Quick Response Report #83 RESPONSE TO A DAMAGING EARTHQUAKE IN AN ENVIRONMENT OF POLITICAL TURMOIL (DINAR, TURKEY, OCTOBER 1, 1995)

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The past few years since the collapse of the Soviet Union have been very challenging for the democratic and secular Republic of Turkey. International and domestic events have brought enormous pressures on the Turkish government and its people. Conflicts in Chechnya, Nogorno-Karabagh, Bosnia, Iraq, and Cyprus have consumed much of Turkey's foreign policy attention. At the same time Syria has rallied the Arab nations to join her in international condemnation of Turkey's sovereign water development projects on the Euphrates and Tigris rivers (1). The long disputes with Greece surfaced again over Aegean territorial limits and over a solution to the Cyprus issue. While addressing these challenges, the Turkish government was actively promoting the creation of the Black Sea Economic Cooperation group, soliciting membership in the European Customs Union, and obtaining land rights for oil and gas pipelines from the new Central Asian Muslim Republics. It was also headed toward a collapse of the parliamentarian coalition government. Turkey certainly faced a full agenda in its foreign affairs, but events occurring on its domestic scene were even more challenging. The Kurdish Worker's Party (PKK) has conducted terrorist attacks for over a decade, with the goal of gaining part of Turkey's southeastern territory for an independent Kurdistan (2). The result has been over 6,000 deaths, thousands of refugees, and monumental economic and social costs (3). Turkey's rampant inflation, high unemployment, and migration of villagers to cities are largely consequences of financing the military

response to the terrorism. All of these conditions have added to the growing tendency of extremist religious and ultra-nationalists to gain political representation at the municipal and parliamentary levels.
On September 20, 1995, over 350,000 workers in the public sector began a strike that shut down ports, rail, and many government services. This largest strike in Turkey's history began on the same day as the collapse of Prime Minister Tansu Ciller's coalition government (4). Nine days later, a strong earthquake occurred in Dinar, Turkey.
The objective of this research is to address the question: What is the response to a damaging earthquake when the government has collapsed and a country is facing extremely serious domestic challenges such as terrorism, rampant inflation, labor strike, high unemployment, and a rising Islamic movement? My response to the question is based on a Quick Response Research grant. This grant enabled me to travel to Dinar, Turkey, (4-11 October 1995) just days after the October 1 earthquake occurred.

This Research and the Literature

One advantage of international research, in this case an earthquake in western Turkey, is that it allows one to look at a different society, with different political challenges and orientations, and see how it behaves and reacts when faced with a sudden natural event and disaster beyond its control. I say this well aware of the contemporary research trend to identify human actions that "cause" or contribute to the catastrophe. Scholars, especially sociologists (Barton, 1969; Dynes, 1975; Mileti, Drabek, and Haas, 1975; and Drabek, 1986) and geographers (White, 1945; Kates, 1971; Burton, Kates, and White, 1978, 1993; Whittow, 1979; and Hewitt, 1983) have extensively studied human actions and reactions toward natural and human induced disasters. Yet there is more to learn. An international call for more research has been made by the United Nations during this International Decade for Natural Hazard Reduction (United Nations General Assembly, 1987). The United States has endorsed this action and the US. Committee for the Decade for

Natural Disaster Reduction has addressed the importance of this focus (National Research Council, 1991). One of the Committee's recommendations was that "data on the . . . disasters be systematically collected and shared and that the resulting lessons learned be incorporated into policy and practice to reduce the impacts of future disaster" (National Research Council 1991, p. 4). Doing so at both the national and international scales would help us gain further knowledge available at a period of enhanced awareness during hazard occurrences. The continued research on foreign events could also be designed to address current issues that question earlier focus on natural hazards, for example, Hewitt's call for "a revised vision of how and why disaster occurs, giving full credit to the ongoing societal and man-environment relation that prefigure it" (1983, p. 27). Turkey, in many ways like California, is a seismic region that can help us understand the physical and social factors that govern the many damaging earthquakes that have occurred there during this century. Although earthquakes will continue in Turkey and elsewhere, undoubtedly their tragic impact can be reduced.

Methodology

Like all research projects, this study was constrained by costs, time, and choice of data collection techniques. Considering all aspects of how to best conduct this fieldwork, I chose the direct participant method for data collection. My interviews were designed to minimize the victims' grief and interruption of the emergency phase of disaster recovery. It was very important for this project to include interviews with officials of government and emergency response programs. This resulted in some of my data coming from "elite interviewing" techniques that were unstructured and open ended.

Given constraints above, the emotional state of the respondents, and the sensitive nature of accusations against provincial and local officials, my interviewing was limited to only those respondents who remained after the earthquake (many had already left before the main shock) and to

those officials in the Civil Defense Crises Action Center. My interviewing always was overt and preceded by an introduction of my purpose and affiliation with Baylor University and the Natural Hazards Research and Applications Information Center of the University of Colorado. I also carried my published reports on the Erzurum, Erzincan, Lice, and Gediz earthquakes (5). These publications opened many doors and helped ease tensions and overcome suspicions. I assured each respondent of his/her choice of confidentiality. As expected, several respondents chose anonymity. This research is based on field interviews of 42 Dinar citizens, 6 provincial and local officials, two professors from the University of Istanbul, and two professors from Izmir. It makes no claim of universal applicability, but does capture and assess human response to a damaging earthquake when a nation has a collapsed government and much of the national public sentiment strongly criticizes mitigation efforts as inefficient and earthquake resistant construction codes as non-enforced (Atac, 1995; Ustun, 1995).

Seismicity

Although Turkey is at risk from a wide variety of natural hazards, including floods, droughts, landslides, avalanches, forest fires, blizzards, and earthquakes, Turks generally equate a natural disaster to earthquake. There are good reasons for this. Human interactions with geological, topographical, seismic and climatic characteristics in Turkey have resulted in earthquakes causing about two-thirds of all destroyed human construction units and most of the human and animal casualties. Loss due to construction practices in seismic zones have tended to increase since 1960, increasing the pressure for public and private mitigation action.

Turkey is located in an active seismic zone on the Alpine-Himalayan fault line. The zone extends within Turkey for about 1,000 miles from Edremit's Kaz mountains in the Western Thrace to the Caldiran mountains near Van in the East. Earthquake experience is not new to Turkey since 92% of its population, 90% of its cities, 755 of its

industrial complexes, and 40% of its dams are in active earthquake zones (Atac 1995, p. B1). Earthquakes frequently destroy settlements across the country. Fifty-five earthquakes in this century alone have killed over 70,000 people, injured another 122,000, and destroyed 420,000 buildings (Gulkan and Ergunay, 1992).

Site and Situation

Dinar, practically on top of the epicenter, is located on a major transportation artery of road and rail that connects the surrounding provinces of Denizli, Burdur, and Isparta with Antalya in the South, Izmir to the West, and Konya-Ankara in the East (6). The town's elevation ranges from 860m to 950m. Its origin was on the limestone, marl, and schist hills trending northwest-southeast surrounding the north-south trending alluvial plateau. The main tributary of the Buyuk Menderes river flows by Dinar. The town is also partly surrounded by the Samsun mountains (1500m) in the North, the Ak mountains (1502m) in the South, and the Kara mountains (1000m) in the West (Figures 1 and 2).

Growth from the town's origin on the rocky hills to the east has expanded west and south to the more level, alluvial plateau. Most of the city is now located on this sand, gravel, and clay alluvial base.

The town sits at 38.09 degrees north and 30.15 degrees east in a sparsely populated rural agricultural center in the "lake district" of southwestern Anatolia, about 200 miles east of Izmir and 200 miles south- southwest of Ankara.

Dinar has been continuously settled since about 1200 BC. Dinar (Meandros) was probably the capital of King Midas' kingdom in the 8th century BC. The city declined in importance during the Byzantium era, and remained a small settlement (Geyikler) under the Selcuk and Ottoman periods. It became a district of Afyon Province, similar to an American county seat, with the establishment of the Republic of Turkey after World War I.

Since the town of Dinar is located on cross roads between Interior

Anatolia, the Aegean region, and the Mediterranean regions, and is situated on a vast alluvial plain with irrigation from the Buyuk Meanderes river, it is a thriving agriculture center. Production has shifted over the past two decades from subsistence agriculture to mostly commercial crops. Over 60% of the population is engaged in agricultural production. Crops are mainly wheat, sugar beets, vegetable and fruit production. Production of opium poppy, once an important traditional cash crop, has been severely reduced from the government action of 1974.

Dinar (population 35,000 in 1990) is now one of ten district centers (ilce) located within the province (Il) of Afyonkarahisar (Afyon), one of Turkey's 67 first order administrative divisions. The province's population of 730,223 is distributed over 14,230 km in 499 villages and towns. The Dinar district has 35 villages under its jurisdiction, along with its sub district towns of Dombayova and Haydarli. Dinar's total administrative jurisdiction covers 65 towns and villages with a total population of 91,000 (1990 census). Village populations in the region range from as few as 73 people to as many as 7,474. Obviously, this is not a densely populated province (Figure 3).

Prior to the Main Shock

Residents in the Dinar region had experienced minor to light magnitude earthquakes several days before the main shock occurred. On September 26 a Ms=4.1 was felt in Dinar and its villages. The next day residents felt a moderate Ms=5.1. These two events, combined with the other light tremors, triggered understandable concern, anxiety, and pleas for shelter assistance. According to every respondent, over 90% of the residents feared a larger earthquake and refused to sleep in their homes. People slept in their cars, wagons, trailers, or on the ground. Some of the public buildings had visible damage. The schools were closed, businesses shut down, and residents started evacuating Dinar. Those who remained (estimated at less than 10,000 by Dinar Mayor Ekmeksiz) became very vocal and demanded temporary shelters from the regional stockpile of

tents in Afyon. Officials (Assistant Governor) in Afyon tried to reassure the residents that the danger was over on Saturday, September 30. Radio and TV announcements from the Afyon governor attempted to reassure everyone to return to their homes. On Sunday, October 1, on the noon radio news, Governor Yaha Gur announced that the public schools would open on Monday and that everyone should return to their homes. This information was also announced by loudspeakers throughout Dinar. A few residents heeded the official's advice. Four hours later, a strong earthquake of magnitude Ms=6.1 struck the region. The epicenter was practically under the city of Dinar. Ninety people died and more than 200 were injured. Early estimates were 3,719 houses damaged or destroyed and most of the government buildings destroyed. Damages extended beyond Dinar to 53 surrounding towns and villages. The low loss of life relative to the high damages can be partly attributed to the foreshocks that encouraged people to stay out of their homes. Many, including 75% of my respondents and practically all the national print and visual media, view the loss of life that did occur as excessive, preventable, and attributable to the actions of Afyon's governor.

Casualties and Injuries

A minimum of 90 men, women, and children died in their homes or in public buildings. Over 200 received medical treatment in portable clinics or were taken to surrounding hospitals in Burdur or Afyon. The state hospital was structurally damaged, but the severity had not been determined during my visit. The medical personnel were treating victims in the adjacent courtyard.

Search and Rescue

Turkey is well experienced with disasters requiring search and rescue actions. Some search and rescue teams and civil defense units were on the scene late on the first day. As with the past five major earthquakes in Turkey, Swiss and German search teams with dogs and detection

devices were quickly on the scene by day two. Greece sent a 22-person rescue team and a 6-person medical team to assist. As with previous efforts to quickly rescue survivors during the critical first 48-72 hours, conflicts between use of the sophisticated sound detection devices (which require minimal background noise) and the large, noisy, and heavy equipment operators surfaced. Even so, at least 20 people were rescued by the S&R teams.

Structural Damages

Much of the constructive criticism reported in the Erzincan earthquake of March 13, 1992, is also applicable to the Dinar case (EERI, 1993). That is, many structural failures are the result of improper construction not in compliance with earthquake resistant construction codes. Dinar's public buildings, built by government contractors, were particularly vulnerable and suffered total or major damage. Such was the case for the Security Headquarters building, the Sub-Provincial Governance, the Minister of Justice residence, and the State Hospital. Most of Dinar's 37 public buildings were destroyed or heavily damaged. Some of these public buildings may have been leased after construction (Citipitioglu, 1995). In these cases the government was not responsible for the construction (nevertheless, such buildings should be thoroughly inspected by civil engineers before leasing).

In the 23 neighborhoods of Dinar, 1,228 houses were totally destroyed or heavily damaged, 990 houses were moderately damaged, and 1,558 received minor damages (7). Nine hundred and forty-three houses were totally destroyed in 53 outlying villages under Dinar's jurisdiction (8). Reports attributed to the national government range from 4,000 destroyed and 1,000 partially damaged in Dinar to approximately 3,000 or 30% of all buildings in Dinar (Ustun, 1995; Bogazici University, 1995).

Buildings in Dinar are one to five stories. The first levels of multistory buildings on the main streets of Dinar are usually occupied by commercial retail stores. Almost all the five-story apartment buildings

were destroyed or heavily damaged. These buildings, as with the buildings on the main streets, were built with reinforced concrete. Walls are either solid or hollow brick. Most buildings suffered heavy damage from severe failure in column and beam-column joints of reinforced concrete. Severe cracks occurred in load bearing walls of masonry buildings. The Post Office (PTT) suffered major damage and was condemned during my visit. It appeared to be fairly new.

Assessment and Lessons Learned

The Dinar earthquake was Turkey's sixth significant earthquake during the past 25 years (1970-1995). On the basis of these experiences the national government has made some improvements in preparing for a disaster. Educating the public by television and print media has been attempted. Correct construction practices to minimize risk, even with low-level technology in poor villages, has been introduced. A formal administrative hierarchy to plan for and manage disasters is in place from the national to sub-provincial level. Research to monitor physical changes and identify areas at risk is ongoing. A national seismic risk map, with modifications, has been available for over two decades. In the area of recovery, the government has extensive experience with rapidly replacing destroyed and damaged homes with safer prefabricated structures. Various universities are conducting research to minimize the risk before the event and to improve the recovery actions and construction practices. Nevertheless, the national public outcry over the Dinar disaster demonstrates that the nation has much more to accomplish in mitigation and public confidence building measures.

It appears that the Turkish public has reached a new level of awareness. People seem to now demand that earthquake risk maps be updated, that regulations concerning construction practices to minimize risk be enforced, that quality control be enforced during new construction, and that older buildings and houses clearly at risk be properly retrofitted. This awareness and public opinion are an important step toward more significant progress. But is it realistic to expect major changes in a

rapidly developing economy with limited resources and the many domestic challenges discussed above? In some areas, yes.
The purpose of this research is to assess the response to a disaster when a state is in an environment of domestic turmoil. The emergency response of search and rescue appeared to compare favorably with previous earthquake disasters. Politicians, including the President and Prime Minister were quickly on the scene. President Demirel offered condolences and promised to rebuild "the nicest city in Turkey." Unlike previous disasters the government has taken longer to announce definite plans for reconstruction. Parliament representatives attributed local dissatisfactions and damaged government structures to their opponents. The Welfare party (Refah) was particularly critical toward the Ciller government. Less than three months later, the Ciller government was voted out of office and the Welfare party won more seats in parliament than any of the other parties. It is not possible based on this research to determine what impact, if any, that this earthquake disaster had on the subsequent political events. Neither is it possible to state that the political environment caused slower or poorer response. This tentative and cursory research raises many questions and opens the door for a far more extensive work.
Dinar was a warning of what to expect in cities such as Istanbul and Izmir. Enforcing compliance of construction codes for all new public buildings and retrofitting older public buildings is essential. Such action would help build public confidence in the government. This compliance of the law would be important for saving lives and would likely encourage contractors to extend proper construction practices into the private sector. Although Dinar was a warning of what to expect on a much larger scale in Izmir and Istanbul and other large Turkish cities, it also could be a catalyst for critical corrective actions.

Conclusion

Disasters remain a significant problem in all societies. But Turkey is exceptionally vulnerable. A major earthquake in Izmir or Istanbul would

be catastrophic. There would be thousands of fatalities and injuries, and economic damage would expand all over Turkey and the region, paralyzing imports and exports and probably costing Turkey about 100 billion dollars in direct and indirect costs (Atac, 1995, p. B1). Clearly, further research is needed to monitor, assess, and provide constructive responses to a problem that will not disappear. Lessons learned from the Dinar case validate a much larger problem whose solution will require political action to re-prioritize and re-allocate very limited national funds.

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Footnotes

1. This problem is examined in detail in Kolars and Mitchell, 1991.
2. See Gunter, 1990; Robins, 1991; and Mango, 1994 for this problem in detail.
3. Mine is a very conservative estimate. Ismet G. Imset (1992, p. 1) reported 5,100 deaths in 1982. The national and international media widely report up to 18,000 fatalities ("Most Turkish Troops End North Iraq Push," 1996).
4. See "Biggest-Ever Strike Becomes Key to Breaking Political Deadlock" in *Turkish Daily News*, October 6, 1995, pp. B-1.
5. These publications were useful in renewing acquaintances and adding credibility to my research efforts. See Mitchell, 1976, 1977, 1985, 1993; and Mitchell and Weida, 1981.

6. A team of seismologists from Bogazici University were quick on the scene and produced a brief reconnaissance report just days after the earthquake. It has been distributed on the Internet. See Bogazici University, 1995.
7. Interviews with officials representing Disaster Affairs.
8. Ibid.

Figures

Figure 1
General Location of Dinar, Turkey

Figure 1. Physical map of Western Turkey with rectangle indicating location of Dinar, Turkey. Source: A. Barka in Bogazici University Reconnaissance Report No. 1, 1995.

Figure 2
Physical Relief Map of Dinar

Figure 2. Relief map of Dinar and vicinity with area of extensive damage. Source: Bogazici University Reconnaissance Report No. 1, 1995.

Figure 3
Map of Afyon Province

Figure 3. Districts, including Dinar, in Afyon Province. Source: Census

of Turkey, 1990

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