers all responsible for any damage that could occur with or without seismic activity. The sharing of responsibilities make the already existing legal sanctions ineffective, although it *could* vastly improve work ethic and quality (Cilingir 2010).

The governmental decree 587 stipulates the creation of compulsory earthquake insurance for residential buildings and offices. Instead of providing new homes for the collapsed ones, the government formed the Turkish Catastrophic Insurance Pool (TCIP). Coverage in the amount of $17,000 would be provided for each damaged or collapsed insured home by TCIP but private insurers supply coverage in excess of this (USGS 2011), making them a more desirable alternative. Also, the insurance penetration for the TCIP is quite low (14%). One of the causes of the low Compulsory Earthquake Insurance (CEI) penetration is the low level of public awareness about CEI. Communities, for the most part, are not informed that only those who have paid the CEI premiums would be eligible for receiving the $17,000 in coverage (Cilingir 2010).

Unfortunately, soon after the Bingol earthquake in 2003, the Turkish government announced that new homes would be constructed by the government for those families whose buildings were damaged in the earthquake regardless of their participation in TCIP. This discouraged involvement in TCIP and was unfair to citizens who paid the CEI premiums. There is no political will to enforce the CEI or a driving mechanism to encourage participation in TCIP. Also, there is a lack of legal ramifications for those citizens who do not insure their buildings according to TCIP (Cilingir 2010).

It is important to recognize that the TCIP does not address or encourage mitigation. They reduce financial risk. This is mode of DRR, but the mismanagement and lack of enforcement of CEI furthers Turkey's inability to move toward a 'self-reliant' approach of governance.

The final decree relevant to disaster and emergency management is 4734, the Procurement Law. An assessment of the Bingol and Pulumur earthquakes that occurred in 2003 showed that one of causes of the devastation was the heavy damage in public buildings such as schools, which revealed the weakness of the Turkish Public Procurement system. By integrating DRR concepts in the procurement of materials and resources for building critical infrastructure, the resiliency of the buildings would be at their maximum. This prevents damage to the building or anything of fiscal value when a seismic event does happen and therefore is financially prudent. This also ensures the safety of the people inside. Following the 1999 Kocaeli earthquake, the Procurement Law was updated, but there is still no report of whether the Turkish Public Procurement system has been effective since a seismic event that would test the procurement processes has not happened. Still, Turkish scholars say that the update of the Procurement System has, insofar as it has been enacted, displayed mutual considerations for both 'fatalistic' societal approaches to risk management as well as 'self-reliant' approaches (Bakir and Boduroglu 2004).

Despite a strong presence of DRR ideas and strategies within the Turkish government, many scholars and researchers are worried about the lack of legislative focus on EQRR policies in Turkey. Of the EQRR policies that do have a legal foundation, there is

concern that these are ineffective or there is a lack of knowledge and resources to truly implement the ideas and strategies of a prepared society (Erdik and Durukal 2007).

> "An effective disaster mitigation strategy must depend on two basic premises: One is the crafting of an effective spatial (physical) planning system in which disaster occurrence is considered explicitly as a prime parameter. The second includes strict building construction supervision plans, the transparency of their preparation, and accountability of public officials reinforce the safety considerations" (Ergunay et al. 2012, 4).

Public Education of DRR

As Turkey is trying to figure out what role legislation and social policies play in social organization pre- and post-disaster, there is another influential mechanism contributing to the relatively low coping capacity of Turkey. Education for public disaster preparedness and disaster mitigation has been under the responsibility of the central government (Initiative 2011). Local governments and non-governmental organizations do *not* play a sufficient role in these issues. "The hierarchical top-down nature of the disaster management system tends to discourage local initiative and undermines the role of local authorities who must face the affected people" (Ergunay et al. 2012, 1). Education about earthquake risk is offered in primary and high schools, but there is no systematic education program for the general public. Development of standards for public education and community organizations, reaching the public at large, active participation of the public, 'training the trainers,' and production of training materials has not been considered to the extent where a blossoming 'culture of resiliency' could grow (Initiative 2011).

Although the educational efforts underway so far are valuable and have reached a large number of people, the current situation can be summarized as a pervasive state of un-

preparedness (Center 2005). Communities across Turkey, specifically those with high seismic risk, are presented with information on earthquakes, demonstrated the importance of non-structural mitigation and how to properly execute it, and are shown what to do during an earthquake. This focus is certainly important, but does not feed the growth of a culture of resiliency. Clearly another focus is required; which is to find the mechanisms to get the public to take action with the education they receive in order to reduce the risk that earthquakes present in Turkey (Initiative 2011). This would greatly increase the independence of the Turkish community, as the public would have the ability and the authority to increase future coping capacity.

Significant deficiencies in the Turkish construction industry and building stock, ineffective and out of touch governmental decrees, and incomplete vision of DRR education for the public are key reasons why Turkey's social organization is still primarily 'fatalistic'. There are many advocates and leaders working towards changing these variables of social organization in favor of a more 'self-prepared' structure, but there are still barriers that stifle this transition in social organizational structures. I will explore the steps being taken towards a 'risk' society in the following chapters.

In Chapters 4 and 5, I offer an in-depth examination of DRR activities in two case study communities in Turkey: Istanbul and Antakya. Using themes and core ideas found in qualitative interviews conducted in Turkey, I explore the role of the government, the private sector, education, healthcare, and grassroots organizations in reducing disaster risk. I then explore how these institutional engagements in DRR foster a 'culture of resiliency'. This will provide a preliminary understanding of how community institutions engage in DRR in Istanbul and Antakya, Turkey. In Chapter 6, I will examine the barriers

and resource needs that respondents reported as being key to the slow transition from 'fatalistic' to a 'risk' society.

CHAPTER 3: METHODOLOGY

This chapter provides an overview of the methodological design I used in order to answer my research questions, including a discussion of sampling, data collection strategies, and methods of analysis. I first introduce my research questions and then explain the mixed methodological approach that was taken into order to answer those questions. I then give a brief overview of both research sites, Istanbul and Antakya, and describe the types of community institutions that I studied. Next, I describe, in more detail, the strategies used to collect and analyze the primary data. Finally, I address the methodological challenges and limitations in my research design and execution.

RESEARCH QUESTIONS

Multiple community institutions, focusing on government, business, education, healthcare, and grassroots organizations, advocate for and participate in disaster risk reduction (DRR) practices. In order to understand the DRR capacities within a community as a whole, for example Turkey, it is important to examine how the primary community institutions that help structure and sustain a community, participate in DRR practices. The two primary research questions I explore in this thesis include:

1. How do different community institutions engage in and use DRR strategies, practices, and mechanisms in Turkey?
2. How do DRR community institutions engage in DRR help to foster a 'culture of resilience' in Turkey?

MIXED METHODS APPROACH

DRR is a multi- and interdisciplinary social mechanism, and therefore should be researched with multi- and interdisciplinary methods that "… take into account reality and are most apt to generate solutions for complicated challenges" (McEntire 2006, 2). Qualitative methods are most effectively used when trying to obtain information on nature, affect, or meaning. Quantitative methods complement this type of knowledge by measuring structural, contextual, and institutional features (Ragin 2004).

When exploring how community institutions engage in DRR and how these institutions help foster a 'culture of resilience,' qualitative data enhances and contextualizes quantitative data. A holistic and dynamic analysis and understanding of these community institutions comes from the interaction of both types of data. The qualitative observations supplement quantitative data by explaining what is going on with the data. "… mixing quantitative and qualitative approaches can enable researchers to explore the structure (or form) of networks from an 'outsiders' view and the content and processes of networks from an 'insiders' view" (Edwards 2010, 2). Both qualitative analysis and quantitative data are necessary in social research because qualitative approaches do not lend themselves to systematic numerical accounts. On the other hand, quantitative approaches "over-abstracts and over-simplifies the social world… and produces measures that cannot be adequately interpreted when divorced from the social context" (Edwards 2010 – quoting Crossley 2009). The combination of qualitative interviews and the quantitative deductions gathered from surveys taken in the field allow for both in-depth and more broad-ranging analyses (Stallings 1997).

Edwards (2010) exclaims that, like the relationships between structure and agency, a clear understanding of either qualitative or quantitative approaches requires the other. It also offers the best chances to obtain useful and holistic answers to research questions. Johnson et al. (2004) state that research approaches should be mixed in ways that offer the best opportunity to answer the research question(s). They also point out that a mixed methods approach increases the legitimacy of the research since it rejects dogmatism and does not restrict or constrain researchers choices or the types of results that may come from their research.

Qualitative data collected from my interviews allows for an exploration of the construction, reproduction, and dynamics of the chosen community institutions: government, business, education, healthcare, and grassroots. Quantitative data collected from the survey questionnaire provides what is, but fails to explain the reasoning behind what is or further our understanding of what is (Edwards 2010). Both research questions ask 'how', demanding not only an answer, but also an explanation to the answer. Mixing the two research methods exercises a methodological pluralism, "which frequently results in superior research (compared to mono-method research)" (Johnson et al. 2004, 14).

Qualitative

Creswell (1998, 19) suggests that "we ask open-ended research questions, wanting to listen to the participants we are studying and shaping the questions after we 'explore', and we refrain from assuming the role of the expert researcher with the 'best' questions." Open-ended questions permit for an unlimited number of possible answers allowing for

unanticipated findings from the respondent to be discovered. Complex issues can be explored further while creativity, self-expression, and richness of detail are all permitted (Neuman 2006). The questions were designed to discourage the interviewer from leading the interviewee at all times. Also, probes were designed in order to gain additional information according to the answers and the direction of the conversation. Probes are defined as "a follow-up question in survey research interviewing that asks a respondent to clarify or elaborate on an incomplete or inappropriate answer" (Neuman 2004, 306). As open-ended questions can lead interviewees into tangents or cause repetition in the things they are saying, probes are an effective technique used to steer the interview back towards the question of interest. Probes should be a neutral request for the respondent to clarify an ambiguous statement.

Qualitative research is a means to gather detailed information about a particular set of informants and to learn how they behave and think. Unlike quantitative data, this involves discovery in lieu of verification (Ambert 1995). This research project was designed in order to discover the way that social institutions engage in the realm of DRR. This exploration called for open-ended questions during in-depth interviews, where unfettered dialogue meant the interview could uncover and span new territory.

Quantitative

Survey questionnaires handed to each interviewee following the initial interview were designed to provide a contextual structure to the specific community institutions engagement in DRR. Quantifying data that was discussed during the interview and recognized as an important aspect of how organizations engaged in DRR was needed so

that meaning found in the qualitative interviews was given a clear structure. For example, the survey questionnaires identified the public's lack of interest is their seismic risk as an extreme barrier to DRR implementation in both Istanbul and Antakya. This survey finding was then complimented by the in-depth interviews, which shed light on the processes that informed the barriers.

RESEARCH SITES

Two experts in qualitative research design, Marshall and Rossman (2011), discuss the importance of being critical when choosing sites to study, which increases the quality of the data that is gathered. They recommend choosing research locations where "(a) entry is possible; (b) there is a high probability that a rich mix of the processes, people, programs, interactions, and structures of interest is present; (c) the researcher is likely to be able to build trusting relationships with the participants in the study; (d) the study can be conducted and reported ethically, and (e) data quality and credibility of the study are reasonably assured" (Marshall 2011, 101). This provided a logical framework to begin the city selection criteria process.

The two case study sites where I conducted research for this thesis were determined by a set of guidelines. Each location needed to have high seismic risk and be safe enough to travel in. Two different geographic locations and population sizes were sought out because they are influential to how earthquake risk is perceived and acted upon. It was also important that each community had been recently exposed to a seismic event, since this would influence their EQRR experience (see Appendix A for additional information on how the cities were selected for this study).

According to the USGS, Turkey is the fifth highest-ranking nation for seismic damages and losses; only proceeded by China, Japan, Italy, and Iran. This includes the total number of fatalities and the number of earthquakes killing more than 10,000 (Gurenko 2006). Globally, it is the 17th most heavily populated nation and is the 95th fastest growing. Two fault lines run through Turkey. The North Anatolian fault line spans the entire northern border and the East Anatolian fault line runs north to south on the eastern side of the country. The Hellenic Arc/Trench is located in the southwestern corner of the nation and digresses into the Mediterranean Sea. Turkey is considered a democratic country, absent of any political unrest, and was deemed a safe travel zone.

The project team chose two different cities in Turkey for study based on population size and the recency of exposure to an earthquake. Istanbul is the 21st largest city in the world and is the biggest metropolis in Turkey (Dursun 2010). The city is also ranked to have the 6th highest seismic risk in the world according to the Earthquake Disaster Risk Index (Davidson et al. 1997). Istanbul has always been the center of the Turkish economy due to its strategic location at an important junction of land and sea trade routes. This historic city generates 21.2% of Turkey's GNP. It is also the only city in the world that sits on both the European and Asian continent (CIA 2011). It's most recent devastating quake was in 1999, when approximately 17,000 died, 50,000 were injured, and 500,000 Turks were left homeless (USGS 1999).

The Istanbul Metropolitan Municipality has a vast array of DRR departments and initiatives. Their DRR management structure extends into almost every sector of the city and has proven to be a model in which other city governments structure their DRR management systems around (Center 2005). Istanbul was considered an ideal location to

seek out professionals who actively work in DRR because they are considered a leader in DRR and have relatively recent exposure to seismic activity, which has greatly influenced their interest and engagement in DRR.

The other location I studied in Turkey was Antakya. It lies on the southeastern border of Turkey and is one of the closest Turkish cities to the Syrian border. Interviewing professionals in two different locations in the same country helped me to gain perspective of how the nation of Turkey interacts with DRR and expanded the possibilities for discovery of new knowledge. Therefore, my second location needed to have a vastly different demographic make-up and hazards history than Istanbul. The city of Antakya is also landlocked and with a population of 215,000, is much less populated, smaller in size, and more suburban than Istanbul. The majority of the EQRR practices that take place in Antakya result from national mandates. Often times, enforcement from the capital, Ankara, is necessary in order for the correct resources to be mobilized to satisfy a new federal DRR policy.

The most recent earthquake to shake Antakya was in June of 1998 and was followed by a destructive aftershock in July 1998. Approximately 140 people lost their lives and 3,000 people were injured (EERI 1998a). Even though this is the most recent destructive quake, Antakya's DRR structure did not change until after the tragic 1999 Kocaeli earthquake that devastated the western part of Turkey (Sezen et al. 2000). Antakya's DRR management is smaller in scale, less advanced, and overall very different than Istanbul's, but they have both proven effective over the past decade. Finding representatives of each of the five community institutions in these two different geographical locations in Turkey fulfilled the goal of having "reasonable variation in the phenomena, settings, or people"

(Marshall 2011, 103) and gave me a more holistic understanding of the types of DRR strategies and mechanisms that different institutions engage in across Turkey.

DISASTER RISK REDUCTION COMMUNITY INSTITUTIONS

When defining 'community institutions' for this thesis, it was important for the chosen community institutions to have a role or be active in DRR practices within their community. I am using the UNISDR as well as the HFA established by the UNISDR in order to define DRR. I also used the UNISDR in order to determine the types of community institutions that would be central to research. The five community institutions are 1) government, 2) business, 3) education, 4) healthcare and 5) community-based grassroots organizations. These community institutions were chosen because the UNISDR stresses that each plays an important role in reducing risk and establishing a culture of safety in communities. "UNISDR will utilize the extensive disaster risk reduction networks in civil society, government, private sector, international agencies, and the technical, scientific, and academic institutions to consult on the post-2015 framework for disaster risk reduction" (UNISDR 2012, 1). Additionally, the concept paper for the UNISDR's Fourth Session of the Global Platform for Disaster Risk Reduction in 2013 outlines particular institutions that will be given priority and special attention including: local governments and cities, parliamentarians, DRR champions, academics and science networks. The conceptual design for the Fourth Session of the Global Platform proposes three main organizations to include in the agenda. The goal of the three main constituencies is "to determine policies, practices, and measures for disaster risk reduction and take responsibility for reinforcing resilience

to disasters" (UNISDR 2012, 3). These organizations are the private sector, potential communities and networks, and national governments with local authorities.

For the purposes of my research, two representatives from each of the five community institutions were identified using key informant sampling. This involved selecting a sample of professionals who have special expertise in DRR and would have the ability to answer my interview questions. It was crucial that each of the interview respondents be involved in EQRR and/or mitigation activities and have some capacity to influence decision-making within their organizations (see Appendix B for extended version of the interviewee selection criteria). In the end, the interviewees from each sector held the following job titles: branch manager, civil defense expert, civil engineer, geophysical engineer, geological engineer, seismologist, archeologist, doctor, assistant director, director, deputy director, deputy governor, and president. These individuals were knowledgeable informants who could speak to their own roles as DRR professionals and to their broader organizational mission (see Appendix H for complete list of the interviewees and job titles).

In order to obtain the most reputable sources possible, Justin Moresco and I worked with a local partner, Mahmure Ezgi Bakir. Ezgi is a Masters student at Boğaziçi University in Istanbul and works at the Kandilli Observatory and Earthquake Research Institute (KOERI) in the Department of Geophysics. Ezgi was briefed on the nature of the research project as well as the criteria that each interviewee must meet. It was not required of our interviewees to speak English, so having a local partner fluent in both English and Turkish was crucial. Ezgi contacted possible representatives of each community institution and was able to set up nine interviews with representatives of the five community organizations in

Istanbul in mid-July 2011. Ezgi also arranged 11 interviews in Antakya during late July 2011. The final sample for my research included 20 in-depth interviews**,** nine of which are from Istanbul and 11 were completed in Antakya (Appendix H). As some of the interviews were with multiple people at once, the sample included 25 men and one woman representing the five key sectors.

DATA COLLECTION

Interviews

Prior to visiting the research sites of Istanbul and Antakya, I worked with a larger project team to develop a semi-structured interview guide. We developed preliminary research questions that informed the design and eventually directed the interviews. This allowed me to stay flexible in the field, so I could ask questions as the interview unfolded (see Appendix D for the complete interview guide). All of the primary questions asked were open-ended, and allowed me to probe more deeply should the interviewee misunderstand the question, not be descriptive enough, or mention something intriguing that would enhance the quality of the interview. Probes to the respondent's answers were previously designed, but I had the freedom to pursue questions in more detail as they emerged; this is one of the hallmarks of qualitative data collection, which is highly flexible. The interview questions were also designed to be translatable into the different rhetoric used by different organizations.

Creating the interview questions was an ongoing process that changed and developed throughout the course of the research (see Appendix D). Some interviewees

would answer the majority of our questions by simply giving us a detailed answer to questions one or two. Innovative and on-the-spot probes were needed for other interviewees in order to obtain the information that was needed. Five main questions were designed around five topical areas: 1) Work, 2) Programs – Understanding, Preparing for, and Mitigating EQ Risk, 3) Barriers, 4) Partnerships, and 5) EQ Risk Perception (see Appendix D for complete interview guide). A series of interview probes to each question were created in order to generate additional information relevant to the research questions. Academic risk reduction and risk communication literature was used to inform the creation of the questions and probes.

During the week of July 17-23, 2011, Justin Moresco, M. Ezgi Bakir, and I conducted interviews in Istanbul, Turkey. During the week of July 24-30, 2011, we conducted interviews in Antakya, Turkey. We rode the metro, hired taxis, or walked to meet with the interviewees, primarily at their place of work. We tailored our schedule around our interviewee's schedule.

Before the official recording of each interview began, an introduction of the project and our goals and desires was explained to the interviewee. If the participant did not speak English, Ezgi would brief the interviewee in Turkish. Even when the interviewee did speak English, Justin and I came the conclusion early on in the interview process that the ultimate goal of our interview should not get lost in translation and should be given to the participant in his or her native language. Permission to record the interview as well as an acknowledgement from the interviewee of the time the interview would take was obtained. When the official recording began, it was important to establish a common, respectful, but easy-going rapport with the interviewee.

In order to establish rapport between the interviewee and myself, the first question asked for the name and title of the interviewee as well as the name of the organization. *"Will you please say your name, title, and the name of your organization? Will you tell me about your job here?"* This topic laid the foundation to discuss how the organization and the specific practitioner work with DRR activities. The interviewee, being previously briefed on the nature of the interview, would often continue their train of thought, explaining what his or her job was at the organization and how they engaged in seismic risk reduction practices.

The second question was designed to help me understand the programs used by the particular community organization to prepare for and mitigate earthquake risk. *" What earthquake education, preparedness, or mitigation activities is your organization involved in?* The discussion following this question also provided me with a clearer understanding of how their organization engaged in DRR and fostered a culture of resilience. Additionally, this question provided me with information regarding what is needed as well as what organizations already have in terms of knowledge, tools, and resources. This information helped me further understand how the organization might want to engage in DRR. For example, though they might be legally mandated to implement DRR, they might need additional tools and resources to be effective.

The third open-ended question was designed to determine the needs, challenges, or barriers the organization had experienced engaging in DRR. *"What barriers have emerged with designing or implementing your earthquake [hazards] program?"* Data collected from the answers to this question help determine why certain organizations participated in

particular DRR practices, but not in others. This data can also inform how they would most likely engage in DRR, if they had the capacity and ability to overcome barriers.

The fourth question prompted the interviewee to consider the DRR partnerships and networks they were a part of and what those partnerships have meant in terms of their professional development. *"What lessons have you learned from other leading individuals or organizations about understanding or reducing earthquake risk?"* This topic allowed me to identify how networks of DRR professionals and organizations worked together to reduce risk. This identification gave me a better understanding of how Turkey, as a nation full of community institutions, was fostering a culture of resilience.

The final question we asked prompted the respondent to think about and explain how they think about risk and DRR within their community. *"When you think about the possibility of a major earthquake happening in your community, what concerns you the most?"* This topic helped me understand how local DRR advocates and leaders perceived earthquake risk.

Justin Moresco, Ezgi, and I would debrief after each interview in order to assess the success of the interview protocol and to make sure that we, as a team, were as effective as possible. These debriefings helped us to ensure that we were on the same page about what was working, and not working, in terms of the question-and-answer format in the open-ended interviews. This ultimately gave us a chance to alter the interview structure and to critique one another on different interview techniques and methods of communication.

Following each interview, the team administered a brief, two-page survey questionnaire to each interviewee (see Appendix E for full survey questionnaire in English; Appendix K for full survey questionnaire in Turkish). Following the survey, another set of

interview questions were designed to learn more about why the interviewee answered the way he or she did on the survey. Three primary questions were asked following the survey. 1) Of those items you do not have access to, which would be most helpful/useful to you? 2) Of those items you do have, how would you like the information delivered (maps, charts, online, etc)? 3) What online tools and resources would you like developed to make your institutions more effective at reducing earthquake risk?

Surveys

The two-page survey (which was administered in Turkish) (see Appendix E – English/Appendix K -Turkish) allowed us to collect quantitative data pertaining to the barriers present in DRR creation and implementation, the types of earthquake risk and exposure information that the respondents did and did not have access to, how they preferred to receive this information, as well as how their institutional efficacy could be improved upon. The survey was designed so that the language used was simple and accessible to a variety of different professionals with a strong DRR background (see Appendix E – English/Appendix K-Turkish).

The survey first asked each interviewee to identify their access, or lack-thereof, of certain types of DRR data and information available in their professional work. For example, respondents were asked whether they have access to: "Projected ground shaking intensity in an earthquake" and then they were asked to mark either "already have", "would like to have", or "do not need".

The second section of the survey asks the respondent about the types of barriers present when their institution or program implements EQRR activities. For example, the

barrier “lack of money” is listed and the interviewee was asked to respond by marking “minor barrier”, “major barrier”, or “not a barrier”.

The third section of the survey asked interviewees to consider how they prefer to receive and share information for professional purposes and to determine the usefulness of a list of information sources. For example, “newspapers”, “email”, and “government websites” were listed and the respondent was asked to mark “low”, “medium”, “high”, “not available”, or “available but not useful” so as to determine the effectiveness of information sources used by their organization.

The final survey section asked respondents to mark what types of information they have or they most want should the building where they work be damaged in a seismic event. Types of information offered were “projected cost to repair the building after the earthquake” and “projected likelihood that the building would collapse”. Interviewees were then asked to recognize these potential pieces of information as “already have”, “would like to have”, or “do not need”.

Finally, the interviewee was asked to fill out and turn in a brief demographic form about themselves and their relationship to the organization and community. At the close of each interview, I would collect the survey questionnaire and demographic form and thank the participants for their time and knowledge (see Appendix F for demographic form).

Literature

In addition to interviewing DRR professionals that represent their individual communities as well as their specific institutions, I endeavored to understand the existing Turkish DRR regulations. Thus, to supplement the original data I collected for this thesis, I

read historical documents depicting prior DRR guidelines, seismic activity, and reactions to seismic activity. I also reviewed literature that assessed the Turkish publics sentiments regarding the effectiveness of the DRR mitigation policies and response and recovery measures. The information gathered from my readings connects the data collected from the interviews and surveys to the practical application of DRR efforts that Turkish community institutions are engaged in. This information informed my analysis and presentation of the findings in this thesis and can be found in Chapter 2.

DATA ANALYSIS

After data collection, Sandy Adler, a professional transcriptionist, prepared verbatim transcripts of the audio-recorded interviews. The transcripts of the recorded interviews were then loaded into the qualitative software analysis program, Atlas.ti. Atlas.ti is a program with an interface that allowed me to read and label (or code) each interview according the particular topics and themes that emerged.

To begin my data analysis, I read each transcript multiple times without physically coding it in Atlas.ti. Instead, I simply made mental and physical notes of the types of themes and patterns—or the "…fuzzy constructs, which investigators identify before, during, and after data collection" (Ryan 2003, 1)—that appeared in the initial readings. In addition, the interview guide, the survey, as well as my personal field notes and knowledge from conducting the actual interviews helped establish a foundational set of themes and patterns before I started physically coding the transcripts in the software program.

Once I had identified a preliminary set of themes in my initial reading of the interview transcripts, I then translated them into codes. Charmaz (1983, 111-112) defines codes as "shorthand devices to label, separate, compile, and organize data… Codes serve to summarize, synthesize, and sort many observations made of the data. By providing the pivotal link between the data collection and its conceptual rendering, coding becomes the fundamental means of developing the analysis." When I coded the transcripts, I started by searching for the most general themes and patterns that emerged. Next, axial coding helped me identify more generalizable thematic patterns. During axial coding, a researcher organizes the codes, links them together, and discovers and examines key analytical categories (Neuman 2004). Finally, representative coding involved me selecting relevant quotes in the transcripts that would reinforce my findings and allow me to illustrate them in the actual text of this thesis.

In the end, I developed a codebook, in consultation with the larger research team that spanned well over a dozen typed pages. This codebook included both code names as well as memos that helped to elucidate the meaning behind the code (see Appendix J for the final codebook).

METHODOLOGICAL CHALLENEGES AND LIMITATIONS

As with any research project, I encountered many challenges throughout. While this was not my first time in Turkey, I found that not being able to communicate with some of our interviewees in Turkish to be challenging. We were completely reliant on Ezgi to get the types of information that were crucial to answering the research questions. Thankfully,

the majority of our interviewees did speak English very well, so we were able to converse with the interviewee and make sure that ideas and questions were not lost in translation.

Translation from English to Turkish and then from Turkish back to English in order to get the answers recorded accurately in the transcript proved exhausting at times. Ezgi worked very hard and without complaint in order to deliver a successful interview with usable data. It was important that Ezgi understand the nature of our research so that she was capable of asking the right questions in Turkish. The first few interviews presented a challenge in that Ezgi did not quite understand one particular idea we were trying to get the interviewee to discuss. She resolved this by rephrasing the question entirely, in Turkish, as the direct translation of the idea did not make sense to our first few interviewees.

Another challenge that I enjoyed tackling was using the data compiled for the larger research project to answer my research questions. Although the larger project goals and this thesis research questions were similar, I did have to use data that resulted from questions that were not directly aligned with the types of information I wanted to collect. This forced me to look at themes, codes, and all of the interviews through a funnel; gathering a sense of the broader picture at first, and then digging deeper into the details and specifics of the interviewee's responses. In the final transcripts, the answers to my research questions were not always obvious. This made me look at the data from multiple different perspectives, change my ideas of what I thought was useful data within the interviews, and made me more thorough when reading and rendering a meaning from the respondent's answers. I also sought out secondary literature to augment my understanding of the DRR context in Turkey.

Another challenge and limitation of the study was that I could only spend a limited amount of time in Turkey. This also affected my sample size. I was not in Turkey long enough to get the representative sample I desired. I would have liked to get a larger sample population in which to work with in order to verify the emergent themes that I identified in this exploratory work.

I also felt limited by the time constraints of each interview. Each participant was informed that we would take up approximately 1-1.5 hours of his or her time. This meant that we had to be very clear with what kind of information we were asking for and steer the interviewee in the right direction should the interviewee start discussing unrelated topics. I understand the need for a time limit in any interview, but had the interview time be longer, or unfixed, we may have learned more about each participant and their organizations role in DRR in their community.

Even with these challenges and limitations, I still learned that clarity, consistency, and kindness are three fundamental traits that one must have and exercise in an interview. I learned that despite cultural or professional differences, people are truly keen to help you achieve your goal, no matter how many times that might mean repeating a question or an idea. Despite the methodological challenges, the mixed methods approach used to examine how different institutions user DRR variables is a model that proved useful for this thesis: the first systematic exploration of DRR in Turkey with a focus on these five key community institutions.

CHAPTER 4: CASE STUDY – ISTANBUL

Istanbul is the largest and most populated metropolis in Turkey and the city plays a crucial role in the economic, cultural, and financial success of the nation. As of December 2010, the population of Istanbul was estimated at 13 million and the rate of population growth has averaged approximately 3.45% per year (Municipality 2008). The influx of people to Istanbul is a result of the rapid migration from rural to urban areas as people try to find employment and an increased standard of living. Additionally, the rapid rate of population growth increases the demand for housing, infrastructure, and civil and critical facilities.

The North Anatolian Fault line lies directly beneath the city. Geologists and seismologists predict that a 7.6 magnitude earthquake happening on the North Anatolian Fault before 2030 is greater than 60% (Traynor 2006). "If a major earthquake hit Istanbul, much of the city would be devastated, due to unlicensed, jerry-built construction" (Lonely Planet Turkey 2011, 662). Moreover, given the historical prominence of the city and the cultural value it retains for Turks all around the world, the loss of critical facilities, residential buildings, and historic structures would also mean the loss of the structure that supports and shapes the entire nation. Researching and understanding how key community institutions in Istanbul engage in disaster risk reduction (DRR) is imperative in order to understand the vulnerability—and potential resilience—of this historic city.

This chapter provides an overview of the earthquake risk reduction activities already underway in Istanbul, Turkey. Specifically, the sections that follow describe the DRR programs and initiatives that are currently in place; explore the tools and resources

that DRR professionals and other community leaders use to assess and mitigate their risk; examine the key concerns that motivate DRR action; and present barriers that hinder DRR activity in Istanbul. The chapter is organized around the five primary community institutions that I studied—government, business, education, healthcare, and grassroots groups working to reduce disaster risk in the city.

Government

The local government in Istanbul is extremely involved in DRR as well as specific EQRR activities. Government officials in Istanbul have completed training and capacity building activities targeting both the staff as well as the general public (Madji 2011). One of their primary EQRR projects is the Istanbul Seismic Risk Mitigation and Emergency Preparedness Capacity Enhancement Project (ISMEP). The International Bank for Reconstruction and Development and the World Bank loaned financial resources to the city so the government could create and enact ISMEP. The project consists of three core components: 1) Enhancing the Capacity of Emergency Preparedness, 2) Seismic Risk Mitigation for Priority Public Buildings, and 3) Implementing Zoning and Building Legislation. Osman Kilic, the Deputy Director of the Ground and Soil Research Directorate is Istanbul, explains that once the risks are identified, it is the "government's responsibility to determine how to deal with the risks."

Two of the government's primary concerns, as explained through the goals of the ISMEP project, are: 1) the quality of the buildings in the city and 2) the application and enforcement of building codes standards. Through the ISMEP project, the government of Istanbul is responsible for the retrofit for 800 public buildings, most of them schools. The

government hires local experts to inspect the buildings and these experts are responsible for identifying the magnitude of risk presented to the building as well as recommending which buildings should be retrofitted.

To enhance the capacity of emergency preparedness, the first priority of ISMEP, the government provides free training seminars and first aid training to the municipal employees as well as the public. The goal is to make people aware of their risk and to provide information about what mitigation and preparedness activities they can do to reduce that risk. While the majority of the ISMEP project is conducted through the government of Istanbul, ISMEP also helps the Istanbul Provincial Disaster and Preparedness Department financially support nongovernmental organizations DRR efforts. This contradicts the paternalistic structure many criticize as being the most pervasive weakness characteristic of the DRR system and the most difficult attitude to correct. Still, it must be noted that Istanbul is a mega-city, and some would agree that the city government is not localized enough to implement appropriate DRR. District governments and local neighborhoods would be a more appropriate government entity to implement a project such as ISMEP, but on scale apt for the characteristics of the neighborhood (Ergunay et al. 2012).

The Risk Management and Urban Development Department in Istanbul was loaned funds by JICA to conduct a province wide loss estimation study in 2009. This partnership addressed two of the key components of ISMEP: 1) Seismic Risk Mitigation for Priority Public Buildings, and 2) Implementing Zoning and Building Legislation. The results of the study have since informed many of the government's urban transformation projects.

Local officials and the Mass Housing Administration have continuously undertaken numerous urban development and renewal projects in the past decade (Dursun 2010). The mission of these projects is to create new centers at the end nodes of the city, to transform the dilapidated historic neighborhoods through urban renewal projects, to rehabilitate squatter settlements through mass housing projects, and to design existing built areas and residential structures as manifestations of disaster and earthquake risk safety. Kilic explains that earth science data in addition to building quality examinations informs the government of the buildings that need to be renovated or retrofitted as well as the areas in which buildings should not even exist in Istanbul, new or old. The urban transformation projects are intended to guide the structure of current and future government public building plans. This is includes land-use planning, planning for retrofitting, planning for resident relocation, and planning contingent with seismic building codes.

The government regularly provides their findings regarding the specific buildings that need to be vacated or retrofitted, the areas that have deficiencies, which adds to their vulnerability, and supplemental risk awareness assessments to the public and private sector. Due to specific barriers among the social organization of the city, government's ability to act upon the information and data they collect is limited. Especially with regards to the private sector as the government is not allowed to interfere with the private sector's buildings because of their lack of authority in decision-making with the private sector. The government is interested in these buildings, since public and private buildings often intermingle, and therefore what affects one will most likely affect both. However, they do not have the power to manipulate property they do not own.

The intended consequences of the earthquake based urban transformation projects involve forcing people to relocate from structures that are collapse hazards, destroying unsafe buildings, and building structures that are resistant to possible EQ activity in Istanbul. The government uses its elected leaders as well as experienced professionals to help persuade residents of the importance of the urban transformation projects. Kilic explains that in order to eventually establish an earthquake resistant district within the city of Istanbul, a large number of people will be have to be relocated and uprooted. The will of the government and the will of the people are often incompatible, and this presents a primary barrier between effective DRR and building a culture of resilience. Since the government has decided to address Istanbul's seismic risk, Kilic says that the "government or the municipality [should] use other tools, other legal tools" to carry out the urban transformation projects.

Another project the government of Istanbul is working on is the Megacity Indicator System (MIS) or Istanbul Disaster Risk Indicator system. The goal of the project is to help city officials identify the tools they need to understand the priorities, to set up benchmarks, and track progress in their disaster management systems, so they can justify decisions and investment in DRR. The MIS is a tool to communicate the risk and promote discussion around relevant local-level risk parameters that enable disaster risk management professionals and decision-makers to develop disaster risk management strategies. This project will show the risk levels of different areas within the city in terms of a geological profile, building stock quality, as well as social vulnerability indicators.

Extensive networks and relationships with a variety of professionals who can contribute to the database of DRR knowledge increase the capacity of the city to manage its

risk and enhance preparedness efforts. The government respondents expressed how important it was for them to have an extensive network of professionals in the city to support and implement DRR action so they do not have to rely on outside professionals to help inform their DRR activities. Support from local sources also bolsters the local economy and strengthens the idea of DRR as a standard cultural entity. The primary local resource that many community institutions use to inform their EQ risk as well as their mitigation and preparedness activities is the Kandilli Observatory and Earthquake Research Institute (KOERI).

> *We are very lucky, because Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, exists in Istanbul. The observatory gives them information, and they use [this to inform] a system about the possibility of disaster and risk.* Necmi Ercin, Department Chief of the Istanbul Provincial Disaster and Preparedness Department

Ercin expressed his satisfaction with the recent DRR and emergency preparedness conference his department organized. Many professionals came from all over Turkey and shared information about EQRR techniques, strategies, and mechanisms. These networking opportunities and information sharing venues are a particular resource and asset that the government of Istanbul intends to capitalize on. Fostering these opportunities broadens the scope of possibilities for DRR government officials and provides them with a support system to ensure best management practices.

The Istanbul Provincial Disaster and Preparedness Department has a fully functioning command and control center that is used to monitor, direct, and maintain order in the city following a disastrous seismic event. Though this center is considered a response mechanism, it has been financed and exists as a precautionary measure, so the provincial

government is ready to respond at the highest capacity necessary. It is a model of DRR technology and does increase the level of government preparedness.

Although the local government of Istanbul has made tremendous progress over the past 13 years in terms of DRR activities, challenges remain. In particular, government respondents discussed three major barriers to DRR. These include the negative effect of politics/election periods, the discrepancies between the government's needs and the resident's desires, and the result of the time lapse between the last event and the present. Additionally, the high turnover rate of personnel in institutions causes a loss of knowledge and continuous restructuring of organizational relationships and partnerships. I will also explain how government respondents have overcome the barrier of a lack of social vulnerability indicators used in data collection and decision-making.

Kilic explains that urban transformation projects, as with any government project, are a political game. These are projects that place the dysfunctions of a city (earthquake risk in Istanbul) at the center of its scope. They work to reclaim urban spaces and economies in order to restructure and improve urban landscapes (Sakizlioglu et al. 2010). Many decision makers and officials bend to the will of the people and what they want in the short term in lieu of understanding what they need to keep them safe, which are often long-term processes. This is particularly noticeable during election season. Promises are made that cannot be kept while slanderous insults are batted back in forth. Whoever can get voters to believe them, trust them, and like them, will most likely win. Lying, over-exaggerating, and fudging the facts and figures has proven to be the most effective form of winning, according to the government respondents in this study.

> *But there is an interesting negative point for the success of this kind of transformation project, that especially in election periods. The other party is always trying to give to the people that they are trying to get everything from you. They are using it political tools to win, to reach their target.* Osman Kilic, Istanbul Metropolitan Municipality Deputy Director of the Earthquake and Soil Research Directorate

The government also found that while their goal was to make the districts of the city safer and more resilient to seismic activity, the perceived goal of most of the residents was to live in a "bigger and better flat" after the renovation or retrofit was done. Kilic notes they learned that scientific and practical realities are important to consider, but people cared more about their rights and how they would benefit from the project. Kilic also mentions that the residents did not want to move or to be uprooted during the renovation, and they did not want to lose their neighborhoods, so they often did not even care about the purpose of the project.

While the government has made earthquake risk reduction a priority, most residents of Istanbul are not reminded of their seismic risk on a daily basis. People forget about their risk and therefore their desire to be prepared. The government officials I interviewed argued that adolescence is the right age range to be learning about and exercising DRR activities. However, since the last seismic event was thirteen years ago, many young people in Istanbul do not recall the event. For someone who is twenty-six, thirteen years have passed, half of their lifetime, since the drastic reminder of the importance of DRR in Turkey. Since the 1999 earthquake, other more pressing issues, in the community as well as in people's individual lives, have occurred and taken precedence over DRR. Their risk as well as DRR tools and strategies become little if an absent priority due to the significant time lapse since the 1999 earthquake to the present.

One barrier mentioned by government respondents was their lack of social vulnerability data in decision-making. They emphasized that they do not have quality data on specific social vulnerability indicators and not fully understanding and considering vulnerability indicators for each district in the city makes it impossible to make a fair assessment of risks and projected needs. To address and overcome this barrier, the Istanbul Metropolitan Municipality established the Megacities Indicator System. The MIS overlays important data that is considered in urban planning and urban investment opportunities in order to determine the most vulnerable as well as dangerous locations in the city. The types of information overlaid include information on the geological profile (geological bedrock, topography, local soil classification, average shear wave velocity, surface geology, liquefaction, landslide risk, and land suitability) of Istanbul, the city layout, building type and quality. These types of information overlaid with different social vulnerability indicators such as age, income, and educational attainment provide a comprehensive understanding of the level of vulnerability of the different districts in Istanbul.

Two contingent analyses of the overall risk of different districts in Istanbul were conducted using several different earthquake scenarios. The most probable being a magnitude 7.5 event and the worst-case scenario a magnitude 7.7. The Megacities Indicator System estimated 70,000-90,000 would be dead, 500,000-600,00 would be left homeless, and the total economic loss would be $40 billion in the worst-case scenario (Tabarly 2010). The amount of emphasis placed on social vulnerability indicators was debatably minimal. Though they have the tools and personnel, progress getting good and statistically significant data on the social structure of Istanbul is inadequate as it has yet to be collected

and analyzed. Also, this is the first time that social vulnerability indicators have been used and recorded by the IMM. While this study has been active for quite some time, how to score indicators has yet to be determined.

> *[It's important for me to know the] impacts [on] different population groups. We want to have information about the older people. We want to reach older people after the natural disaster. It's very important, and we have a problem about it.* Necmi Ercin, Department Chief of the Istanbul Provincial Disaster and Preparedness Department

Business

Businesses active in DRR in Istanbul focus their programs and activities towards promotion of their product, increasing profit, and programs that help DRR become a part of the culture. The business respondents asserted that programs that foster a culture of resilience ultimately benefit their enterprises in the long run as their DRR products and services may become a necessity for members of the community. It is therefore, from their perspective, in the best interest of these businesses active in DRR to strongly advocate for risk reduction efforts in their community.

One respondent, a mechanical engineer, runs a business that addresses structural and non-structural engineering components for buildings. Another respondent is the coordinator for the Turkish Catastrophe Insurance Pool (TCIP), and deals only with earthquake insurance for residential buildings. These respondents work in for-profit businesses that 'market' different types of DRR strategies and mechanisms. For example, the mechanical engineer's business promotes and sells the latest structural and non-structural components necessary to enhance the structural integrity of a building or to conform to earthquake building codes. No matter their business, though, they continue to

interact in the market, trying to inform what a good or bad DRR product might look like, or which services are most needed for a community at risk considering cultural and traditional restraints.

The business respondents I interviewed also act as seismic risk awareness advocates by simply being in business. The success of a business that uses, promotes, and demands DRR also helps the larger community become more resilient to earthquakes. Should insurance penetration increase, the TCIP will benefit and more people will be financially protected from an earthquake taking away all they have. The more businesses succeed in this regard, the more they help DRR become a central component of cultural and social life. For example, a mechanism that buildings sit on top of that increases the flexibility and movement capacity of the buildings can be sold to contractors and designers. As contractors and designers become more aware of the safety implications as well as the success of the product, they will continue to buy and use this mechanism. Gradually, this DRR mechanism will be considered a part of standard building procedure and its use and necessity will benefit the businesses that sell the product and society as a whole.

Beyond the individuals that I interviewed, the products of many businesses in Istanbul directly reduce the risk that earthquakes pose. TCIP not only provides insurance in case of earthquake damage or losses, but they also model risk, and conduct loss estimation studies. These provide additional knowledge and can act as an effective resource in order to positively reinforce DRR activities.

Another important contribution of businesses in Istanbul is their significant expansion in the DRR network. As multiple industries play an important role in the structure and the function of the city, it is also important that multiple industries are

considered and work together in DRR. All businesses have a stake in DRR, as their potential continuity in the face of disaster is dependent on the success of DRR.

> *… no single company or any single institution or any single industry can handle this by himself. In New Zealand, Chile, and Japan, it was proven, this theory. So we are telling insurance companies, public officers, adjusting associations, etc., that we have to coordinate in that respect. And construction companies as well. So we are invest[ing] in the coordination.* Ismet Gungor, Executive Vice President and Coordinator of the Turkish Catastrophe Insurance Pool (TCIP)

Frequent meetings, seminars, and conferences allow businesses to share knowledge and information, receive the most up-to-date training, and provide a venue in which they are able to market and compare their products to others of a similar nature. Businesses can also instill trust or distrust. When a business uses data from an NGO, this relationship exhibits trust in the NGO. Also, if skewed data is published in favor of a particular businesses product, a businesses reputation can suffer. Businesses understand that a factor in their continuity and success is the network connections they develop.

Businesses also act as educators and enforcers of DRR principles. Eren Kalafat, mechanical engineer and owner of his own engineering firm, provides products that enhance the strength of physical structures. He also raises awareness of and provides products that are used for non-structural mitigation practices. Kalafat explains that in order to most effectively advertise his product, he must convince contractors, engineers, and other customers that it will help them meet national and international building codes, regulations, and laws. This informs the customer that a risk does exist and there is something available that can help reduce the risk. This also gives Kalafat the opportunity to explain the importance of non-structural mitigation, as many people are not aware of the

non-structural risks present in their buildings. Also, businesses use their own money, in lieu of funding from outside investors (such as the World Bank) or using the tax payer's money to invest in DRR. This way, they can control every aspect of their operation, from the quality and methodology of research and data collection to the mechanisms used to market their product. Since they are using their own money, respondents say that it is in their best interest, financially, to educate and enforce DRR principles and foster a culture of resilience.

It is clearly important for businesses to market their products. However, the business respondents in this study expressed challenges and barriers associated with articulating the goals and uses of some of the products that they produce. The way the message is conveyed is also important in overcoming resistance to risk reduction. For example, Kalafat explains when talking to a building designer or contractor, it is often best to emphasize the benefits and added value that structural and nonstructural mitigation components will add to their project, rather than instilling fear about the risk and underscoring the enormous losses that could occur.

Yet, Kalafat explains that awareness of seismic risk and therefore of possibilities for seismic protection is not enough in Istanbul. As the government struggle with people forgetting about their risk and DRR activities, businesses struggle with people not believing in the necessity of DRR. Gungor reports that it is hard to convince the public to think about reducing their risk. People have told him that "no one asked me" about whether I should reduce risk, and "we believe in our destiny" when it comes to earthquakes, and "it's not going to happen to us". He says people in Istanbul are not properly informed of their risk and some believe their building is resting on a solid and safe place. Another skewed

perception that the public/customers have of DRR that business respondents mentioned was the cost of DRR. They struggle because many customers do not realize that DRR is much cheaper than they imagine and, more importantly, costs significantly less than if DRR action was not taken and a disaster did occur.

> *People think still that the insurance is expensive. However, when we tell them the price, they are surprised because it's so cheap. And we say it's less than one bread a day; monthly premium is less than one pack of cigarettes. They are quite surprised. So it's an excuse, but the price itself is not an issue.* Ismet Gungor, Executive Vice President and Coordinator of the Turkish Catastrophe Insurance Pool TCIP

Businesses also struggle with having trustworthy information and convincing potential users of their actual motives. Since they are for-profit organizations, the business respondents encounter some who believed they might have manipulated their data to fit their profit-driven agenda. For example, one respondent emphasized that professors can be rather distrustful of for-profit organizations and their products because they believe that because they have an agenda (to make money), their data and knowledge is biased. While suggestions can be made, often times the academics leave it up to the businesses to make sense of data for themselves and inform their own decisions since it will ultimately effect their business model more than the academics reputation.

Education

The Turkish government subsidizes education at all levels and law enforces attendance at primary and secondary schools, which accounts for eight years of education. However, due to the insufficient number of higher education institutions, only a select few of candidates for college actually get to attend. There are approximately 200 schools in the city of Istanbul. Istanbul Technical University (1773) is the world's third oldest technical university that is entirely dedicated to engineering sciences. There are approximately 45 major private universities and 120 well-known public and private high schools within Istanbul. Approximately 15 high school facilities have yet to be classified (NationsEncyclopedia 2012).

The primary responsibility of the education sector is to educate youth and, by extension, the public about their potential risks and how they can prepare and protect themselves against a seismic event. By educating new generations of risk-aware-youth, the education sector strives to move toward a culture of risk reduction in Istanbul. This is an important goal, as over one-fourth, or 26.6%, of Turkey's population is younger than 15 years old (CIA 2012).

Following the 1999 Kocaeli earthquake, the Ministry of Education changed school curricula radically with the help of universities to focus much more explicitly on DRR than response and recovery (Cilingir 2010). JICA proposed a school-based education project that is being implemented by the Ministry of Education. The project aims to improve school-based disaster education in the Marmara Region. This program targets primary and secondary school teachers and administrators. The program is aimed at increasing disaster

management systems in schools and increasing disaster education capacity of teachers including DRR training.

In Turkey, DRR educational materials and strategies are targeted primarily at children. Their aim is to increase young people's awareness about earthquakes and to teach them preparedness skills that they would then take home, share with their families and communities, and, ideally, would maintain throughout their life.

KOERI at Boğaziçi University in Istanbul is the central source for DRR educational material in Istanbul and is considered a well-known and trusted organization that works daily to reduce seismic risk. It is the organization that others go to when information about seismic risk and EQRR is needed. Kandilli's Community Impact Project (CIP), supported by the United States Agency for International Development (USAID) significantly increased the educational capacity of the city. The CIP primarily targets students and schools, but has materials and strategies for other institutions as well. The CIP is made up of four key programs aimed at increasing the educational capacity as well as the overall seismic risk awareness in Istanbul. These four programs are all directed towards student learning and programs #2 and #3 are directed towards improving the structure of schools. The four programs are 1) basic disaster awareness training module, 2) nonstructural mitigation program, 3) structural awareness training program, and 4) a community volunteer program directed at disaster response. The educational program in the Disaster Preparedness Unit at the Kandilli Observatory and USAID created a large variety of materials. For each of the four programs, materials such as booklets, posters, presentations, short films, and interactive learning devices were created. For example, an earthquake simulator was developed in order for children to witness as well as experience the

importance of non-structural mitigation. Additionally, a school disaster management project was established by the Ministry of Education and is aimed at preparing the structural and nonstructural components of the actual school building as well as designing the management plan for the entire school should an earthquake take place.

While most of the materials are directed towards children, the CIP also created educational materials for museums, hospitals, and more vulnerable populations like persons with disabilities. Educational materials are regularly provided in paper format as well as online to increase accessibility. There are three types of E-Learning systems tailored towards the general public, teachers, and students. Teachers can access an E-Learning program called Disaster Risk Educational Materials Content Management System (DREAMS). In addition to Kandilli's E-Learning website, they also work with and educate other professionals about seismic risk and risk reduction. Professionals that should be involved in DRR are provided with resources available through the Observatory that will not only increase their awareness and knowledge of seismic risk in Istanbul, but also educate them about the tools and resources available in order to be prepared for an earthquake. They also have a train-the-trainer program for professionals specifically working in civil defense and emergency management.

Educational institutions in Istanbul are responsible for reinforcing the DRR networks within the city. Not only are universities the primary developers and producers of information and data concerned with seismic risk, vulnerability, and DRR in Istanbul, they also play a central role in conveying risk information to a variety of different organizations. Seyhun Puskulcu, a geophysical engineer and Head of the Educational Program – Disaster Preparedness Unit at the Kandilli Observatory notes that the majority

of teachers know the Observatory and the extensive opportunities offered. By working with a variety of organizations across Istanbul, Kandilli has developed the capacity to bridge the gap between EQRR tools and those who desire them.

Barriers that impede the creation and/or success of the education sectors DRR activities are few in Istanbul. Educational institutions, with the Kandilli Observatory leading the way, have the technology and capabilities to educate the public about DRR. Still, educational organizations often run into budget constraints when trying to execute their informative programs and create and disseminate up-to-date educational materials. Puskulcu also noted that Istanbul's large population and the quality of the building stock requires extreme actions by educational institutions to make Istanbul residents more aware and informed of their seismic risk as well as DRR activities that can be implemented. However, in a city of approximately 13 million people, reaching out to all educational institutions and actually impacting the majority of the students and the general public as a whole has proven to be a challenge. Puskulcu has a plethora of information and materials that are primarily targeted at children. She explains that because of the significant lag time between large seismic events, people, especially children who have never been through a seismic event, forget about their risk. This combined with the sheer number of people that need to be aware of their risk puts Istanbul in a constant state of unpreparedness.

> *We are trying to be ready, but [we're] not ready… They are doing very good things, but not enough of course. Our population is very high.* Seyhun Puskulcu, Head Educational Program – Disaster Preparedness Unit

Grassroots Organizations

Grassroots organizations are driven by the politics of local communities. They derive most of their power and reason from the local community and common ordinary people. Grassroots are characterized by organizing in specific communities or among specific types of people to advocate for change. The term 'grassroots' implies that the people supporting and moving the organization are natural and spontaneous, highlighting the differences between this type of organization and that which is orchestrated by traditional power structures (Klein 2008). There are hundreds of these organizations in Istanbul, which can be funded by all levels of government, the private sector, as well as donations. I use information from grassroots organizations that focus on risk awareness and DRR in my sample.

Grassroots organizations involved in DRR in Istanbul are responsible for broader-based community outreach and education. These organizations coordinate, in large part, the disaster volunteer structure and provide funds and assistance to volunteer group's working towards enhancing DRR in their communities. Grassroots organizations in Istanbul, similar to many other places, rely on active volunteer involvement in terms of personnel, as well as continued community recognition and support. Grassroots organizations in Istanbul essentially act to give the community the power to enhance their own capacity to prepare for and cope with extreme events. Moreover, these organizations work with communities to provide strategies, activities, and mechanisms the community can employ to reduce their risk to disasters.

Some grassroots organizations must wait for an invitation into an area in order to execute their resources and skills, but these are primarily search and rescue organizations

that do not target reducing risk and instead focus on response and recovery. Still, non-profit search and rescue organizations often provide free earthquake awareness training sessions, seminars, and materials. Grassroots and community-based organizations in Istanbul often create their own educational materials and strategies when raising awareness about earthquake risk and DRR measures.

> *Our main project is the Neighborhood Disaster Volunteer Project, which basically developing a certain capacity at the neighborhood level. It's a community-based DRM [disaster risk management], very typical. We go into neighborhoods, we train volunteers, [and] we try to create volunteer teams. On top of it, we provide the basic equipment to those teams and organize them in a very simple way and help them keep going. So in that sense, we have quite a widespread network in Turkey, especially in the Marmara region.* Mustafa Elvan Cantekin, general director of the Neighborhood Disaster Volunteers in Istanbul

Grassroots organizations provide training to the public, enhancing their ability to deal with a disaster. The Neighborhood Disaster Volunteer Foundation offers a 36-hour training program that includes five different modules for emergency responders. They introduce risks, provide first aid training, give basic lessons in firefighting, present light search and rescue strategies, and introduce the psychological impacts disasters have.

The grassroots respondents in this study emphasized that they aim to work with neighborhoods in order to reach as many people as possible. For this reason, neighborhood heads and other elected officials are often the first point of contact for grassroots organizations. From the neighborhood head, a core group of neighborhood leaders interact with grassroots and other community-based organizations in order to increase DRR efforts

locally and increase risk awareness throughout the community. This establishes a network of neighborhoods in Istanbul that can share DRR information, knowledge, and resources.

Interestingly, the network structure that community-based organizations created in Istanbul has actually proven to be more of a barrier to DRR than an advantage. Because local grassroots in Istanbul often work at the neighborhood or district level, and different neighborhoods have different status levels, it is often difficult to get them to work with one another. Grassroots organizations in Istanbul are trying to establish community/neighborhood-based volunteer teams, but coming together as one community/neighborhood has proven difficult and the social differences of each district prevent a cohesive participatory rhetoric.

The overcrowded nature and increasing population of this urban area has also proved detrimental to the overall efforts of grassroots organizations in Istanbul. The large number of people, as well as the socially segregated nature of the city, inhibits the grassroots groups from instilling the "culture of prevention" that so many of these organizations strive to promote.

Respondents also emphasized that their organizations are also largely incapable of harnessing the types of resources and capabilities necessary to deal with the magnitude of destruction that an earthquake event would have on the already chaotic city. Within districts, community-based DRR has proven difficult because of the number of people and activities in every neighborhood.

> *The major problem is we are overcrowded… and still Istanbul is receiving immigrants... I think first of all this is what we should do, just to decrease the population of Istanbul. In my opinion, there's only one solution for Istanbul to be earthquake-resistant, earthquake resilient… because of this overpopulation pressure*

> *that these very bad quality buildings are connected and people, they have no other chance... they have to live in those buildings… With this situation, there's no possibility that we can make this city disaster-resilient.* Ali Nasuh Mahruki, President of AKUT, Search and Rescue Association

Due to significant bureaucratic impositions, grassroots groups have no official power, authority, or leadership position in Istanbul in disasters. Each district in Istanbul is assigned a district governor by the federal government. However, the municipal system acts parallel and within a similar capacity and has similar responsibilities as the governorships. Municipalities have mayors that are elected by the locals, while the governor is assigned by the federal government. The governor has the authority in the event of a disaster, but the means and resources are in the mayor's control. Municipalities have the equipment, resources, and personnel since their leadership only deals with the one municipality while the central government is in charge of all of the governorships. This creates confusion and a mismatch of responsibilities between different levels of government (national, regional, cross-regional, local). Cantekin, general director of the Neighborhood Disaster Volunteers in Istanbul, reports that municipalities often do not want to cooperate with DRR activities because this might represent an endorsement of the risk present in their neighborhood and consequently, would lower property values. However, he says that the district governors will work with grassroots organizations.

Grassroots organizations in Istanbul also experience low volunteer rates. One respondent asserted that as time passes without a disaster or a small seismic event to serve as a reminder of risk, an estimated 10% of volunteers drop out every year. This highlights the importance of small local seismic events or outside sensational events that receive a

large amount of media coverage for community-based organizations in terms of their recruiting new volunteers and generating higher levels of risk awareness.

Grassroots groups in Istanbul are not always as confident in the reach of the materials that they provide, for free, to the general public. They question whether or not they are even read and how much information they truly digest. Grassroots organizations feel as though the time, money, and effort that goes into creating free DRR materials for the public is misspent. As one respondent asserted, DRR materials, activities, strategies and mechanisms are useless if they do not influence the community's perceptions and reactions towards DRR.

Healthcare

There are an estimated 90 public and private healthcare facilities in Istanbul and the city has two of the nation's medial schools. Healthcare throughout Turkey is dominated by a centralized state system run by the Ministry of Health. In 2003, a new healthcare reform program was introduced that aimed at increasing the ratio of private to state health provision and making healthcare available to a larger share of the population. Between 80-90% of the Turkish population, including the self-employed, have healthcare provided by the national pension system, but the low quality of care encourages the use of private healthcare providers. Still, in 2006, there was one doctor for every 700 people, one nurse for every 580, and one hospital bed for every 380 people. These ratios are the lowest among all European countries (Division 2008).

The healthcare sector in Istanbul plays a significant but mostly undefined role in DRR. Primarily concerned with emergency response, their involvement in directly reducing

risk is limited. Yet, the state mandates that there are many disaster contingency plans that each healthcare institution must develop, review annually, and file with the Health Ministry. Under Health Ministry regulations, every hospital should have trained disaster managers as well as at least 10 people who are trained in search and rescue and disaster management. There are also mandatory annual training programs with the Health Ministry designed to educate employees about how to create and implement this disaster plan.

> *Physician and deputy chief of the hospitals come here and they give some information about disaster and then they say to them "Now you make a plan about natural disaster for your hospital" … these people which are involved in hospital administration, they share their plans with other people, with other big hospital administrations. And they go to their hospitals, the people who are trained here, and then do some practices and also this unit goes to hospitals to control [monitor] how they do this.* Dr. M Turkay Esin, Head of Disaster Healthcare Services in the Marmara region

Training is offered through hospitals for health sector officials such as doctors, nurses, paramedics, technicians, and police services. In-house training is aimed at educating employees about what they should and should not do during any type of disastrous event. In order to ensure that healthcare employees remain risk aware, all healthcare personnel are required by the Ministry of Health complete one hour of disaster preparedness training a year.

It is important to note that when compared to other community institutions I studied, healthcare institutions are more disconnected from the rest of the DRR dialogue and networks in Istanbul in terms of sharing information *across* the sectors. However, when it comes to information sharing *between* healthcare institutions, their networks and DRR dialogue is equally robust. Healthcare institutions regularly share information with

one another. They have a tight knit network of information sharing and DRR dialogue with a multitude of healthcare professionals constantly reevaluating best possible strategies. Though disjointed from other key institutions, the healthcare institutions work closely with one another in order to maximize their effectiveness during a disaster.

Many of the healthcare institutions that are involved in DRR are response and recovery organizations. The International Search and Rescue Advisory Group (INSARAG) creates a space in which search and rescue organizations can share information. Most importantly, in order to be a member of INSARAG, classifications must be earned and standards and regulations must be followed. This institutionalization of search and rescue operations strengthens preparedness by mandating specific capacities while increasing the network of responders.

The healthcare sector in Istanbul creates its own DRR training and educational materials in coordination with INSARAG's standards and regulations. They report that they do not use information from other local DRR institutions such as the Kandilli Observatory. Healthcare institutions instead work primarily with each other and through the Health Ministry, and often other networks of information sharing are not present. Because of this highly insular structure of DRR dialogues, healthcare professionals see their DRR efforts as more tailored to their needs and therefore more effective. DRR dialogue within the healthcare system goes from top to bottom and also from bottom to top. This change in the way that DRR information is shared across healthcare institutions has changed how healthcare professionals feel about their DRR capacities. Where healthcare professionals felt unimportant and excluded from DRR dialogue and information sharing in the past, now they feel respected and more confident in their DRR efforts.

In addition to training and contingency planning, healthcare institutions provide hospitals with emergency response and recovery materials that will be needed in the event of a disaster. The hospitals must be prepared to utilize the resources provided and if they do not show that they are properly prepared, the Health Ministry requires the completion of additional special training seminars.

Many healthcare professionals work to improve the health of the community and the wellbeing of the city through their jobs and extra-curricular activities. For example, Dr. Huseyin Nail Kavlakoglu, Head of the Besiktas Tuberculosis Defense Center in the Health Ministry, works with at-risk youth and recovering addicts in his spare time. In the course of his work, he provides young people with basic risk awareness and preparedness knowledge, but he says "the educational level of society and investment to an individual as a policy of the whole country is lacking." Dr. Kavalakoglu is determined to implement an educational framework for schools (and eventually the general public) that would be created primarily by community healthcare organizations, or in collaboration with healthcare organizations and other institutions well-versed in DRR.

> *What we want is institutional schedules, lessons at the elementary schools, disaster management, disaster awareness, whatever you name it, one hour a week or one hour a month. This is an investment to the society, the individual.* Dr. Huseyin Nail Kavalakoglu, Head of the Besiktas Tuberculosis Defense Center in Health Ministry

In addition to their disconnect from other community institutions, the major obstacle that hinders the ability of the healthcare sector in Istanbul to effectively implement DRR is that healthcare professionals have low levels of risk awareness, even with the annual training sessions. The respondents in this study noted that healthcare

employees are “wearisome” when it comes to DRR and consider DRR a non-critical part of their professional responsibilities. Dr. Esin explains that reminding professionals daily about their risk—and the important role they will play in an event of a catastrophe—has proven to be a difficult mission.

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In the conclusion chapter, I will return to the strengths and barriers across the five community institutions and I will discuss the implications of what I found throughout the interviews and the survey questionnaire. Through the strengths and barriers present in the creation and implementation of DRR practices in Istanbul, I hope to further an understanding of how community institutions engage in DRR and how this contributes to the establishment of a culture of resilience.

CHAPTER 5: CASE STUDY – ANTAKYA

The city of Antakya lies on the opposite end of the nation from Istanbul and is significantly less populated. Still, with approximately 215,000 people, Antakya is considered more cosmopolitan than most other Turkish cities, primarily due to its close proximity to Syria. Antakya lies atop the Eastern Anatolian Fault line and has experienced multiple devastating earthquakes in the past few decades. In 1998, 140 people were killed and approximately 1,000 buildings were irreparably damaged during a magnitude 6.2 seismic event. Similar to Istanbul, insufficient building stock and a lack of consideration for seismic construction and design were the two main causes of the enormous losses in Antakya.

It is important to examine Antakya's DRR structures and framework because of its size and population relative to other seismically vulnerable cities in Turkey. Antakya also offered an important case for comparison and contrast to Istanbul in my examination of DRR programs, needs, and barriers in Turkey.

Government

The primary responsibility of the local government in Antakya, as in Istanbul, is to increase the public's awareness of earthquake risk and implement activities and tools that will help make DRR a normative part of the local culture. Maintaining the local government's website as well as responding to public information requests is a primary responsibility for the local government officials. Government respondents in Antakya emphasized that EQRR information provided by the government must translate into

general risk reduction, increased coping capacity, and safer everyday lives for the people of their city. Some of the EQRR responsibilities of the government include identifying risks and coordinating with different departments and community institutions also involved in DRR. Similar to Istanbul's ISMEP program, Antakya has the Seramar program, which is significantly smaller in scale than ISMEP. The goals of Seramar are to identify potentially vulnerable buildings throughout Antakya, measure how they would fair in an earthquake, and then persuade residents of at-risk public buildings to retrofit.

In order to increase awareness of seismic risk in the region, the local government also hosts seminars around the province to educate the general public as well as NGO's and other government agencies. Government officials also regularly attend meetings and conferences to increase their own knowledge of seismic risk and DRR. These networks that are created through seminars, meetings, and conferences are an outlet for the government to learn as well as to share information with other community organizations, other governments, as well as the public.

To increase the public's knowledge of risk and DRR, the local government in Antakya has held parades in the city focusing on EQ preparedness and safety. Another awareness tool directed towards students is a movie about earthquakes, which, as Assistant Deputy Governor of Hatay, Kadim Dogan claims "keep this issue a hot subject on the minds of students." In addition to attempting to reach the general public, the government in Antakya also reaches out to "special needs" populations, such as the elderly and the local prison population.

The government is also responsible for providing EQ risk and DRR information to the primary, middle schools, and high schools. This information reaches approximately

70,000 students, who then, ostensibly, take this information home and share it with their family. In Antakya, DRR government officials go classroom by classroom to talk with the students face-to-face. Schools also participate in a seismic evacuation drill after a government DRR official has been to all of the classrooms.

Because of the increase in the population in the city center, many construction sites (both legal and illegal) have emerged in the past decade. Most of these buildings do not implement the seismic safety code regulations and, therefore, even newer buildings are not resistant to earthquakes. The local government, in coordination with the local university, seeks out these 'squatter' settlements and encourages people to take precautionary measures to increase the resilience of their building by constructing (or retrofitting) according to seismic building regulations.

According the law and regulation on 'The Preservation of Deteriorated Historic and Cultural Immovable Properties by Rehabilitation and Renovation" (effectual in 2005), municipalities have been given primary authority to transform old cities. The foundation of this law is to incentivize moving from the older more developed city center to newer construction sites outside the city that are less vulnerable (Debold-Kritter et al. 2006/2007). This law gives municipalities across Turkey the power to remove residents from their current residential buildings and to provide them with a parcel or alternative place to live outside the old city, where newer buildings are built to code, therefore reducing their vulnerability. Though multiple types of incentives are offered, the government does not have the power to dictate where individuals build their new homes once there are removed from their old homes.

> *Let's say you have a building, it's not according to the rules and regulations, you cannot do construction, it's risky, let's say, in the center of the city. The government will give you, let's say, buy your place and give you another place outside the city or some other place where it's more stable to building your own building.* Kadim Dogan, Assistant Deputy Governor of Hatay

In addition to relocating thousands of people, the city of Antakya wants to restore old historic buildings in the city center back to their original designs, but with earthquake safety regulations and practices in mind. Antakya is an old and historic city where many historical structures have not been discovered or explored. The officials whom I interviewed emphasized that the government has an obligation to maintain the cultural memory of their city, through protecting and preserving these historical sites.

As in Istanbul, urban transformation and development is the responsibility of the local government in Antakya. Even though they have made progress, Dogan says that not enough has been done. Additionally, residents have confronted officials with indignation. Residents have no desire to move and uproot their lives, regardless of the risk. In one instance, described by Dogan, a professor from the Middle Eastern Technical University came to Antakya, went door to door, and convinced residents living in one particularly dangerous building that retrofitting would not require them to leave their homes and that there would be minimal interference from construction. After the truth of the situation was clear to the residents, their concern about their risk and the safety of their building became their first priority. It is notable that the local government, in this case, employed a trusted academic to interact with the people living at risk. Rather than the government telling the building residents what to do, the professor shared risk assessment information and gave the building residents vital information regarding the building retrofit. Rather than

exercising authority and instilling fear into their citizens, the local government provided them with information and instilled a sense of responsibility. The government officials emphasized repeatedly that this has proven to be an effective means of implementing DRR; not through fear, but through instilling a sense of commitment and responsibility to their community that can be exercised through the improvement and strengthening of their local buildings.

Local government officials collaborate with universities both in and outside of Turkey and they provide support for NGO's working at reducing risk in their community. Kandilli Observatory, historical city organizations, and Mustafa Kemal University also provide DRR support for the municipality of Antakya. However, because there are two different 'departments' of government in Antakya (governorship and municipality), there is a misjudgment in needed resources, personnel, and data. For example, governorships are not responsible for the development of the urban layout and land use plan. Municipalities are responsible for these development plans while governorships are in charge of verifying and updating the ground survey reports. From these ground survey reports, the governorship is in charge of regulating where buildings can and cannot be built. Governorships are also responsible for the creation of land use planning regulations. Dogan noted that both 'departments' of government are keen to work together on DRR, but regulations often hinder the process.

Governorships— a body of federal government appointed officials—are particularly restricted when it comes to decision-making. The public can ask the governorship whether or not they should retrofit or strengthen their buildings. But the governorships are not responsible for and do not have the authority to physically do the retrofit of public

buildings. Private sector engineering companies are tasked with retrofitting, while the engineers at the governorship need an invitation to test the resilience of existing buildings from the owner and/or occupants. The governorship respondents also claimed that they do not communicate EQ risk and DRR to the public, and that the municipality has taken on that responsibility. This is a barrier to EQRR because two forms of government that dictate similar processes at the local level do not consistently cooperate with one another.

The structure of the municipalities in this region also presents a barrier to DRR progress. Currently, the municipality of Antakya can only work in 40 different sites. There are 17 other smaller municipalities around Antakya where the municipality of Antakya has no authority. Essentially, this means that there is the primary authority and 17 additional different authorities; each drafting their own plans, with their own priorities, for the same resources in the same at-risk region. A new law is being drafted to combine these municipalities into one, cohesive, metropolitan municipality. Dogan explains that it will be easier to deal with these types of land use issues when the municipalities are capable of working as one and have a centralized mechanism for collaboration and coordination.

The time lapse between a tragic event and the present has also become an issue with regards to DRR awareness and implementation in Antakya.

> *Unfortunately, in Turkey, people react instantly to things and they forget about it. No matter what we do on a local level or a national government level, we cannot bring the people to the same level of awareness in Japan. People go about their daily life and they forget and when they do their buildings, construct them, they don't obey regulations.* Kadim Dogan, Assistant Deputy Governor of Hatay

Business

I could only obtain one interview with a for-profit organization in Antakya. This will influence my ability to determine how businesses engage in DRR in Antakya. This can be attributed to the significantly small population in Antakya, a lack of private enterprises engaged in DRR in Antakya, or explains the constant state of unpreparedness and the lack of DRR capacity in the city.

For-profit organizations are a primary resource engaged by local government officials in Antakya during construction management and oversight. Businesses work with or are often hired by local government in order to create, maintain, and promote DRR throughout the community. While the government creates and sometimes enforces building regulations and codes, they have placed the responsibility of quality control and oversight of building materials in the hands of private enterprises. For example, the Sigma Engineering Laboratory tests the quality of construction materials for new buildings as well as the materials used in older buildings. According to Hakan Uslu, the Ministry of Industry primarily, but indirectly, dictates his business model. They enter construction sites, collect materials, test materials, and then make recommendations to the contractor according to their findings. His business, the Sigma Engineering Laboratory works under the control of the Ministry of Industry although they also provide oversight and quality control for the government. These are shared responsibilities as the government is in charge of creating rules while businesses are to make sure the rules are enforced. The government, however, executes penalties and punishments.

Business owners regularly attend meetings or public seminars where they provide DRR information, which often coincides with the products and services offered by

businesses. In this case, DRR promotes their business while their business promotes DRR. Depending on their mission, businesses can also make people conscious of their risk, the quality of their buildings, as well as the things they can do reduce their individual risk. For example, brochures handed out at meetings and seminars give information about the proper way to mix, pour, and harden concrete.

In Antakya, the business sector is widely trusted by the community and by the Ministry of Industry. Yet, prior to 2002, buildings materials and the types of oversight for the building materials were less than adequate. Civil engineers, aware of this issue, contacted and discussed their issue with the Minister of Industry.

> *Lots of time he tell[s] the Minister of Industry, "OK, come up and see this type of market, this type of materials. They are weak. You have to do something about it." Lots of time he told him, and he did – He accomplished…[translator referring to Uslu] Now 3% only, not according to standards… Before 45%, now 3%."* Hakan Uslu, Civil Engineer and Owner of Sigma Engineering Laboratory

The above quote represents just one example of the power and authority that for-profit organizations and private sector individuals have not only on the government but also with regards to DRR. They have a knowledge base and the ability to influence the market and community. They also have the power to guide, improve, and change building materials, design, and plans. Contacting the owners of a building under construction and explaining the quality of the building materials has proved effective in terms of improving building standards. Still, many are wary, as these are private enterprises, whose primary goal is to make a profit. More influential are the penalties and punishments that are now enforced post-2002, should building standards and codes not be met. Also, Uslu explains that the network of contractors, building owners, engineers, and designers communicate

with each other. Now, if a contractor is known to sell inadequate materials, they will soon have a bad reputation and lose business.

The Ministry of Industry worry about the quality of industry and its products. Even though contractors, engineers, building owners and designers are mandated to obey national building code regulations. Before 2002, Uslu claimed that not only the building materials, but the oversight mechanisms of the quality of building materials, did not exist to the extent that was compliable with the national building code regulations.

> *The problem is in the regulation it is written, but the problem is the merchants. They don't follow these regulations. He [translator is referring to Uslu] thinks that because there is no control of quality.* Hakan Uslu, Civil Engineer and Owner of Sigma Engineering Laboratory

Another interesting aspect about for-profit organizations is that they tend not to trust the public's capacity to know the importance of good building materials. The interviewees in this study emphasized that they trust science as well as their own experience. Their experience and knowledge base often informs not only how they run their businesses but also how they promote DRR information. Interviewees also reported that they trust professors and academics for up-to-date information. Online organizations that provide materials and updated information, often ones that cost money to obtain access to, are also readily available to businesses since they are using their own profits in order to pay for this up-to-date, trustworthy, relevant information.

> *Between my experience[s], I compare to it and I'm thinking… If it is scientific things, I believe it. If it isn't, I don't believe it. I don't care who did it, who give this information, I don't care, but if its scientific things, I believe it. I trust it.* Hakan Uslu, Civil Engineer and Owner of Sigma Engineering Laboratory

Uslu also explains how he wishes that quality building materials as well as other EQRR activities were more dynamic. This will not only enhance their business's continuity capacity, but can increase DRR in the community, which in turn can increase profits.

Education

As stated in Chapter 5, the Turkish government subsidizes education at all levels and enforces attendance at primary and secondary schools, which accounts for 8 years of education. Due to the insufficient number of higher education institutions, only a select few of the candidates for college actually get to attend. For example, there is only one university, Mustafa Kemal University, in the entire province of Hatay while there are approximately 32 primary schools.

Education in Antakya is heavily influenced and run by the Antakya Provincial Education Directorate. This regional government department is a part of the National Education Directorate, which is very closely governed by the Ministry of Education in Ankara. The federal government determines and guides the types of DRR strategies and mechanisms that are disseminated to the public through the public school system. The Ministry of Education maintains primary authority because they provide the funding for structural and non-structural mitigation activities in schools as well as educational resources and materials that teachers and students use.

Each locale is dependent upon the provincial, and by extension, the federal government, for provisions including funds for school retrofits, training materials for students and teachers, civil defense experts, as well as the types of information given to the

teachers and students. The local education directorate in Samandag, a town in Antakya, has a strong trust of the knowledge and materials given to them by the government of Antakya. Zeki Huzmeli, the branch manager of the Samandag Education directorate proclaims, "We trust the governorship of Antakya, so [if] these documents are sent by the government of Antakya, so I trust them." The governorship of Antakya sends schools documents, videos, and presentations already produced by civil defense experts and the Ministry of Education. The provinces trust the Kandilli Observatory as well and "if they see it's written 'Kandilli Observatory', they trust." All training and information documents are available online as well. Teachers use these materials to inform their DRR practices. The messages that are most often sent to students and teachers through these government produced materials include: how to protect themselves against a plethora of natural disasters; what to do when an earthquake occurs; how to prepare for an earthquake that has not yet happened; and the most effective way to respond to the seismic event as well as how to evacuate their school premises.

The branch manager of the Samandag Education Directorate in Antakya explains that the risk reduction activities in the schools are divided into two types of DRR strategies. First, they consider the physical safety of the school's infrastructure. The provincial government in Antakya has retrofitted approximately 45 school buildings in the city and they have plans to continue to retrofit any existing educational structure that does not comply with current earthquake building regulations. Second, they work towards increasing the awareness and preparedness capacity of students and teachers. These two types of DRR strategies are defined in a five-year plan designed by the Antakya Provincial Education Directorate. Despite the barrier that lack of funds presents, these five-year plans

allow the provincial education department to prioritize DRR activities. Of the two types of activities that the educational directorates in Antakya engage in, Huzmeli explains, "education is more important. Because he [translator is referring to Huzmeli] thinks that the buildings don't kill the people, but if people don't get these information, they are killed."

Most often, the provincial government uses civil defense experts to talk with, inform, and train the teachers. The teachers are then responsible for how this DRR material is disseminated to the students. Teachers organize classroom response and evacuation routines, practice response techniques, and are required to provide a report to the provincial government about their experiences with DRR in the classroom. Additionally, teachers are responsible for civil defense clubs that are designed directly to target the students and improve the response, rescue, and evacuation strategies. Provincial experts also provide the plans and sometimes execute practice exercises with regards to how to respond to a seismic event. Experts of civil defense are directly involved with school earthquake preparedness programs and practices on Civil Defense Day, February 28th and throughout the week of March 1st – March 7th each year.

Overall, education in Turkey is strongly paternalistic. The national government has complete control of DRR in the schools. However, the national government is dependent upon an educational institution, KOERI, for their educational materials, knowledge, and seismic data. This supplements the two-fold, top-down/bottom-up approach the government in Turkey takes as they support educational institutions engaging in DRR. Also, at the national level, the DRR standards are broad. They allow the provincial governments their own devices and give plenty of allowance for the provinces to tailor DRR in schools to their specific regional risk and risk perception.

Grassroots Organizations

The grassroots community in Antakya is significantly smaller than the one in Istanbul. However, the small number of grassroots organizations is relatively proportional to the population. There is no exact report on the number of grassroots organizations within Antakya. Still, these organizations are funded by governments, private investors, donations, and contributions and are run primarily by volunteers.

Grassroots organizations in Antakya act as educators of the community. They hold presentations, seminars, and workshops for the public as well as for different types of professionals. They provide information about Turkey's seismic risk, present information specific to Antakya, and most importantly, explain the best ways to prepare, mitigate, and respond to an earthquake. Grassroots organizations can reach out to all corners of a community and are therefore imperative when expanding risk awareness and possible DRR strategies among the public.

Grassroots organizations act as community educators by increasing their awareness of risk, emphasizing the importance of mitigation, and teaching proper response techniques. Prior to 1992 and the establishment of Mustafa Kemal University, grassroots groups in Antakya coordinated their efforts and focused on the social issues surrounding EQ risk. It was not until the mid-1990's that grassroots organizations in Antakya started to focus their efforts on projects geared towards the structural aspects of DRR. Following the Kocaeli quake, despite their distance from the epicenter, the network of grassroots organizations in Antakya realized that one of the primary issues that needed to be addressed in their city was the lack of enforcement of building regulations. Now the Chamber of Civil Engineering, a non-profit dedicated to reducing the seismic risk of their

community, along with the local government, participates in the Seramar Project where members of the Chamber compare the structural integrity of old and new buildings in Antakya. They provide their findings as well as their recommendations for action to the local government to try to spur change and more stringent building codes.

Although their work is focused on projects whose aim is to strength the building stock of the community, grassroots organizations still work with the public to actively engage and normalize the want for DRR.

> *They inform people by presentations and also professors, they have lots of experiences about it, and also professors help them to inform people… These presentations give information to the people like what they should do during the earthquakes, also before the earthquake and after the earthquake and also if their buildings are old, [they request the resident to] please move to new buildings, which are built according to the regulations.* Murat Alkaya, Assistant Director of Hatay Chamber of Geological Engineering

The active involvement of grassroots organizations with the entire community requires their knowledge to be translated in a variety of ways so a variety of people are able to understand and use the information. Alkaya says "They give non-scientific engineering programs to the ordinary people…" These community organizations are also of the opinion that children are not aware of their risk, how to mitigate and prepare, as well as what to do when a seismic event does occur. Despite this recognition, their target population is the community-at-large, while schools primary target population is the regions youth.

In Antakya, grassroots organizations work closely with the Kandilli Observatory as well as Istanbul Technical University and Eastern Technical University in Ankara.

Financially, non-profits in Antakya are supported by the Ministry of Public Works and Settlements through the Governorship of Hatay. Unfortunately, interviewees representing this sector reported that these funds are not sufficient for multiple grassroots organizations to work effectively towards a comprehensive regional approach to DRR.

Interestingly, the representatives from the grassroots organizations were the only respondents who spoke of seismic risk as a national issue with regional differences. They are aware that while the North Anatolian fault zone affects Istanbul, the province where Antakya is located, Hatay, is on the Eastern Anatolian fault zone. Therefore, different methods of engineering structures and regional infrastructures are required. Another grassroots organization, the Hatay Chamber of Geological Engineering, reports very different findings of soil and ground water reports when compared with soil and ground water reports in Istanbul. This results in different types of geologically safe locations in which to build structures. Grassroots organizations are hyperaware of these differences and continuously strive to tailor DRR to their regional characteristics. It is important to note that these organizations are not troubled with the demographic differences between regions, yet. They are focused, primarily on the unique geography and hazards profile of each region of the country.

Healthcare

Healthcare is subsidized by the national government, even though there has been a push in recent years for an increase in private healthcare facilities in order to make healthcare available to more people. Approximately 80-90% of all Turks have healthcare coverage through the national pension system. However, due to the low quality of care,

private medical facilities are often preferred. There are three hospitals in Antakya, two private and one public. They are all equipped with emergency plans, but these plans are for all natural disasters, not just earthquakes.

As in Istanbul, the healthcare institutions in Antakya are the least connected to the other community institutions in terms of collaborative DRR work. Interestingly, Dr. Alaattin Ozturk explained that he would like DRR information provided to him through the same networks and in the same means as the public receives DRR information. The reasoning behind this preference is not clear. Potential speculations can be made to whether this is because the healthcare sector in Antakya is wantonly trying to remain distant from other DRR institutions and sharing in a DRR dialogue or because this type of information is the most effective way for the healthcare sector in Antakya to participate in the DRR dialogue. Unlike the other four DRR community institutions, the healthcare sector in Antakya has a one-way relationship with providers of knowledge, such as the Kandilli Observatory.

In Antakya, the healthcare representatives emphasized that to date, their primary focus has been on effective emergency response. Dr. Ozturk noted that there have been minimal DRR measures within hospitals in Antakya, but again, most of the focus has been on preparing for emergency response services. Similar to the education system throughout Antakya, the healthcare sector is a paternalistic community institution; highly dependent on the national government and the Minister of Health for the information and knowledge they use to prepare for a disaster.

> *The Minister of Health sent them documents about how they overcome natural disaster and just people who are responsible for the preparedness of natural disaster such as earthquake and they take these documents from the Ankara Health Directorate."* Dr. Alaattin Ozturk, Director of Emergency Services

Still, the ambulance services in Antakya execute practices and mock scenarios in order to stay prepared. First responders are educated by the federal government and are constantly tested on their preparedness skills and capacities by their jobs and experiences. Dr. Ozturk stated that practices and mock scenarios were few since they consider their everyday on-the-job experiences as sufficient practice. Dr. Ozturk also claims that the capacity of the ambulance services combined with the hospitals will not be sufficient to reach and assist all of those injured during a seismic event.

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In the conclusion chapter, I will return to the strengths and barriers across the five community institutions in Antakya. I will discuss the implications of what I found throughout the interviews and the survey questionnaire. Through the strengths and barriers present in the creation and implementation of DRR practices in Antakya, I hope to further an understanding of how community institutions engage in DRR and how this contributes to the establishment of a culture of resilience in Turkey.

CHAPTER 6: QUANTITATIVE SURVEY ANALYSIS

This chapter offers a summary of the findings from the survey questionnaire distributed at the end of each of the in-depth interviews. The purpose of the survey was to collect quantitative information regarding barriers to disaster risk reduction (DRR) implementation and professional resource needs (see Appendix E for complete survey questionnaire).

Barriers to DRR Implementation

I interviewed many exceptionally talented earthquake safety practitioners who want to reduce risk in their communities but are repeatedly stymied by obstacles to action. Understanding those barriers provides a different perspective from which to analyze DRR engagement, and they should not be characterized as ignorance or lack of access.

> "[Barriers are] shaped by a complex and interconnected array of social, cultural, historical, and economic forces. In addition… knowledge does not always lead directly to action… the knowledge-to-action process involves developing and providing access to new technologies and resources, persuading potential users to adopt the new technology, and acknowledging and overcoming barriers to adoption. Understanding barriers is thus particularly important, because it helps to explain why even knowledgeable individuals and/or well-resourced organizations may be unable or unwilling to adopt and use a particular technology" (Peek et al. 2012).

Potential barrier items drawn from a review of empirical research literature regarding obstacles to accomplishing effective DRR activities were included in the survey. Specifically, the survey asked participants to specify whether the following nine items were

a ‘minor barrier’, ‘major barrier’, or ‘not a barrier’ in their professional risk reduction activities.

- Lack of money;
- Lack of time to dedicate to such activities;
- Lack of personnel available to work on such activities;
- Lack of technical expertise;
- Lack of earthquake information;
- Other, more urgent, social or economic problems;
- Other, more serious hazards;
- Lack of interest in earthquake hazards among colleagues;
- Lack of interest in earthquake hazards among the public.

Table 6.1 summarizes and color-codes barrier response counts and percentages, by city, and for each of the nine barrier items on the survey. By adding the number of respondents in each city that claimed a variable as ‘not a barrier’, ‘minor barrier’, or ‘major barrier’, I was able to calculate 1) the percentage of the respondents that did not see the variable as a barrier, or it was not present in their institutions; 2) the percentage of respondents that considered the barrier minor in DRR implementation; 3) the percentage of respondents that considered the barrier to be a major hindrance to DRR. Table 6.1 is organized as follows. The two target cities are listed across the top row of the table, while the nine barrier items assessed in the survey are listed along the far left column. When read *horizontally*, the table’s numerical data show how many respondents in each city ranked a variable as ‘not a barrier’, a ‘minor barrier’, or a ‘major barrier’. When read *vertically*, the table’s data depicts how respondents from the two case study cities of Istanbul and Antakya responded to each of the nine survey items.

Table 6.1. Barrier Response Counts and Percentages by City

	Istanbul			Antakya		
Barrier Item	Not a barrier	Minor barrier	Major barrier	Not a barrier	Minor barrier	Major barrier
Money	3 30%	3 30%	4 40%	2 22%	2 22%	5 56%
Other soc/econ problems	1 11%	4 44%	4 44%	3 33%	1 11%	5 56%
Lack of available personnel	1 10%	3 30%	6 60%	2 22%	2 22%	5 56%
Lack of technical expertise	6 60%	1 10%	3 30%	2 22%	1 11%	6 67%
Public lack of interest	0 0%	1 10%	9 90%	2 22%	3 33%	4 44%
Lack of earthquake info	5 56%	0 0%	4 44%	3 33%	3 33%	3 33%
Other serious hazards	3 33%	3 33%	3 33%	3 38%	3 38%	2 25%
Time	6 67%	2 22%	1 11%	3 33%	3 33%	3 33%
Colleagues lack interest	4 40%	1 10%	5 50%	3 33%	4 44%	2 22%
Total	29 34%	18 21%	39 45%	23 29%	22 28%	35 44%

White: Low barrier, where 55% or fewer respondents indicated that the item is either a minor or major barrier	Yellow: Moderate barrier, where 56-69% of respondents indicated that the item is either a minor or major barrier.	Orange: High barrier, where 70-85% of respondents indicated that the item is either a minor or major barrier.	Red: Extreme barrier where 86-100% of respondents indicated that the item is either a minor or major barrier

After analyzing the survey data by each item, I calculated an *overall barrier percent score* by adding the minor and major barrier percentages from the total column in Table 6.1. Istanbul has a minor barrier percent score of 21% and a major barrier percent score of 45%, which yields an overall barrier percent score of 66%. Antakya has a minor barrier percent score of 28% and a major barrier percent score of 44%, yielding an overall barrier percent score of 72%.

Interestingly, the two cities looked similar in terms of the absolute number of minor and major barriers that were expressed. Respondents from Istanbul expressed more extreme barriers and more low barriers, while Antakya respondents fell in the moderate or high range for all nine items. But again, the overall scores for the two cities looked very similar, which is interesting given the other differences between the cities in terms of population size, economic well-being, primary available services, and recency of earthquake experience. Below, I offer a more specific discussion of the barrier items, by city.

Istanbul

Of the nine survey items, respondents from Istanbul indicated that three of the items represented extreme barriers to DRR, one was a high barrier, two were moderate barriers, and three were low barriers. *Extreme:* other social/economic problems, lack of available personnel, and lack of public interest in DRR; *High:* Money; *Moderate:* Other serious hazards present and colleagues lack of interest; *Low:* lack of technical expertise, lack of earthquake information, and time.

The in-depth interviews helped illuminate these survey findings. For example, in Istanbul, 88% of respondents said that other pressing social and economic problems that detract from DRR activities represent either a minor or major barrier to action. Turkey's strong desire and prolonged efforts to join the EU often takes attention away from many social and economic problems, including the necessity for DRR. Even so, Turkey also has pressing social and economic issues that require more urgent attention than DRR strategies. For example, the rate of population growth has increased to the point where illegal squatter settlements, dangerous even in areas where there is no risk for seismic

activity, diminish the safety as well as the standard of living within communities in and surrounding Istanbul. Also, jobs become harder to find as more people try to fill the same space. Unfortunately, these other social and economic problems diminish the awareness of earthquake risk as well as the on-going need for DRR.

The majority of respondents (90%) in Istanbul indicated that the lack of available personnel to execute DRR strategies and mechanisms represents a minor or major barrier to action. This influences the number of DRR advocates present in the community, adding to the ability (or inability) of the community to foster a culture of resilience.

All of the respondents (100%) in Istanbul indicated that lack of public interest is a major or minor barrier to DRR. The respondents proclaimed that many people are not readily aware of their risk. They know about the probability of seismic activity in Istanbul, but as a precipitating event (e.g., the 1999 Kocaeli earthquake) drifts more and more into the past, so does their awareness and their desire to mitigate and prepare for another event. Interviewees also stated that even within their own organizations, the priority to address earthquake risk has weakened, as their organizations are required to address other pressing and more current issues.

Money, or lack thereof, presents a high barrier to the implementation of DRR in Istanbul as well. The survey indicated that 70% of survey respondents in Istanbul reported lack of funding as a major or minor barrier to DRR action. Again, other social and economic issues decrease not only the awareness of risk and DRR, but also the amount of funding available for DRR.

The three barriers that the fewest respondents reported as being barriers to DRR were lack of earthquake information (44%), lack of technical expertise (40%), and time

(33%). It is still notable that between one-third and nearly one half of respondents from Istanbul saw these items as minor or major barriers to DRR.

Antakya

In Antakya, respondents ranked none of the nine items as *extreme* barriers. Four *high* barriers were indicated on the survey: between 77-78% of all respondents indicated that money, lack of available personnel, lack of technical expertise, and lack of public interest were either minor or major barriers. The remaining five barrier items were ranked as *moderate* barriers to DRR: other social/economic problems, lack of earthquake information, other serious hazards, time, and colleagues lack of interest in risk/DRR. Between 63-67% of all survey respondents in Antakya reported that these items were barriers to DRR action.

The survey revealed that 78% of the interviewees in Antakya reported money as being a barrier to DRR. Turkey's desire to enter into the EU often dictates the flow of money throughout the nation. Antakya's demographic does not always register first on the national radar since mega cities, such as Istanbul, or the capital, Ankara, tend to take financial precedence. DRR tools and activities are not *directly* related to increasing or enhancing Turkish economic strength, and therefore, funding is often not as robust as most community institutions would need. DRR tools are not always considered *directly* related to strengthening a community as small as Antakya.

Over three-quarters (77%) of respondents reported lack of public interest as a DRR barrier. In Antakya, it has been 14 years since a major earthquake happened. The interviews revealed that respondents felt the length of time that has passed, combined with other challenges, has diminished public interest in DRR.

Lack of available personnel who can execute methods of DRR weakens the ability of DRR advocates and leaders to foster a culture of resilience, even during the most propitious of times. Lack of technical expertise stifles not only the creation of a culture of resilience, but it also greatly affects how community institutions are able (or not able) to interact with methods of DRR. A majority of Antakya's DRR champions are a result of a national decree or mandate by a national ministry. The strong paternalistic structure of Turkey as a nation has a detrimental effect on smaller communities, like Antakya, to exercise DRR on their own regional terms. Paternalism throughout Turkish social organization "gives assurances to the people that the all-powerful state will eventually replace all lost property, rebuild every shop, and rehabilitate affected economic investments through low-interest loans, debt annulments, and free credits" (Ergunay et al. 2012, 2). The inherent characteristics of this social organization hinder the small community of Antakya from taking on the responsibility of their own local risk. A majority of survey respondents in Antakya (77%) agreed that lack of available personnel and lack of technical expertise stifles DRR.

Two-thirds, or 66%, of all respondents in Antakya reported lack of earthquake information, lack of colleague's interest, and time as minor or major barriers to DRR action. Without the proper data and up-to-date knowledge about earthquakes, creation of DRR is stifled, which in return completely stalemates DRR implementation. Although DRR leaders in Antakya have access to general earthquake information, it is not specific enough to the region. The city requires DRR leaders to advocate for more data on more DRR variables in order to successfully assess as well as address their risk.

Additionally, lack of colleague's interest in either risk or DRR proved to be a barrier. Local DRR advocates are often given the responsibility of a handling a variety of regional or

local disasters. For example, in 2011, thousands of Syrian refugees had fled to the outskirts of Antakya to escape the Arab Spring in Syria. A lack of interest among those who participate in the organization can have an effect on how the organization interacts with DRR. Also, the time available to professionals to dedicate to such actions can be limited when individuals and their colleagues are working on multiple projects at once.

Other social and/or economic problems were reported by 67% of the respondents in Antakya as major or minor barriers to DRR action. In 2011, with Antakya's close proximity to the large Kurdish population of Turkey as well as to the Middle East, the news often hits closer to home. Their climate and limited access to proper medical care also poses health threats to the small population as it is dry, arid, and not as close to the Mediterranean Sea as Istanbul. Also, priorities of organizations and individuals change often, despite their desire to create, implement, and maintain DRR practices within their community.

The final barrier measured as *moderate* is the presence of other hazards. Earthquakes trigger many of the hazards in Turkey, but some hazards result from other natural phenomena. Turkey is a vast nation, and crises are dealt with nationwide regardless of the cause. Accordingly, 64% of Antakya's respondents identified other hazards as being a barrier to DRR creation and implementation.

Resources Needed to Implement DRR

Identifying the *needs* of DRR advocates, users, and leaders is critical to promoting social change. Unfortunately, all too often resource needs are not matched with resource supplies, as has been argued elsewhere: "Disaster risk reduction communications have often been *supply driven* (what experts think others should know) rather than *demand driven* (what affected people want and think they need). The assumption on the part of experts tends to be that 'we' already know what 'they' need" (Petal 2007). Consequently, a great gap has formed between what decision-makers and end users say they want from science and technology, and what science and technology are offering to decision-makers. Fortunately, this gap is can be sealed by engaging in dialogue and needs assessments across the science-users divide in order to begin to build bridges between DRR users and the scientific community. The survey items on resource needs were meant to help assess what end users say they need in order to most effectively implement DRR. The survey included the following 21 items, which respondents said whether they 'don't need', 'have', or 'would like to have'.

- Projected ground shaking intensity in an earthquake;
- Maps of earthquake fault lines in the community;
- Maps of potential earthquake-induced landslides or tsunamis in the community;
- Projected number of deaths in an earthquake;
- Projected number of injuries in an earthquake;
- Projected impacts on different population groups (such as elderly, homeless, etc.) in an earthquake;
- Projected damage to housing in an earthquake;
- Projected damage to schools in an earthquake;
- Projected damage to businesses in an earthquake;

- Projected damage to hospitals in an earthquake;
- Projected damage to roads, bridges, and other infrastructure in an earthquake;
- Projected damage to electricity, gas, and water delivery systems in an earthquake;
- Projected damage to mobile phone networks in an earthquake;
- Projected damage to Internet networks in an earthquake;
- Projected economic losses in an earthquake;
- Information about how individuals and facilities can prepare for earthquakes;
- Information about how organizations can prepare for earthquakes;
- Information about how to fasten contents of buildings so that they will not fall during earthquakes;
- Information about how to strengthen buildings so that they will not collapse during earthquakes;
- Access to technical experts who can identify and explain earthquake risk;
- Access to technical experts who can help individuals or organizations prepare for earthquakes.

The survey results for the resource needs items are presented in Table 6.2, which is organized as follows. First, the 21 survey resource items are listed in the left column in descending order, such that the item at the top of the table (projected damage to Internet networks) represents the most commonly cited resource that respondents would like to have access to, and the last item (family preparedness) represents the least commonly cited resource that respondents would like to have. Second, the two target cities are listed across the top row of the table.

To read Table 6.2, start by referring to the far-left column. This column includes a cell for each of the 21 survey resource items. When read *horizontally*, the numerical data in the table shows how many respondents, in each city, ranked an item as 'have' or 'would like

to have'. When read *vertically*, the data displays how respondents in each city categorized each of the 21 survey resource items.

One additional point of clarification regarding the data is presented below: the fact that a respondent did not mark an item as 'would like to have' does not mean that the item is unimportant to the person in his or her professional work. The questions that the team asked of respondents following their completion of the survey revealed that in most cases, when a respondent did not mark a resource as 'would like to have', that person already had access to the item.

Table 6.2: Resource Needs Response Counts and Percentages by City				
Resource Item	**Istanbul**		**Antakya**	
	Have	Would like	Have	Would like
Internet Damage	3 30%	7 70%	2 25%	6 75%
Mobile Damage	4 40%	6 60%	2 22%	7 78%
Business Damage	6 67%	3 33%	2 25%	6 75%
Differential Impacts	5 56%	4 44%	3 38%	5 62%
Road Damage	6 60%	4 40%	2 22%	7 78%
Utility Damage	6 60%	4 40%	3 38%	5 62%
Economic Losses	8 80%	2 20%	2 25%	6 75%
Projected Deaths	7 78%	2 22%	3 33%	6 75%
Projected Injuries	7 78%	2 22%	3 33%	6 67%
Hospital Damage	6 67%	3 33%	3 38%	5 62%
School Damage	7 70%	3 30%	3 33%	6 67%
Landslide or Tsunami Maps	5 56%	4 44%	2 25%	6 75%
Housing Damage	6 60%	4 40%	4 44%	5 56%
Risk Experts	6 60%	4 40%	4 44%	5 56%
Building Contents	4 50%	4 50%	5 56%	4 44%
Preparedness Experts	6 60%	4 40%	5 56%	4 44%
Strengthen Buildings	7 78%	2 22%	4 44%	5 56%
Organization Preparedness	9 90%	1 10%	3 33%	6 67%
Maps of Fault Lines	8 80%	2 20%	8 89%	1 11%
Ground Shaking	7 78%	2 22%	5 56%	4 44%
Family Preparedness	8 89%	1 11%	5 56%	4 44%
Total	131 66%	68 34%	73 40%	109 60%

White: Low resource deficiency, where 40% or fewer of the respondents indicated they would like to have access to state item.	Yellow: Moderate resource deficiency, where 41-69% of respondents indicated they would like to have access to state item.	Orange: High resource deficiency, where 70-89% of respondents indicated they would like to have access to stated item.	Red: Extreme resource deficiency, where 90-100% of respondents indicated they would like to have access to stated item

I calculated an overall resource needs percent score for each city by adding together the total number of 'already have' responses and comparing the results to the total number of 'would like to have' responses. Just over one-third (34%) of the respondents from Istanbul and nearly two-thirds (60%) of respondents from Antakya, across all 21 survey items, reported that they would like to have access to the resources listed in the survey. Comparatively, respondents from Istanbul reported far fewer resource needs than those in Antakya.

Istanbul

The main resource needed was information regarding what damage would be caused to the Internet during a seismic event. A substantial number of respondents, 70%, reported that they 'would like to have' access to how the Internet would be affected following an earthquake.

The three resources that Istanbul respondents reported being moderately deficient in (41-69% of respondents said they would like to have access to the resource) are information regarding damage to mobile/cell communications, differential impacts that a seismic event could have on the city/between districts, and how the contents of buildings would fair in an earthquake. This type of information is highly specific, and therefore could be a result of the lack of available personnel (60% reported this as a major barrier) or a lack of technical expertise in Istanbul (30% reported this as a major barrier).

Antakya

Respondents in Antakya reported a higher number of resources needed including: information on damage to the Internet (75% reported that they 'would like to have' access to this resource), information on damage to telephone lines/mobile lines (78% reported

that they 'would like to have' access to this resource), information on damage to businesses (75% reported that they 'would like to have' access to this resource), information on damage to the road/transportation infrastructure (78% reported that they 'would like to have' access to this resource), an estimation to the economic losses that would occur (75% reported that they 'would like to have' access to this resource), and maps on landslides and tsunamis (75% reported that they 'would like to have' access to this resource). These six resources are the primary resources that respondents wanted to have access to either because they do not have access to this type of information at present or because the types of data they receive and use now are not sufficient.

Respondents in Antakya reported 14 additional resources that they would like to have access to: differential impacts (62%), utility damage (62%), projected deaths (67%), projected injuries (68%), damage to hospitals/healthcare facilities (62%), damage to schools (67%), damage to housing (56%), access to risk experts (56%), earthquake effects on building contents (44%), access to preparedness experts (44%), information about how to strengthen buildings against seismic activity (56%), modes of organizational preparedness (67%), range of ground shaking (44%), and family preparedness information (44%).

It is important to note that while in the same nation, Istanbul and Antakya have different capacities to cope with their risk. The community institutions in each city also engage and interact with DRR in different ways because their access to DRR resources differs. This also influences the ability as well as the ways in which each community fosters a culture of resilience and integrates DRR rhetoric within the community. This understanding augments the notion that disasters and DRR cannot and should not be

considered in a fully national capacity. It is imperative to look at risk as a local, regional, national, *and* international component in order to understand how different types of communities interact and engage in DRR as well as how they cultivate a culture of resilience.

CHAPTER 7: CONCLUSION

Turkey has the unfortunate distinction of being both one of the most seismically prone, and most populous, nations in the world. With Turkey's rapid population growth and the settlement of more people in more hazardous regions, its' cities, and especially Istanbul, has been ranked to have the 6th highest seismic risk in the world according to the Earthquake Disaster Risk Index (Davidson et al. 1997).

In order to reduce the nation's risk of disaster and increase their capacity to cope with an event, different community institutions throughout Turkey exercise disaster risk reduction (DRR) mechanisms and methods. The social, economic, cultural, and geological differences throughout the nation led me to want to explore how two different cities—Istanbul and Antakya—are working to reduce their risk. Using qualitative interviews, a survey questionnaire, and follow-up questions to the questionnaire, I explored how five key community institutions—government, business, education, healthcare, and grassroots organizations—structure, organize, and encourage DRR practices in Istanbul and Antakya. The result of this exploration is a better understanding of how these community institutions in Turkey attempt to foster a culture of resilience in a region marked by extreme seismic risk.

In the conclusion to this thesis, I will clarify how each individual community institution – government, business, education, healthcare, grassroots – (using the qualitative interviews, survey questionnaire, and the survey's follow-up questions) engages in DRR. This involves understanding the primary themes found throughout the interviews as well as identifying the barriers and resource needs specified in the survey questionnaire

and the survey's follow-up questions. I combine the findings from Istanbul and Antakya in order to provide a broader, more holistic understanding of DRR in Turkey. Though different themes were found in Istanbul and Antakya, there were also many similarities in the data. As such, the hope is that this thesis will give a broader portrait than was previously available of the DRR barriers and opportunities in Turkey.

Government

Through the interviews with local government officials and researching secondary resources to understand regional and national government and legislative context, this thesis revealed that there are five primary ways government engages in DRR in Turkey. (How Turkish governments engage in DRR will first be explored as a summation of the types of responsibilities of local, regional, and national government.) First, one of the government's responsibilities is to enhance the general level of preparedness in local communities and their capacity to cope with extreme events. Second, government acts as the legal authority as they are responsible for creating, implementing, and enforcing zoning and building code legislation. Third, the government supports other community institutions, including the private sector, education sector, healthcare, and grassroots organizations, and brings them together to enhance community-level DRR activities. This bolsters DRR networks across community institutions, nationally and internationally. Fourth, government is also responsible for urban transformation projects in Turkey. Fifth, the government is responsible for increasing the public's awareness of earthquake risk and implementing activities and tools that will help make DRR a normative part of the local culture otherwise referred to as a 'culture of resilience'. Osman Kilic, Deputy Director of

Istanbul Metropolitan Municipality's Earthquake and Soil Research, proclaims that it is "government's responsibility to determine how to deal with the risks."

There are three specific roles the Turkish national government plays in DRR. First, they financially support the nation with the fiscal capacity to engage in DRR. Second, the national government strengthens the role of civil service by supporting and fostering multi-level decision-making networks. Third, they use modern technology to inform the types of DRR data and information they disseminate to other governments and community institutions.

There are two primary roles the regional governments in Turkey play in DRR. First, they act as a liaison between the federal and local governments. Second…

The local government engages in DRR in five key ways. One, they use national regulations and laws to direct DRR action. Two, they create and maintain a multi-level/stakeholder platform to promote community DRR. This platform is the foundation for information sharing, transparency, and the development of ideas. Three, the local government engages the local population in DRR knowledge and action. Four, they strengthen the local institutional capacity and implement practice DRR mechanisms. Five, they development and experiment with new tools and techniques. Essentially, local government is responsible for steering long-term processes to solve problems that threaten the local economy, community, and environment.

Business

There are three ways businesses engage in DRR in Turkey. First, businesses interact within the economy, informing what a good or bad DRR product looks like or the services most needed for communities at risk. They act as seismic risk awareness advocates by being in business and being active within the marketplace. Since the products of many businesses directly reduce the risk that earthquakes pose to Istanbul and Antakya, the success of a business that uses, promotes, and demands DRR correlates with the success of DRR. They also act as an effective educator and enforcer of DRR. Second, businesses have the power to guide, improve, and change building materials, designs, and construction plans. While the government creates and sometimes enforces building regulations and codes, they have placed the responsibility of quality control and oversight of building materials and construction in the hands of private enterprises. Third, another important way that businesses in Turkey engage in DRR is through the significant expansion of the Turkish DRR network. As multiple industries play an important role in and the function and economic prosperity of the city, it is also important that multiple industries are considered and work together in DRR. All businesses have a stake in DRR, as their potential continuity in the face of disaster is dependent on the success of DRR.

Education

The method of DRR engagement within the education sector is two fold; one, to educate young people and, by extension, the public about their potential risks and how they can prepare and protect themselves against a seismic event and; two, educational institutions also work towards strengthening and retrofitting school buildings, while also

engaging in non-structural mitigation actions such as securing bookshelves and cabinets in schools.

The Ministry of Education in Turkey is important to the DRR process because of the paternalistic structure of the education system in Turkey. The Ministry determines the types of messages that are delivered to the nation's youth. The Ministry also maintains primary authority because they provide the funding for structural and non-structural mitigation actions for schools as well as educational resources and materials. However, at the national level, the DRR standards are broad. They allow the provincial governments enough flexibility to develop DRR curriculum tailored to the regional risks they face. Individual school DRR curriculum is primarily dependent upon the provincial government for provisions including funds for school retrofits, training materials for students and teachers, civil defense experts, as well as the types of DRR information given to the teachers and students.

The flow of information and types of data available comes full circle as the national government is highly dependent upon the Kandilli Observatory in Istanbul for their knowledge, educational methods, seismic data, and resources. KOERI at Boğaziçi University in Istanbul is the central source for DRR educational material in Istanbul and is considered a well-known and trusted organization that works daily to reduce seismic risk. KOERI acts not only as an educator of students and the public, but also as the epicenter of earthquake information within the community. It is the organization that others go to when information about seismic risk and EQRR is needed. Kandilli's CIP, supported by USAID, significantly increases the educational capacity of the Istanbul.

The CIP primarily targets students and schools, but has materials and strategies for other institutions as well. The four modules that educational institutions focus their DRR education, through the CIP are 1) basic disaster awareness, 2) non-structural mitigation techniques, 3) structural awareness, and 4) the importance of community volunteering. In order to educate in the most efficient way with the most accurate data, educational institutions in Istanbul are also responsible for reinforcing the DRR networks within the city. Not only are universities the primary producers of information and data in regards to seismic risk, vulnerability, and DRR, but they also have the capacity to provide education to a variety of different organizations. Educational institutions work together to obtain and prepare the most accurate and helpful data possible.

Grassroots

There are two primary ways that grassroots organizations in Istanbul and Antakya engage in DRR. First, grassroots organizations involved in DRR are responsible for community outreach and education. They are responsible for the disaster volunteer structure and provide funds and assistance for volunteers working towards enhancing DRR in their communities. As strong community outreach advocates, grassroots groups aim to work with neighborhoods in order to reach as many people as possible. Neighborhood heads and other elected officials are often the first point of contact for grassroots organizations. From the neighborhood head, a core group of neighborhood leaders interact with grassroots organizations in order to increase DRR efforts locally and increase risk awareness throughout the community. They strive to reach out to all corners of a community, and expand risk awareness and possible DRR strategies. Grassroots groups

then translate DRR knowledge in a variety of ways so that a variety of people are able to understand and use DRR information. This establishes a network of neighborhoods in Istanbul that can share and exercise DRR information, knowledge, and resources. These organizations work with communities to provide strategies, activities, and mechanisms the community can employ to reduce their risk to disasters. To do this, they often provide free earthquake awareness training sessions, seminars, and materials. Second, although their primary objective is to actively engage the community in DRR and to promote a culture of resilience throughout, many grassroots organizations have focused their efforts on projects whose aim is to strengthen the building stock of the community.

Healthcare

The healthcare sectors in Istanbul and Antakya are primarily concerned with emergency response, and as such, their involvement in directly reducing risk is limited. However, there are two ways healthcare institutions engage in DRR in Turkey. First, there is a multitude of disaster contingency plans that each healthcare institution must have, review annually, and file with the Health Ministry. Also, healthcare institutions execute practices and mock scenarios in order to stay prepared. Second, under Health Ministry regulations, every hospital should have trained disaster managers as well as at least 10 people who are trained in search and rescue and disaster management. There are mandatory annual training programs with the national government via the Health Ministry designed to educate employees about how to create and implement this disaster plan. This training is offered through hospitals for health sector officials such as doctors, nurses, paramedics, technicians, and police services. In addition to training and contingency

planning, national healthcare institutions provide regional and city hospitals with emergency response and recovery materials that will be needed in the event of a disaster.

Healthcare institutions are more distanced from the rest of DRR networks in terms of sharing information *across* the sectors. However, when it comes to information sharing *between* healthcare institutions, their networks and DRR dialogue is equally robust. Healthcare institutions regularly share information with one another and have a tight knit network of information sharing and DRR dialogue with a multitude of healthcare professionals constantly reevaluating best possible strategies. Though disjointed from other key institutions, the healthcare institutions work closely with one another in order to maximize their effectiveness during a disaster. They will share information with one another and work to coordinate their contingency plans. Because of this internalized structure of DRR dialogues, healthcare professionals see their DRR efforts as more tailored to the ways that healthcare works, and therefore more effective.

Barriers:

There are five primary variables respondents answered as extremely (86-100% of respondents reported) or highly (70-85% of respondents reported) preventative of DRR strategies and mechanisms in Turkey. The barriers found are 1) other social and economic problems, 2) lack of available personnel, 3) lack of technical experience, 4) lack of public interest, and 5) money. According to respondents, it is these five key variables that impede Turkey's ability to foster a culture of resilience.

In conclusion, this broad scope of understanding how community institutions engage in DRR in Turkey lays a strong foundation upon which to learn from as well as expand and improve upon Turkish DRR. Though Turkey is considered a world-wide leader in earthquake risk reduction strategies and mechanisms, barriers and challenges still exist. This thesis can inform a variety of community institutions about the role of other institutions in DRR. As well, this work can supplement the knowledge of governance structures and community institutional networks. It can be used in order to create or improve upon existing DRR networks, strategies, and mechanisms. This study moreover provides a basic understanding of successful (though not perfect) DRR efforts, and allows for other communities to tailor progressive, active, and effective DRR into their particular traditions and culture.

The mission of disaster risk reduction… is to convey an understanding of the environmental and social conditions and the human actions and inactions that lead to disaster, in order to motivate advocacy and to raise expectations of social policy to reduce these threats and to stimulate changes in individual and group behavior toward a culture of safety. Marla Petal, 2007

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LIST OF APPENDICES

A City Selection Criteria

B Interviewee Selection Criteria

C Fieldwork Guide

D Interview Guide

E Survey Questionnaire

F Interviewee Demographic Form

G Summary of the Hyogo Framework for Action

H List of Interviewees

I Recording Matrix

J Final Codebook

K Survey Questionnaire - Turkish

Appendix A: City Selection Criteria

There are 8 criteria, which it used to select the two primary target cities.

1. *National Income*: I selected cities to represent a range of national incomes. According to world development indicator rankings of 215 World Bank Atlas economies, the countries in our sample ranged from 18th (USA) to 160th (India) in national incomes.
2. *Population Size*: I selected both large and less heavily populated cities.
3. *Recent and Distant Exposure to a Large Earthquake*: I selected cities with both "recent" and "distant" exposure to large earthquakes, because exposure to damaging earthquakes is important to understanding public perceptions of risk. The exposure times for the selected cities ranged from one year.
4. *High Seismic Risk*: In order to advance the goal of reaching the most earthquake-prone cities, areas were selected that have high to very-high earthquake hazard risk.
5. *Earthquake Mitigation Experience*: The countries in the sample were classified either as "mitigation leaders", as "active" or as "passive" with regard to mitigation activities. Although no actual mitigation scale exists, I used rankings from the Human Development Index (HDI) as a proxy for risk reduction activity, and therefore experience. Turkey ranks 92nd on the HDI with measurement of 0.699 out of 1 (1 being an unattainable level of advanced development) (Klugman 2011).
6. *Working Environment*: The selected cities had to have a secure working environment and a stable and semi- or fully-democratic government. Although this involved an admittedly subjective assessment of risk within the working environment, this criterion was important to help ensure a safe work environment.
7. *International Development Organization Offices*: At least some cities had to have regional or country-level representation of major international development organizations, such as the World Bank, in order for the GHI-CSU team to conduct supplemental interviews with development professionals in these organizations focused on risk reduction. These interviews were conducted in Bhutan, Peru, and Turkey.
8. *Local Partner*: Contact with local partners was required since English was not the lingua franca of Turkey. Thus, another criterion for city selection was that local partners who would assist with scheduling and conducting interviews, and, in some cases, provide translation assistance as well would need to be identified.

Appendix B: Interviewee Selection Criteria

	Local Government Officials	Business Leaders	School Administrators	Health Sector Officials	Grassroots Organization Representatives and Local Leaders
General Description:	Mix of local government officials, city engineers, planners, and/or local emergency management officials.	Business people with strong ties to the local community and working in industries that are especially important to the local economy. May include bankers, insurers, business owners, property owners—should be *local*, not a part of multinational corporations unless their headquarters are in the city.	District level school administrators, principals, and/or teachers. May also include officials within the Ministry of Education (or related school organization).	Hospital administrators or other leaders within hospitals, nursing homes, or other healthcare facilities. May also include chief medical officers and/or officials within the Ministry of Health (or related health organization).	Representatives from grassroots groups, community-based groups, NGO's, or faith-based groups, etc. who are working with vulnerable populations including women, children, elderly, etc.
Active Involvement: Working on earthquake preparedness, mitigation, or disaster risk reduction. May include persons with past experience, who are not presently active—but ideally they are currently involved in earthquake activities. *Ideally, this person will *also* have some leadership capacity and ability to affect change. However, we	Select individuals who have designed or implemented city-wide hazards public education campaigns, advocated for stricter building codes, championed hazards mitigation activities, or have otherwise worked to reduce earthquake risk within the community.	Select individuals who are involved in business continuity planning and other earthquake mitigation efforts for local businesses. It may be worthwhile to look for local chapters of international (e.g., DRI: The Institute for Continuity Management) or national (e.g., Association of Contingency Planners) organizations.	Select individuals who have designed hazards education materials, implemented education programs in a school or district, and/or actively supported teachers or children who asked for more disaster risk reduction education within schools. Educators who have designed innovative after-school programs should also be considered for inclusion.	Select individuals who have helped design earthquake preparedness, response, and/or mitigation plans for the healthcare sector.	Select individuals from organizations that encourage grassroots, community-based disaster risk reduction at the local level. Groups that *involve* and *empower* marginalized populations to work toward making their lives safer and their communities more resilient to earthquakes should be especially targeted.

will privilege involvement over power.					
Leadership Capacity: Power to influence decision-making within the organization, district, city, or region.					
Language: Must either speak English or have a local partner/GHI team member who can translate					
Availability: Must be available for a one hour interview (or 1.5 hours if translation is required).					
Diversity: The project team will strive for gender diversity among interviewees in each city.					

Appendix C: Fieldwork Guide

What to take to each interview

- Multiple copies of the
    - interview guide,
    - questionnaire (preferably printed double-sided),
    - demographic form, and
    - GEM handout to be left with interviewee (preferably printed in color).
- Audio recorder and extra batteries
- Notebook
- Camera
- Business cards
- Directions to interview site
- Wallet and ID

Key activities during fieldwork

- Conduct and record interviews with 10 community leaders per city.
    - Familiarize yourself with your recorder! Make sure you know how to turn it off and on. And, stop and start the recorder so you can see how it assigns new numbers to new files.
    - Try to basically memorize the interview guide before arriving in the field so you can avoid reading questions verbatim or stumbling with questioning.
    - Leave sufficient time (1.5-2 hours) between interviews. Some interviews may run long, and you don't want to have to rush off from one interview or be late to the next.
    - Make sure the interviews are recorded in a quiet space (offices or conference rooms with closed doors are ideal). Have the local partner request this space when setting up the interview.
    - When you ask the interviewee to fill out the questionnaire (about 40 minutes into the interview), keep the recorder running unless the interviewee is taking an unusually long time and isn't speaking. If you do turn off the recorder, restart it before you begin asking the follow-up questions. Turn it off once the follow-up questions have been answered. See below for information on naming the audio files.
    - If multiple individuals show up for the interview, have all those who actively participated fill out the questionnaire and the demographic form.
    - Ask the local partner to take photos of you and/or the interviewee during the sessions. Also, make sure and get some photos of the local partner "in action." See the San Francisco photo slideshow on Shutterfly for the types of interview photos we are looking for.
    - Debrief with your local partner following interviews to clarify any vague points or to identify issues with the interview process.
    - Takes notes about observations or other insights as soon as possible following the interviews and at least within 48 hours of them occurring. The purpose of these notes is to 1) help the project team discover what, if anything, needs to be changed in the research method for the remaining

cities and 2) help you prepare for the debriefing with the project team after the fieldwork.
    - Be open to interviewing more than 10 people in each city if you meet or hear about someone who you think might provide valuable insight for the project. It is okay if an additional interviewee does not fit neatly into one of the beneficiary classes.
- At the end of each day, download the interview recordings to your computer and send the recordings to Lori via YouSendIt.com. Follow the file naming scheme below.
    - Use Lori's upgraded version of YouSendIt, which allows you to send multiple files at once and files larger than 50MB.
- Conduct an informal interview (no recordings, take notes as needed on key points) with each local partner during the last two days of fieldwork. See local partner interview questions document for suggested questions. Have the local partner fill out a demographic form.
    - Write a brief memo (2-5 pages) summarizing the local partner interview feedback and email to the project team.
- Conduct at least one informal interview (no recordings, take notes as needed on key points) with one official of an international development agency in Lima (Veronica), Istanbul (Justin), and Guwahati or Thimpu (Hari). See international development interview questions document for suggested questions. Have the official fill out a demographic form.
    - Write a brief memo (2-5 pages) summarizing the interviews and email to the project team.
- If time allows, do brief street-side surveys of three buildings under construction in each city.
    - Take photos of the buildings.
    - Write a brief memo summarizing what you observed: size of buildings, structural systems, configurations, general quality of design/construction.
- Take photos.
    - Images of typical architecture, the concentration of buildings or cityscapes could be useful for our report to GEM.
    - Images of interviewees taking the survey, showing preparedness materials, or engaging in the interview with you could be useful to jog your memory later and could be used in our final report to GEM.
    - Upload the photos to the project Shutterfly site: Categorize the images, add captions, create a separate word file or do something else as a way to record simple descriptions of the photos. Again, see the San Francisco slideshow for an example of the types of captions we are looking for. Note that Jen has offered to upload the photos and captions for you—you can send the photos to her using the YouSendIt account and send the captions as a word document.

"What to do if" during the interviews

- Multiple people want to be interviewed: Warn them that the interview will take longer. If they are still willing to complete the interview, then conduct it with up to

three people at a time. Consider splitting up into separate groups if you have multiple recorders and interviewers (e.g., GHI staff and graduate student).

- The interviewee says s/he has less than an hour: focus on the priority questions, which have asterisks by them on the interview guide. Try to have the questionnaire and demographic page completed but you could email them as a back up.
- Someone cancels: If an interviewee cancels, try to reschedule (this is another reason that it is important to "front load" interviews so you have some flexibility during the final days of your trip if you need to schedule make up interviews). If the person cancels and cannot reschedule, begin searching immediately for a "replacement" interviewee from that particular beneficiary class.
- Interviews go long or short: We have allotted 1 hour for interviews (1.5 hours if translation is involved). Do not worry too much if interviews run slightly longer or slightly shorter than an hour, as the timing mostly evens out in the end. However, if interviews are running *really* short, it might be worth a quick Skype call to try to "troubleshoot" to find out if something is going on (culturally or otherwise) that is making the guide not work as well in a particular context.

Audio file downloading, naming, and sending process

- Download audio files to your computer at the end of each fieldwork day.
    - Our protocol for stopping and starting the recorder during the interview sessions (see above) means that you might have 2-3 audio files for each interview session.
- Once downloaded, check to ensure the audio files play properly on your computer. Also check the length of the audio file, so you know exactly how long each interview lasted. After the files are downloaded, right click on each file and select "Rename."
    - Once the box appears that allows you to type a new name, please begin naming the files by the city and with a 1a, 1b, 1c, 2a, 2b, 3a, etc. following, depending on the interview order. Do not use spaces, and leave everything lower case. An example follows, file name is first, with descriptor in (parentheses):
- Once the files are renamed, open an internet browser to: https://www.yousendit.com/. Log in using Lori's account Enter your email in the "From:" box on the left side of the page and Lori's email in the "To:" box. Select the file and then send it to Lori.
- After Lori receives the file, checks it to ensure it is working properly, she will send it to the transcriptionist and will also send a confirmation email that the file was received.

Appendix D: Interview Guide

Thank you for meeting with us today. My name is [XX] and this is [XX]. We are part of a research team supported by the Global Earthquake Model Foundation, an international, collaborative initiative to help calculate and communicate earthquake risk worldwide.

As part of this project, we are traveling to 10 cities in 7 countries to learn about programs and activities that have helped people prepare for and reduce their earthquake risk. We will use this information to advise the Global Earthquake Model Foundation on how they can make their earthquake risk information available, for free, to professionals like you.

We have a series of questions that we would like to ask you. The interview should take about 1 hour [1.5 hours with translation] to complete. Is it okay if I record it, so I can focus on you rather than trying to take extensive notes? The recording will not be shared with anyone outside of our research team.

Do you have any questions about the interview or the project before we begin?

[Note: give interviewee your business card when you first meet]

Interview Questions:	**Probes:**
1. **Work** First, will you please say your name, title, and the name of your organization? Will you tell me about your job here?	
*2. **Programs – Understanding, Preparing for, and Mitigating Earthquake Risk** What earthquake education, preparedness, or mitigation activities is your organization involved in? [Note: If the interviewee talks more generally about "all hazards" programs, probe to see if they are doing anything earthquake specific. If they offer nothing that is earthquake specific—which is a finding in and of itself—ask the interviewee to respond to these probes in relation to the other hazards program(s) they offer.]	What sparked the creation of these programs? What information and resources do you draw on to implement these programs? What groups do you try to reach with your programs? Why do you work with these particular groups? What tools or strategies do you use to communicate with the people you serve? What strategy is most useful in terms of reaching the largest number of people?

*3. **Barriers** What barriers have emerged with designing or implementing your earthquake [hazards] program?	Have you changed anything about your program itself or your overall strategy to try to address these barriers?
4. **Partnerships** What lessons have you learned from other leading individuals or organizations about understanding or reducing earthquake risk?	One of the Global Earthquake Model's goals is to reach as wide of an audience as possible with their technical information. If they were trying to share their information in this city, *who* would you recommend they contact?
*5. **Earthquake Risk** When you think about the possibility of a major earthquake happening in your community, what concerns you the most?	Are the people you serve concerned about earthquake risk? Are there other threats or hazards that the public is more aware of and/or concerned about?

During this last part of the interview, we are going to give you a short survey that asks about earthquake risk reduction information. This should only take a few minutes to complete, and then we will talk about your responses.

Interviewee Completes Survey [keep recorder on unless the interviewee seems to be taking an unusually long time and isn't speaking]

After the interviewee has completed the survey, and if time allows, review the survey document with the individual. Ask these follow-up questions as you look at table 1 at the top of page 1:

1. Of those items that you do not have access to, which would be most helpful/useful to you?
2. Of those items that you do have, how do you like the information delivered (maps, charts, on-line, etc.)?
    a. What makes you trust the information that you use?
    b. Do you feel like the information you have already is reliable? Is there anything that you would change to make it more robust or useable?
3. If the Global Earthquake Model Foundation wanted to connect with professionals like you to share their information for free, how would you recommend they do that? What channels should the Foundation use to reach professionals like you?
4. The Global Earthquake Model Foundation wants to help people reduce earthquake risk by developing online tools and resources. What online tools

or resources would you like GEM to develop to make you more effective at reducing earthquake risk?

This has been exceptionally helpful, and we are grateful for your time. Are there any final thoughts or comments that you would like to add?

Ask interviewee to complete demographic form.

Interviewee Completes Demographic Form [turn off recorder]

Give interviewee the handout on GEM at the end of the interview.

Appendix E: Survey Questionnaire

Think about the organization where you work and the community and people it serves. Which of the following do you already have or would you like to have to help understand earthquake risk? (Note: If you already have access to a resource listed below but would still like the Global Earthquake Model to provide it, please check the 'would like to have' box.)	Already have	Would like to have	Do not need
Projected ground shaking intensity in an earthquake.	❑	❑	❑
Maps of earthquake fault lines in your community.	❑	❑	❑
Maps of potential earthquake-induced landslides or tsunamis in your community.	❑	❑	❑
Projected number of deaths in an earthquake.	❑	❑	❑
Projected number of injuries in an earthquake.	❑	❑	❑
Projected impacts on different population groups (such as elderly, homeless, etc.).	❑	❑	❑
Projected damage to housing in an earthquake.	❑	❑	❑
Projected damage to schools in an earthquake.	❑	❑	❑
Projected damage to businesses in an earthquake.	❑	❑	❑
Projected damage to hospitals in an earthquake.	❑	❑	❑
Projected damage to roads, bridges, and other infrastructure in an earthquake.	❑	❑	❑
Projected damage to electricity, gas, and water delivery systems in an earthquake.	❑	❑	❑
Projected damage to mobile phone networks in an earthquake.	❑	❑	❑
Project damage to Internet networks in an earthquake.	❑	❑	❑
Projected economic losses in an earthquake.	❑	❑	❑
Information about how individuals and families can prepare for earthquakes.	❑	❑	❑
Information about how organizations can prepare for earthquakes.	❑	❑	❑
Information about how to fasten contents of buildings to not fall during earthquakes.	❑	❑	❑

Information about how to strengthen buildings to not collapse during earthquakes.	❑	❑	❑
Access to technical experts who can identify and explain earthquake risk.	❑	❑	❑
Access to technical experts who can help individuals or organizations prepare for earthquakes.	❑	❑	❑

Which of the following minor or major barriers to implementing earthquake risk reduction activities does the organization where you work experience?	Minor barrier	Major barrier	Not a barrier
Lack of money.	❑	❑	❑
Lack of time to dedicate to such activities.	❑	❑	❑
Too few people available to work on such activities.	❑	❑	❑
Lack of technical expertise.	❑	❑	❑
Lack of earthquake information.	❑	❑	❑
Other, more urgent, social or economic problems.	❑	❑	❑
Other, more serious, hazards.	❑	❑	❑
Lack of interest in earthquake hazards among your colleagues.	❑	❑	❑
Lack of interest in earthquake hazards among the people you serve.	❑	❑	❑

Think about how you receive and share information <u>for professional purposes</u>. How useful have the following information sources been for you over the past year?

	Low	Medium	High	Not available	Available, but not useful
Newspapers	❑	❑	❑	❑	❑
Radio	❑	❑	❑	❑	❑
Television	❑	❑	❑	❑	❑

Social media (such as Facebook, Twitter)	❑	❑	❑	❑	❑
Scientific publications (such as books, journal articles, trade magazines)	❑	❑	❑	❑	❑
Email	❑	❑	❑	❑	❑
Telephone	❑	❑	❑	❑	❑
Talking in person with community members	❑	❑	❑	❑	❑
Talking in person with scientific experts	❑	❑	❑	❑	❑
General news web sites	❑	❑	❑	❑	❑
Government web sites	❑	❑	❑	❑	❑
Earthquake- or disaster-focused web sites	❑	❑	❑	❑	❑
Earthquake hazard maps	❑	❑	❑	❑	❑

Appendix F: Interviewee Demographic Form

Name: _____

Title: _____

Organization: _____

Telephone: _____

Email: _____

Gender: ❑ Male ❑ Female

Age: _____

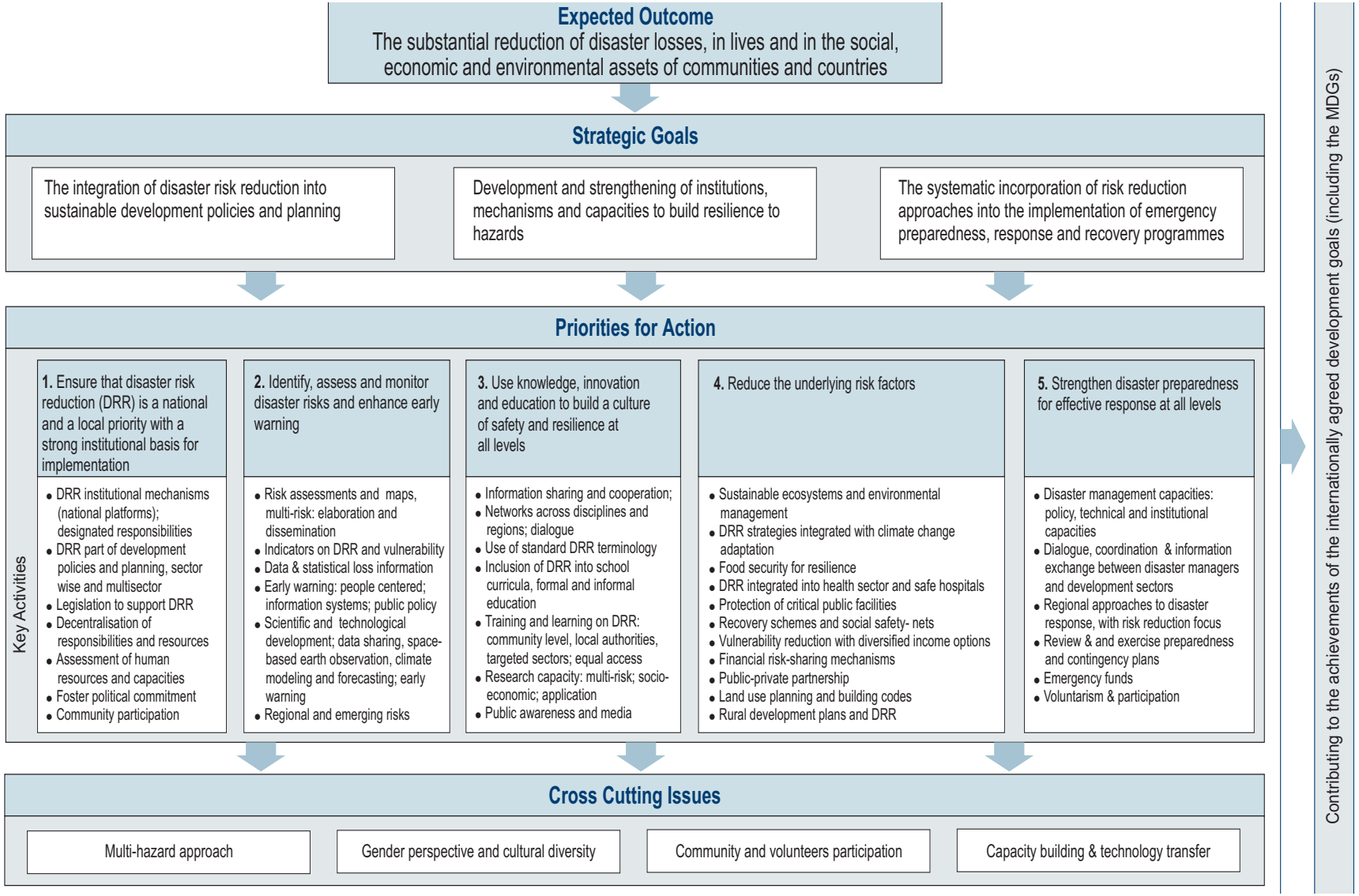
How many years have you lived in this community? _____

How many years have you worked for this organization?_____

How many years have you been involved in earthquake risk reduction activities? ____

We will not share the audio recording of our interview with anyone outside our research team. However, we might want to use your name, title, and organization in the final report. Do you give us permission to use this information in the final report? Yes_____ No_____

Appendix G: Summary of the Hyogo Framework for Action



Implementation and Follow-Up

In order to achieve the goals and act upon the priorities identified in this Framework, the following tasks have been identified to ensure implementation and follow-up by States, regional and international organizations in collaboration with civil society and other stakeholders. The ISDR partners, in particular the Inter-agency Task Force on Disaster Reduction and secretariat, are requested to assist in implementing this Framework for Action.

General Considerations

- Implementation by different stakeholders, multi-sectoral approach; participation of civil society (NGOs, CBOs, volunteers), scientific community & private sector is vital
- States primarily responsible; an enabling international environment is vital, incl. strengthened regional capacities
- Build multi-stakeholder partnerships
- Particular attention to:
  - Small island developing States: Mauritius Strategy;
  - Least developed countries;
  - Africa
- States, regional and international organizations to foster coordination among themselves and a strengthened International Strategy for Disaster Reduction (ISDR)
- Follow-up integrated with other major conferences in fields relevant to DRR; reviews as appropriate

Actors

Critical tasks

States

- Designate national coordination mechanisms for the implementation and follow up, communicate to the ISDR secretariat;
- National baseline assessments of the status of DRR;
- Publish and update a summary of national programme for DRR including international cooperation;
- Develop procedure for reviewing national progress including systems for cost benefit analysis and ongoing monitoring on risk;
- Consider acceding to, approving or ratifying relevant international legal instruments and to make sure they are implemented;
- Promote the integration of DRR with climate variability and climate change into DRR strategies and adaptation to climate change; ensure management of risks to geological hazards.

Regional Organizations and Institutions

- Promote regional programmes including for technical cooperation, capacity development, the development of methodologies and standards for hazard and vulnerability monitoring and assessment, the sharing of information and effective mobilization of resources;
- Undertake and publish regional and sub-regional baseline assessments;
- Coordinate and publish reviews on progress and support needs, and assists countries in preparation of national summaries;
- Establish specialized regional collaborative centers;
- Support the development of regional mechanisms and capacities for early warning, including for tsunami

International Organizations (including UN System and IFIs)

- Engage in the implementation of the ISDR by encouraging integration of DRR into humanitarian and sustainable development fields;
- Strengthen the capacity of the UN system to assist disaster-prone developing countries in DRR and implement measures for assessment of progress;
- Identify actions to assist disaster-prone developing countries in the implementation of the Hyogo Framework, ensure their integration and that adequate funding is allocated; assist in setting up national strategies and programmes for DRR;
- Integrate actions into relevant coordination mechanisms (UNDG, IASC, RCs and UN Country Teams);
- Integrate DRR into development assistance frameworks such as CCA/UNDAF, PRSP;
- In collaboration with networks and platform support: data collection and forecasting on natural hazards and risks; early warning systems; full & open exchange of data;
- Support States with coordinated international relief assistance, to reduce vulnerability & increase capacities;
- Strengthen international mechanisms to support disaster stricken States in post-disaster recovery with DRR approach
- Adapt & strengthen inter-agency disaster management training for DRR and capacity building.

ISDR (Inter-Agency Task Force on Disaster Reduction & secretariat)

- Develop a matrix of roles and initiatives in support of follow/up to the Hyogo Framework;
- Facilitate the coordination of effective actions within the UN system and other international and regional entities to support the implementation of the Hyogo Framework, identify gaps, facilitate processes to develop guidelines and policy tools for each priority area;
- In broad consultation, develop generic, realistic and measurable indicators. These indicators could assist States in measuring progress in the implementation of the Hyogo Framework;
- Support national platforms & regional coordination;
- Register relevant partnerships with Commission on Sustainable Development;
- Stimulate the exchange, compilation, analysis and dissemination of best practices, lessons learnt;
- Prepare periodic review on progress towards achieving the objectives of the Hyogo Framework and provide reports to the UNGA & other UN bodies

Resource Mobilization: States, Regional and International Organizations

- Mobilize resources and capabilities of relevant national, regional and international bodies, including the UN system;
- Provide and support the implementation of the HFA in disaster prone developing countries, including through financial and technical assistance, addressing debt sustainability, technology transfer, public-private partnership and North-South and South-South cooperation;
- Mainstream DRR measures into multilateral and bilateral development assistance programmes;
- Provide adequate voluntary financial contribution to the UN Trust Fund for DR to support follow-up activities to Hyogo Framework; review usage and feasibility for the expansion of this fund;
- Develop partnership to implement schemes that spread out risks, reduce insurance premiums, expand insurance coverage and increase financing for post-disaster reconstruction, including through public and private partnerships. Promote an environment that encourages a culture of insurance in developing countries.

Source: Outcome of the World Conference on Disaster Reduction, Hyogo, Kobe Japan, 18-22 Jan 2005

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Appendix H: List of Interviewees

Istanbul, Turkey			
Name	**Title**	**Organization**	**Beneficiary Class**
Necmi ERCIN and Tezcan BUCAN	Department Chief Branch Manager: Civil Defense Expert	Governorship of Istanbul Provincial, Disaster and Emergency Department	Local Government
Mahmut BAS and Osman KILIC	Director Deputy Director	Istanbul Metropolitan Municipality, Earthquake and Soil Research	Local Government
Selim KACMAZOGLU	Civil Defense Expert	Istanbul National Education Directorate	Education
Ismet GUNGOR	Coordinator	TCIP: Turkish Compulsory Insurance Pool	Business
Seyhun PUSKLUCLU	Geophysical engineer, seismologist	Kandilli Observatory	Education
Dr. M. Turkay ESIN	Responsible of Health Services Unit for Disasters	Istanbul Health Directorate	Healthcare
Dr. Huseyin Nail KAVLAKOGLU	Doctor	Tuberculosis Prevention and Treatment Center	Healthcare
M. Elvan CANTEKIN, Ph.D.	General Director	MAG (Neighborhood Disaster Volunteers) Foundation	Non-Profit
Ali Nasuh MAHRUKI	President	AKUT Search and Rescue Association	Non-Profit
Eren KALAFAT	President	ULUS YAPI	Business
Antakya, Turkey			
Name	**Title**	**Organization**	**Beneficiary Class**
1. Mehmet ALKAN 2. Mustafa KESEF 3. Ibrahim KAFADAR 4. Bestami MISIRLI	1. Chief 2. Assistant Director 3. Branch Manager 4. Civil Engineer	Antakya National Education Directorate	Education
Joseph NASEH	Archeologist and Former Director	local Orthodox Church in Antakya	Additional
Dr. Alaattin OZTURK	Doctor	Ministry of Health (Antakya Hospital): in charge of ambulance services	Healthcare
Engin Murat ALKAYA	Geological Engineer	Antakya's Chamber of Geological Engineers	Non-Profit

Isameddin CECKE and Engin SOZER	Geophysical Engineer Geological Engineer	Antakya Municipality	Local Government
Kadim DOGAN	Deputy Governor/Vice to the Governor	Governorship of Hatay	Additional
Mustafa Halil YUCULEN	Director	Governorship of Antakya's Province: Disaster and Emergency Preparedness Department	Local Government
Selim HARBIYELI	Co-Director/Civil Engineer	Turkish Engineers and Architect Association: Antakya's Chamber of Civil Engineers	Non-Profit
Ali HOCA	Owner/Civil Engineer	Hoca Construction Company	Business
Hakan USLU	Owner/Civil Engineer	Sigma Construction Test Laboratory and Engineering Company: a materials testing company	Business
Zeki HUZMELI	Branch Manager	Samandag Town National Education Directorate	Education

Appendix I: Recording Matrix

Istanbul, Turkey			
File Name	**Interviewee Name**	**Beneficiary Class**	**Interview Length**
istanbul1a	Necmi Ercin	Local Government	44 minutes, 24 seconds
istanbul1b	Necmi Ercin	Local Government	45 seconds
istanbul1c	Necmi Ercin	Local Government	17 minutes, 18 seconds
istanbul2a	Mahmut Bas and Osman Kilic	Local Government	1 hour, 5 minutes, 19 seconds
istanbul2b	Mahmut Bas and Osman Kilic	Local Government	18 minutes, 18 seconds
istanbul3a	Selim Kacmazoglu	Education	1 hour, 8 minutes, 53 seconds
istanbul3b	Selim Kacmazoglu	Education	16 minutes, 41 seconds
istanbul4a	Ismet Gungor	Business	55 minutes, 25 seconds
istanbul4b	Ismet Gungor	Business	6 minutes, 19 seconds
istanbul5a	Seyhun Puskulcu	Education	28 minutes, 58 seconds
istanbul5b	Seyhum Puskulcu	Education	23 minutes, 7 seconds
istanbul6a	Dr. M. Turkay Esin	Healthcare	47 minutes, 21 seconds
istanbul6b	Dr. M. Turkay Esin	Healthcare	9 minutes, 33 seconds
istanbul7a	Dr. Huseyin Nail Kavlakoglu	Healthcare	45 minutes, 5 seconds
istanbul7b	Dr. Huseyin Nail Kavlakoglu	Healthcare	18 minutes, 11 seconds
istanbul7c	Dr. Huseyin Nail Kavlakoglu	Healthcare	7 minutes, 37 seconds
istanbul8a	M. Elvan Cantekin Ph.D.	Non-Profit Org	47 minutes, 27 seconds
istanbul8b	M. Elvan Cantekin Ph.D.	Non-Profit Org	7 minutes, 53 seconds
istanbul9a	Ali Nasuh Mahruki	Non-Profit Org	34 minutes, 5 seconds
istanbul9b	Ali Nasuh Mahruki	Non-Profit Org	12 minutes, 48 seconds
istanbul10a	Eren Kalafat	Business	27 minutes, 23 seconds
istanbul10b	Eren Kalafat	Business	7 minutes, 16 seconds
Antakya, Turkey			
File Name	**Interviewee Name**	**Beneficiary Class**	**Interview Length**
antakya1a	Mehmet Alkan, Mustafa Kesef, Ibrahim Kafadar, and Bestami Misirli	Education	50 minutes, 36 seconds
antakya1b	Mehmet Alkan, Mustafa Kesef, Ibrahim Kafadar and Bestami Misirli	Education	11 minutes, 28 seconds

antakya2a	Joseph Naseh	Additional interview: Former Director of the local Orthodox Church, no questionnaire available	19 minutes, 47 seconds
antakya3a	Dr. Alaattin Ozturk	Healthcare	34 minutes, 14 seconds
antakya3b	Dr. Alaattin Ozturk	Healthcare	8 minutes, 41 seconds
antakya4a	Engin/Murat Alkaya	Non-Profit Org	29 minutes, 48 seconds
antakya4b	Engin/Murat Alkaya	Non-Profit Org	14 minutes, 19 seconds
antakya5a	Isameddin Cecke and Engin Sozer	Local Government	1 hour, 3 minutes, 58 seconds
antakya5b	Isameddin Cecke and Engin Sozer	Local Government	21 minutes, 30 seconds
antakya6a	Kadim Dogan	Additional Interview: Assistant/Deputy Governor of Hatay, no questionnaire available	22 minutes, 52 seconds
antakya6b	Kadim Dogan	Additional Interview: Assistant/Deputy Governor of Hatay, no questionnaire available	5 minutes, 25 seconds
antakya7a	Mustafa Halil Yuculen	Local Government	48 minutes, 8 seconds
antakya7b	Mustafa Halil Yuculen	Local Government	20 minutes, 25 seconds
antakya8a	Selim Harbiyeli	Non-Profit Org	40 minutes, 36 seconds
antakya8b	Selim Harbiyeli	Non-Profit Org	7 minutes, 7 seconds
antakya9a	Ali Hoca	Business	33 minutes, 16 seconds
antakya9b	Ali Hoca	Business	4 minutes, 28 seconds
antakya9c	Ali Hoca	Business	30 minutes, 25 seconds
antakya10a	Hakan Uslu	Business	47 minutes, 5 seconds
antakya10b	Hakan Uslu	Business	13 minutes, 43 seconds
antakya11a	Zeki Huzmeli	Education	37 minutes, 1 second
antakya11b	Zeki Huzmeli	Education	8 minutes, 22 seconds

Appendix J: Final Codebook

Goal: Explain how different community institutions in Turkey engage in DRR. How community institutions interact with DRR practices to foster a culture of resilience.

Interviewee - This set of codes should capture key insights regarding the interviewees' actions and abilities. These coding categories may involve more *personal stories*, where interviewees describe ideas or actions they have taken to encourage earthquake risk reduction. The intent with this set of codes is to help describe how the interviewee views their participation in DRR.

- **interviewee innovator** – when the interviewee came up with a new idea—a plan, policy, program, or position—and then figured out a way to move the idea to action.
- **interviewee implementer** – when the interviewee actually describes the work that he or she has done to spark the implementation of earthquake related programs or policies.
- **interviewee instigator** – when the interviewee discusses going to "higher ups" (higher ranking officials in his/her organization, political leaders, economic leaders, etc.) to try to encourage the adoption of new earthquake-related programs or policies; this code may include discussion of strategies or techniques the interviewee has also developed him or herself.
- **interviewee resource generator** – when the interviewee describes places where he or she went to obtain the necessary resources (financial, human, or material) to make a program or policy work.
- **interviewee receiver** – when the interviewee describes a time that he or she was receptive to a new idea, innovation, etc. This information may have come from a colleague or someone "higher up" in the organization. Receivers are generally receptive to new information and actively seek it out and try to learn more.

Programs – This set of codes should capture any already existing (or developing) programs that the interviewee describes. These programs may be coordinated by the interviewees' organization or by other organizations that the interviewee describes. This theme will provide more detail about how each individual institution engages in DRR.

- **programs earthquake mitigation** – any programs aimed at promoting structural or non-structural hazards mitigation.
- **programs earthquake preparedness** – any programs aimed at promoting preparedness among professional staff or the population(s) that the organization serves.
- **programs all-hazards** – programs with an all-hazards focus.
- **programs tsunami** – programs that focus on tsunami risk.
- **programs fire** – programs that focus on fire risk.
- **programs public health** – programs that focus on public health; may include chronic health threats (e.g., HIV/AIDS) or more acute threats (e.g., disaster).
- **programs people involved** – any individuals (paid staff, volunteers, etc.) who assist with running a program.
- **programs goals** – a description of the goals of the program.

- **programs discontinued** – any program(s) that the organization used to sponsor but no longer does; or, this may be a program that was proposed but it never got off the ground.
- **programs community network cohesion** – programs that focus on creating a cohesive community network in order to strengthen social capital.
- **programs building retrofit** – programs that focus on providing an understanding and informing the interviewees organization about the safety of buildings in particular areas as well as how to properly go about retrofitting these buildings.
- **programs response** – any programs that are implemented to assist in the response phase of a disaster.
- **programs desires** – what the interviewee would like to see happen if they had unlimited time and resources.
- **programs risk measurement** – programs that are designed to measure risk.
- **programs incentive** – programs that provide incentives to those who implement earthquake risk reduction activities and programs suggested by the interviewee's organization.
- **programs lifelines –** program that focuses on the improvement of lifelines and public works.
- **programs earthquake hazard** – program that focuses specifically on earthquake hazard rather than earthquake risk.
- **programs information gathering –** programs designed specifically to gather information and data about earthquake hazard, risk, preparedness, etc.
- **programs recovery** – programs that focus on community long-term recovery efforts.

Program Actions – This set of codes should capture actual actions that have been taken, actions that will be taken, or actions that program leaders would like to take as a consequence of the lessons learned through the programs described. This information will provide me with a good understanding of how different community institutions practically apply their DRR activities.

- **action retrofit** – any description of the retrofitting of buildings, either for the organization or the larger community.
- **action non-structural mitigation** – any description of activities aimed at completing a non-structural mitigation activity (e.g., securing the contents of a building, fastening equipment, etc.).
- **action worker preparedness** – actions aimed at preparing workers in the organization for a disaster.
- **action public preparedness** – actions aimed at preparing the public that the organization serves for a disaster.
- **action business continuity** – actions aimed at preparing businesses for a disaster.
- **action lifeline assessment** – actions aimed at assessing lifelines (e.g., gas, electric, water, etc.).
- **action disability preparedness** – actions aimed at preparing for persons with disabilities.
- **action structural mitigation** – any description of activities aimed at completing a

structural mitigation activity (e.g., building new, EQ resistant structures, upgrading seismic building codes, etc.).

- **action update/improve program info** – any updates that occur within a project, whether that be update the information used to inform the project or obtaining new resources in order to implement the project better.
- **action legal/government mandates** – legal resources/government mandates used to implement and enforce earthquake safety standards.
- **action distribution of planning rights** – project seeks to distribute the planning rights and responsibilities for potential building locations to particular organizations in order to create an earthquake resistant district.
- **action increase consciousness** – actions used to increase the awareness of the public about their earthquake risk.
- **action financially supports other organizations** – financially supports other organizations, institutions, and/or departments whose primary goal is earthquake risk reduction.
- **action community empowerment** – actions taken to empower and train community members to advocate for their own risk management needs.
- **action professional networks** – communicate and coordinate risk reduction activities and programs with other organizations and institutions.
- **action response** – actions taken to increase the communities response knowledge and capacity.
- **action participatory-**any training or planning that is done in a participatory manner, (e.g. professionals and/or community members coming together to create a plan that works for them).
- **action land use planning** – actions taken with regards to land use planning in order to address earthquake risk.
- **action post earthquake –** actions that were taken after the earthquake.
- **action risk communication –** action taken to try and communicate earthquake risk.
- **action hope –** actions taken to provide hope to community members suffering post-earthquakes.
- **action standardize planning** -- actions taken to standardize preparedness and planning efforts in order to meet the needs of as many people as possible.

Program Creation – This set of codes should capture key things that led to the creation of earthquake or hazards programs that the interviewee describes.

- **creation leader w/ vision** – an individual or team of individuals who pursued hazard risk reduction activities and prompted the creation of the program.
- **creation funding** – when funding became available, the program was created.
- **creation incident city** – a disaster or other emergency *in the same city* sparked the creation of the program.
- **creation incident nation** – a disaster or other emergency in a different city, but the same nation, sparked the creation of the program.
- **creation incident other nation** – a disaster or other emergency in *a different nation* sparked the creation of the program.

- **creation community advocates** – powerful voices within the community advocated to have the program started.
- **creation external organization** – an organization external to the city (either at the state or federal level, or an international organization outside the nation) created the program.
- **creation concern about community** – concern about vulnerable members of the community, vulnerable structures, etc. led to the creation of the program.
- **creation legislation** – new legislation prompted change.
- **creation leadership support** – increased support from leaders or government officials sparked the creation of the program.

Information Sources – This set of codes should capture where the organizations/individuals represented in the sample are currently getting their information. This theme will help me understand the network of professionals and their relationships.

- **sources websites** – may include local, state, or federal government sites; private preparedness sites.
- **sources news media** – when interviewees obtain information from general news media, either print or on-line.
- **sources technical publications** – may include scholarly journals, books, and other professional publications.
- **sources technical databases** – may include CDC data, HAZUS, USGS ShakeMap, etc.
- **sources field reconnaissance** – any reference to learning about earthquakes from actual field reconnaissance trips to other earthquake affected regions.
- **sources past earthquakes** – drawing on information from past earthquakes within the interviewees' home city.
- **sources internal experts** – experts who are within an organization who provide information.
- **sources external experts** – academics, scientists, emergency managers, and others who advise agencies and provide information or data. This code also may capture going to professional conferences to listen to external experts.
- **sources partnerships** – may include partner organizations or umbrella organizations that offer information and resources to encourage earthquake risk reduction activities.
- **sources credible** – any description of what makes the interviewee trust or believe in the accuracy of an information source; also may refer to the importance of having access to credible or reliable data.
- **sources past all-hazards** – drawing on information, resources, and/or lessons learned from past hazards.
- **sources community networks –** community networks that share information and resources that inform and promote earthquake safety.
- **sources government –** resources for earthquake preparedness are provided by the government.

Program Implementation – This set of codes should capture what makes their programs work well and/or are used to actually implement and run the programs. This information will directly guide me to the practical application of DRR by each institution.

- **effective leader** – one person, or a small group of people, who provide consistent, long-term, unwavering support for risk reduction activities.
- **effective general support** – the program receives positive feedback and/or support from the "public" it serves (whether it be parents involved with a school, members of the community, etc.).
- **effective funding** – adequate funding is available.
- **effective information** – appropriate and accessible information is available and usable to professionals.
- **effective goal** – a clear, central goal and/or mission statement that drives the program.
- **effective networks** – program coordinators work with persons from other agencies and organizations to understand and stay on top of "best practices."
- **effective resources** – appropriate resources are available for use by professionals.
- **effective communication** – information is being communicated effectively.
- **effective training** – appropriate effort is put into training staff and/or public about disaster preparedness/response.
- **effective culture –** a situation in which the culture supports earthquake preparedness and recovery.
- **effective buildings –** building codes were adequate and contributed to many buildings withstanding ground shaking from the earthquake.
- **effective business continuity** – businesses were up and running quickly after the earthquake.
- **effective success** – anytime someone mentions their success of being able to withstand and respond an earthquake in some capacity.
- **effective trust** – the level of trust among community members made response and recovery go more smoothly.
- **effective community** – strong sense of community made the earthquake response and recovery go more smoothly.

Lessons Learned – This set of codes refers to lessons learned and whom those lessons were learned from. This theme will help me understand the network of professionals and their relationships.

- **lessons leaders** – any description of the leaders within the field.
- **lessons learned** – lessons learned from others about earthquake preparedness, response, or mitigation.
- **lessons learned EQ** – specific lessons that were learned from experiencing an earthquake.

Program Targets – This set of codes should capture the individuals or groups that are targeted by the programs that were described in the interviews. This theme will add to my holistic understanding of how the institutions' participate in the community as well as with one another.

- **reach school children** – programs designed to reach school-age children.
- **reach parents of school children** – programs designed to reach parents of any school age child.
- **reach elderly** – programs designed to reach older residents.
- **reach staff / workers** – programs designed to help the individuals within the organization prepare themselves as well as their families and so that they can be readily available should disaster strike.
- **reach disabled** – programs designed to reach persons with disabilities.
- **reach poor** – programs designed to reach low-income populations, persons on fixed incomes, etc.
- **reach homeless** – programs designed to reach homeless populations.
- **reach homeowners** – programs designed to reach homeowners.
- **reach renters** – programs designed to reach renters.
- **reach rental property owners** – programs designed to reach rental property owners.
- **reach faith-based orgs** – programs designed to reach faith-based organizations (FBOs).
- **reach non-profit orgs** – programs designed to reach non-profit or community-based organizations (CBOs).
- **reach businesses** – programs designed to reach businesses.
- **reach policy makers –** programs designed to reach policy makers.
- **reach neighborhoods –** programs designed to reach community neighborhoods.
- **reach building owners** – programs designed to reach building owners.
- **reach other organizations/institutions/departments** – programs designed to reach other organizations, institutions, or departments that are working in earthquake risk reduction activities, or who *should* be working in earthquake risk reduction activities.
- **reach community** – efforts and/or goals of the program are to reach the community in general.
- **reach leaders** – actions taken to reach community and village leaders or government officials.
- **reach healthcare** – programs designed to reach healthcare professionals.
- **reach drug** – programs designed to reach drug users/addicts.
- **reach volunteers** – programs and/or information designed to reach volunteers, or whoever wants and desires to find and use this information.
- **reach prisoners** – programs or actions taken designed to target the prison population.
- **reach education sector –** reach people in the education sector to increase safety of school buildings.
- **reach women –** program is designed to reach women.
- **reach media** – actions taken to reach journalists or the media.
- **reach industry--** programs designed specifically to reach industry.

Communication Channels – This set of codes refers to the ways the interviewees and their organizations communicate with the people they serve. This may capture community channels and strategies already in place, or those that the interviewees hope to have established. This set of codes also may capture communication channels that interviewees do not use. "Communication channels" will help my understanding of how the organizations work with one another, clarifying the network of professionals and their relationships.

- **communication social media** – social media used to communicate (e.g., Facebook, Twitter, etc.).
- **communication direct contact** – person-to-person contact, door-to-door contact, contact through church or other speaking engagements, etc.
- **communication Internet** – communication through websites, email, web-based newsletters.
- **communication paper** – communication through pamphlets, reports, paper newsletters, etc. Note, these documents may also be posted on websites somewhere, but if they are also in paper format, make sure and "double code" so that the document is captured under both the "communication internet" and "communication paper" code.
- **communication community networks –** communication through networks already established or desired to be established within the neighborhood or community.
- **communication news media** – television or radio news media is used to communicate.
- **communication telephone** – communication through telephone.
- **communication radios** – anytime a person or organization plans to use professional radios for risk communication.
- **communication photos** – when a person or organizations uses photos to communicate a point.
- **communication presentations** – when a person or organization uses presentations/slides/PowerPoint's/seminars in order to communicate earthquake risk reduction information.
- **communication TV movies** – TV, movies, YouTube videos, or other digital visual media strategies are used to communicate risk information.
- **communication games** – games as an effective means of communicating earthquake risk and response strategies

Barriers – This set of codes should capture any expressed barrier to implementing earthquake risk reduction or hazard risk reduction activities. The "barriers" theme provides an understanding of the DRR activities that community institutions might want to participate in, but do not have the ability to do so.

- **barrier time** – not enough time.
- **barrier money** – not enough funding available.
- **barrier available personnel** – not enough available personnel.

- **barrier expertise** – not enough available expertise on the topic.
- **barrier long-range perspective** – difficult to get other key decision makers to take a longer-range perspective and to make an investment.
- **barrier other issues** – other social issues, which are perceived to be more pressing, receive more attention.
- **barrier other hazards** – other hazards, which are perceived to be more pressing, receive more attention.
- **barrier emergency response** – response activities receive more priority and/or funding than preparedness or mitigation related activities.
- **barrier community networks** – community networks or lack thereof present a barrier to the creation and implementation of effective community risk reduction strategies.
- **barrier voices** – too many voices and opinions make the creation and understanding of a clear framework difficult.
- **barrier consistent message** – the message the organization is trying to articulate is not consistent across multiple platforms.
- **barrier culture** – culture presents barrier to seismic risk reduction and preparedness information dissemination.
- **barrier policy** – past or current public policy restricts mitigation and preparedness activities.
- **barrier resources**– not enough non-monetary resources available.
- **barrier organizational networks**– organizational networks or lack thereof present a barrier to the creation and implementation of effective risk reduction strategies.
- **barrier leadership** – breakdown or changes in leadership inhibit adequate disaster preparedness/recovery efforts.
- **barrier trust** – distrust of the source or credibility of the disaster risk reduction information being provided.
- **barrier planning** – the organization either does not have any risk reduction plans in place or the plans are insufficient
- **barrier government law** – the organizations are subjects of the government and are required to follow the job title dictated to them by the government.
- **barrier private sector/buildings** – organizations struggle with the lack of control that they have over private sector buildings; how safe they are as well as what types (if any) of structural retrofitting or mitigation techniques taken to make the building safer.
- **barrier political climate** – the political atmosphere impedes earthquake mitigation and preparedness activities from occurring.
- **barrier forget** – the communities tendency to forget about their risk to earthquakes presents a barrier impeding the effectiveness of certain programs.
- **barrier no transportation** – there is no transportation available to help staff members respond in a timely manner.
- **barrier crime** – high crime in certain areas prevents organization from reaching vulnerable populations.
- **barrier persuade** – an inability to persuade the public to learn and/or participate in earthquake risk reduction programs, activities, and actions.
- **barrier accessible information** – information on earthquake preparedness and

risk is available, but not accessible.

- **barrier Internet** – there is very little Internet availability in the area, which limits people's ability to access information online or through social media.
- **barrier enforcement** – earthquake preparedness plans are not strictly enforced so people do not follow through with them.
- **barrier parent involvement –** a lack of parent involvement and financial support creates a barrier to earthquake preparedness.
- **barrier access to data** – there is not enough available data i.e. housing stock, infrastructure, etc. to accurately measure risk.
- **barrier unexpected event** – the earthquake that occurred was not what was expected or mapped prior to the event.
- **barrier laggard upgrades** – not adhering to new building code standards or being laggard in building retrofits and upgrades proved to be a barrier when the earthquake hit.
- **barrier unsafe development** – processes that allow developers to build in unsafe areas to maximize profits creates a barrier to earthquake mitigation.
- **barrier building code limitations** – building codes are only meant to keep the buildings from falling, not to be functional after an earthquake.
- **barrier bureaucracy** – bureaucratic processes limited the amount of agency individuals had to begin recovery.
- **barrier delays** – delays in reconstruction following an earthquake can create significant barriers to recovery.
- **barrier communication –** the loss of communication tools i.e. radio, TV., Internet, phones, etc. created a barrier following the earthquake.
- **barrier insurance** – lack of or no insurance coverage within the community severely hindered their ability to respond and recover from an event.
- **barrier unemployment** – unemployment after an earthquake is a barrier to recovery.
- **barrier preexisting social issues** – social issues that existed before the EQ were magnified afterwards.
- **barrier unclear motivation**-- too many differing motivations for participating makes implementing programs difficult.
- **barrier focus**-- either too specific or too broad a focus hinders success.
- **barrier assessment--** there is not a formal assessment or review of the program which makes it difficult to measure success.
- **barrier building practices**-- building practices are unsafe and/or there are not formal licensing requirements to build safely.

Information Preferences – This set of codes should capture how professionals want to have information delivered to them and explanations why. This set of codes may also be used to describe which of these information channels have been effectively used to communicate risk to others.

- **preference maps** – deliver information in map format.
- **preference charts** – deliver data in charts, statistical tables, etc.
- **preference online** – deliver information online.

- **preference downloadable** – deliver information in a way that it can be downloaded and transferred to computers, smart phones, iPads, etc.; in the event of an Internet outage, this will still allow data to be accessed.
- **preference work** – deliver information in such a way that professionals can use the information in their workplace, to present information to their colleagues to educate them regarding risk.
- **preference public** – deliver information in such a way that professionals can use the information for public presentations, meant for a general audience, to educate laypersons regarding risk.
- **preference all-hazards** – deliver information in a way that it can be integrated with an all-hazards plan and perspective.
- **preference tips** – any general discussion of how risk communication "works"; description of the most effective channels for relaying risk information.
- **preference other reputable organizations/departments** – prefer to have information delivered to them through other departments in the government or other organizations that they trust.

Earthquake Concerns – This set of codes refers to concerns expressed regarding earthquakes. The goal of this theme is to help inform how different community institutions want to engage in DRR, but have not been able to due to particular barriers.

- **concern intensity** – concern regarding the intensity, speed, depth, etc. of an earthquake.
- **concern soft story building** – concern that this particular type of building will collapse and cause additional "ripple effects" (e.g., gas line explosions).
- **concern unreinforced masonry buildings** – concern that this particular type of building will collapse.
- **concern non-ductile concrete** – concern that this particular type of building will collapse.
- **concern historic structures** – concern that historic structures will be damaged, destroyed, and/or demolished after an earthquake.
- **concern buildings general** – general concern that "buildings" (any type) will fall down or are at risk in some way.
- **concern bridges roads** – concern that bridges or roads will be impassable, will collapse, etc.
- **concern lifelines** – concern that gas, electric, water, sewage or other critical lifelines will be damaged.
- **concern nuclear** – concern that a nuclear power plant is in an earthquake fault zone.
- **concern emergency access** – concern that due to destruction of lifelines, emergency personnel will not be able to reach the city.
- **concern communication** – concern that communication technologies such as phones, Internet, text messaging will not work.
- **concern vulnerable populations** – concern that vulnerable groups (homeless, disabled, etc.) will be harmed or killed.

- **concern liquefaction** – concern that parts of the city will experience liquefaction or that liquefaction has not been dealt with appropriately.
- **concern landslides** – concern that landslides will occur.
- **concern fire –** concern that fires will occur due to broken gas lines or other issues associated with the earthquake.
- **concern tsunami** – concern that a tsunami will result from an earthquake, causing more damage and loss.
- **concern population displacement** – concern that people will leave after the earthquake and will not return.
- **concern other hazards** – concern that other hazards will occur (outside of an earthquake) that may affect operations (e.g., global warming, environmental contamination, etc.)
- **concern overall survival –** concern that members of the community will not survive an earthquake.
- **concern home –** concern that people's homes will not survive a seismic event.
- **concern business continuity –** concern that loss of a community business will result in a decrease of or complete loss of morale.
- **concern overall public health and safety** – concern for the overall public health and safety of a community or neighborhood.
- **concern general community** – concern for the community in general.
- **concern affordable housing –** concern that earthquake damage would decrease the amount of affordable housing available.
- **concern evacuation** – concern that individuals will not be able to evacuate buildings and/or homes safely.
- **concern sheltering** – concern that the city does not have the capacity to adequately shelter evacuated populations or that citizens will not be prepared to shelter in place.
- **concern crime** – concern that crime rates will increase after a disaster.
- **concern chaos –** concern that there will be generalized chaos, disorder, or social breakdown after a disaster.
- **concern dense population –** concern that high risk areas are densely populated.
- **concern informal living –** concern about people living in informal settings, e.g. squatters, invaders, shanty towns, etc.
- **concern for private sector buildings** – because of the lack of oversight from appropriate professionals, private sector buildings are not as safe as public buildings.
- **concern interference private sector buildings** – there is a concern within the organization that in order to plan with private building owners, you must interfere.
- **concern consciousness of the public about their risk** – there is a concern about the public's lack of consciousness about their true earthquake risk.
- **concern lack of enforcement** – despite well-intentioned codes, regulations, and legislation, there is a significant lack of enforcement, making these laws useless/void.
- **concern non-structural mitigation** – concerned about the lack of non-structural mitigation (community awareness as well as implementation).
- **concern small businesses**- concern that small businesses will not survive an

earthquake.

- **concern not enough** – concern that, despite their efforts, what is being done is still not enough to sufficiently prepare
- **concern earthquake philosophy** – any time the interviewee shows concern through a philosophical discussion about the nature of earthquakes.
- **concern lifestyle disruption** – community members are concerned about the disruption that earthquake risk reduction programs and activities will cause in their life. This worry leads to a lack of community support, hindering earthquake risk reduction programs and activities.
- **concern unstable land** – concern that the land or soil is unstable and settlements in these areas will be damaged.
- **concern floating population** – concern that many people in the city do not live there permanently. There is a large incoming and outgoing population.
- **concern proper burial** – concern that there will be (was) so many dead bodies without caskets that people will have to be buried in mass graves.
- **concern response capacity** – interviewee displays concern for the response capacity of the community/organization or lack thereof.
- **concern temporary work locations** – concern about working from home or in temporary office spaces post-earthquake.
- **concern critical buildings** – concern that critical buildings such as hospitals, public works, schools, etc. will remain functional following an earthquake.
- **concern insurance** – any discussion of the role insurance companies have played post-disaster or the role that they will play in the future.
- **concern psychological impacts** – concern that earthquake events have a negative psychological impact on community members.
- **concern rebuild** – concerns about the plans for rebuilding the city post-earthquake.
- **concern media** – concern that information presented in media reporting is often inaccurate and can have serious implications for recovery.
- **concern fatigue –** concern that people who were affected by the earthquakes are experiencing fatigue, which is hindering their ability to prepare for future events.
- **concern displacement –** concern about members of the community that have been or will be displaced from the homes due to an earthquake.
- **concern disaster relief funds –** concern that disaster relief funds are not being used appropriately.
- **concern type of earthquake –** concern that earthquakes can come from all different directions with different levels of shaking which makes risk hard to estimate.
- **concern preparedness** – interviewee is concerned about the preparedness capacity of their community.
- **concern temporary housing** – concerns about people in temporary housing following an earthquake.
- **concern post-earthquake research ethics –** ethical concerns about post disaster research.
- **concern schools** – concern that school are not or will not be up and running quickly after an earthquake.
- **concern students** – concern that students education is/will suffer following an

earthquake.

- **concern time of day** – concern that an earthquake would be more harmful at night than during the day.
- **concern dependency on relief aid** – concern that community members become dependant on disaster relief aid, which affects their long-term recovery trajectory.
- **concern NGO's** – concern that NGO's are either not doing an adequate job or that there are too many overlapping/conflicting services after an earthquake.
- **concern flood** – concern that flooding will occur.

Risk Perception – This set of codes concerns levels of risk perception (high, low, non-existent) among different actors. This theme gives a broad understanding of the participant's perspective as they consider their community and institutional involvement in DRR.

- **risk perception public** – descriptions of how concerned "people" or "the public" are about earthquake threats.
- **risk perception children** – descriptions of how children think about earthquake risk.
- **risk perception powerful** – descriptions of how those in powerful positions—either within the interviewees' own organization or other powerful actors outside the organization—think about earthquake risk.

Survey Questions – This set of codes should be used to capture the responses to the probes asked at the end of the interview, after the interviewee has taken the survey. If the interviewee speaks to other relevant issues, codes, or themes, they should be captured. This theme helps clarify why the interviewee answered the way they did on the survey.

- **survey most important** – response to the question "which of these items is most critical, or important to you, and why?"
- **survey format** – survey response to the question "what format do you prefer to received your information in?"
- **survey needs** – any discussion of explicitly stated needs, what the interviewee would like to have access to, etc.
- **survey trust** – what makes you trust/distrust the sources where you currently receive your information?
- **survey online –** survey response to the question "how do you prefer to receive information online?"

Appendix K: Survey Questionnaire – Turkish

Küresel Deprem Modeli Vakfı Anketi

Kurumunuzu, buradaki topluluğu ve buraya hizmet eden insanları düşünerek cevap veriniz. Aşağıdakilerden hangisine deprem riskini anlama yönünden sahipsiniz yada sahip olmak isterdiniz?(Not: Eğer aşağıdaki kaynaklara erişiminiz olduğu halde bu kaynağı Küresel Deprem Modeli' nin sağlamasını istiyorsanız "İhtiyaç var" seçeneğini işaretleyiniz.)	**Var**	**İhtiyaç Var**	**İhtiyaç Yok**
Bir depremdeki yer sarsıntı miktarı tahmini?	❑	❑	❑
Bölgenizdeki fay hatları haritası.	❑	❑	❑
Deprem tarafından tetiklenebilecek potansiyel toprak kayması yada tsunami haritaları.	❑	❑	❑
Depremde gerçekleşen ölüm sayısı tahmini.	❑	❑	❑
Depremde yaralanan sayısı tahmini.	❑	❑	❑
Farklı nüfuslardaki etkilerinin tahmini. (Yaşlılar, evsizler … vs.)	❑	❑	❑
Depremde hasar gören konut tahmini.	❑	❑	❑
Depremde hasar gören okul tahmini.	❑	❑	❑
Depremde hasar gören işyeri tahmini.	❑	❑	❑
Depremde hasar gören hastane tahmini.	❑	❑	❑
Depremde hasar gören yol, köprü ve altyapı tahmini.	❑	❑	❑
Depremde zarar gören elektrik, doğalgaz ve su taşıma sistemleri tahmini.	❑	❑	❑
Depremde cep telefonu şebekelerinde meydana gelecek hasar tahmini.	❑	❑	❑
Depremde internet ağında meydana gelecek hasar tahmini.	❑	❑	❑
Depremde oluşacak ekonomik kayıp tahmini.	❑	❑	❑
Bireylerin ve ailelerin depreme nasıl hazırlanacakları konusunda bilgi.	❑	❑	❑
Kurumların deprem için nasıl hazırlanacakları konusunda bilgi.	❑	❑	❑
Binaların içerisindekilerin deprem sırasında düşmeden durabileceği süre miktarını artırma hakkında bilgi.	❑	❑	❑
Binaların deprem sırasında yıkılmamaları için nasıl güçlendirilebilecekleri hakkında bilgi.	❑	❑	❑
Deprem riskini belirleyebilecek ve açıklayacak eksperlere erişim.	❑	❑	❑
Depreme karşı hazırlık konusunda bireylere ve kurumlara yardımcı olacak teknik uzmanlara erişim.	❑	❑	❑

Çalıştığınız kurum deprem riskini azaltma konusunda yürüteceği aktivitelerde hangi önemli yada daha önemsiz engelleri deneyimledi?	**Önemsiz engel**	**Önemli engel**	**Engel değil**
Maddi yetersizlik.	❑	❑	❑
Bu gibi çalışmalara ayıracak zaman yetersizliği.	❑	❑	❑
Bu gibi çalışmalarda yer alacak çalışan yetersizliği.	❑	❑	❑
Teknik yetersizlikler.	❑	❑	❑
Yetersiz deprem bilgisi.	❑	❑	❑
Diğer daha kritik, sosyal yada ekonomik problemler.	❑	❑	❑
Diğer daha ciddi tehlikeler.	❑	❑	❑
Meslektaşların deprem tehlikesi konusuna karşı yeteri kadar ilgili olmaması.	❑	❑	❑
Hizmet ettiğiniz kitlenin deprem tehlikesine karşı yeteri kadar ilgili olmaması.	❑	❑	❑

Profesyonel amaçlar için bilgileri nasıl aldığınızı ve paylaştığınızı düşündüğünüzde aşağıdaki bilgi kaynakları geçen sene içinde sizin için ne derece faydalı oldu?	**Düşük**	**Orta**	**Yüksek**	**Bu olanak yok**	**Bu olanak var ama kullanışlı değil**
Gazeteler	❑	❑	❑	❑	❑
Radyo	❑	❑	❑	❑	❑
Televizyon	❑	❑	❑	❑	❑
Sosyal paylaşım siteleri (Facebook, Twitter…vs.)	❑	❑	❑	❑	❑

Bilimsel yayınlar (Kitaplar, makaleler, mesleki dergiler…vs.)	❑	❑	❑	❑	❑
E-posta	❑	❑	❑	❑	❑
Telefon	❑	❑	❑	❑	❑
Meslektaşlarla bilgi alışverişi	❑	❑	❑	❑	❑
Bilim uzmanları ile bilgi alışverişi (Mühendisler, araştırmacılar, akademisyenler…vs.)	❑	❑	❑	❑	❑
Haber siteleri	❑	❑	❑	❑	❑
Hükümet siteleri	❑	❑	❑	❑	❑
Deprem veya doğal afet siteleri	❑	❑	❑	❑	❑
Deprem tehlike haritaları	❑	❑	❑	❑	❑

<u>Çalıştığınız binanın</u> bir depremde hasar göreceğini öğrenmiş olsaydınız aşağıdakilerden hangi bilgiye sahip olurdunuz yada olmak isterdiniz?	**Var**	**İhtiyaç var**	**İhtiyaç yok**
Depremden sonra binadaki hasarı telafi etmek için tahmini masraf miktarı.	❑	❑	❑
Depremden sonra binanın onarılana dek tahmini ne kadar sure (gün, hafta, ay…)kullanıma kapalı kalacağı.	❑	❑	❑
Deprem sırasında binanın tamemen yıkılma olasılığı, içerisindeki tahmini potansiyel yaralı ve ölü sayısı.	❑	❑	❑
Binanınızın deprem olmadan once daha az zarar görmesi yada yıkılmaması için tahmini güçlendirme çalışması tutarı.	❑	❑	❑

ADINIZ:_____