THE ORGANIZATIONAL STRUCTURE OF TURKISH DISASTER MANAGEMENT: A CRITICAL EVALUATION

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Seismic risk is a constant threat for most local communities in Turkey. Earthquakes have caused significant losses to human lives and properties. The Policy makers have adopted various linear policies to deal with this complex problem. Despite recent reforms, the organization of Turkish disaster management is ineffective in dealing with complex disaster environments. Current public policies i ncluding the disaster law and regulations as well as the principles of operation are important reasons for this problem. Public policies that count for complexity is required for timely and collective seismic response operations.

KEYWORDS
Seismic risk, Organizational structure of Turkish disaster management, Inter-governmental relations, Disaster management.

TÜRK AFET YÖNETİMİNİN ORGANİZASYON YAPISI: ELEŞTİREL BİR DEĞERLENDİRME

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Sismik risk, Türkiye'deki pek çok yerleşim birimi için sürekli bir tehdit niteliği taşımakta, meydana gelen depremler yüksek miktarda can ve mal kaybına sebebiyet vermektedir. Uzun yıllardır uygulanan doğrusal (lineer) politikalara ve 1999 Marmara depremi sonrasında gerçekleştirilen reformlara rağmen, Türk afet yönetimi, dinamik ve karmaşık afet şartlarında etkin faaliyet gösterecek bir örgütlenme anlayışına sahip değildir. Afet yönetiminin mevcut örgütlenme politikası ve operasyon prensiplerini belirleyen yasal ve idari düzenlemeler bu problemin önemli bir sebebidir. Depremlere zamanında ve kolektif müdahalenin koordinasyon içerisinde gerçekleştirilmesi, afet ortamlarının karmaşık ve dinamik şartlarına uygun organizasyon politikalarının geliştirilmesini gerektirmektedir.

ANAHTAR KELİMELER
Sismik risk, Afet yönetimi, Türk afet örgütlenmesi, Kamu kurumları arası koordinasyon

1. INTRODUCTION

Seismic risk threatens the well-being of numerous communities in the world. Nevertheless, the degree of exposure to risk is not the same for all. It depends on whether the communities take action against it or not (Hewitt 1997, Waugh 2000). In its attempt to reduce the risk of disasters the policy makers in Turkey has adopted various public policies for organizing public organizations and their resources. Regrettably, the official policies have been ineffective for managing an intergovernmental collective action, because of the fallibility of their linear assumptions in complex disaster environments.

This paper reviews Turkey's vulnerability to seismic risk and the formal organizational structure of Turkish disaster management in conjunction with the reforms after the 1999 Marmara earthquake. The paper proposes a complex policy perspective for facilitating intergovernmental coordination in Turkish disaster affairs. The study uses data from laws and regulations, on-site observations, post-disaster critiques, review of official reports, as well as interviews conducted with public organizations between October 5 and December 20, 2002.

2. TURKEY'S EXPOSURE TO SEISMIC RISK

Turkey is founded on the historically earthquake prone Anatolian Peninsula. Turkey's location in the Eastern Mediterranean sector of the Alpine-Himalayan earthquake belt exposes 92% of the population and 95 % of the land to seismic risk (Saglik Bakanligi 2004).

There are six active and main tectonic belts in Turkey. The distribution of damaging earthquakes by the main tectonic belts in the last century is provided in Table 1.

Table 1: Main Tectonic Belts in Turkey

Main Tectonic Belts	**Number of Damaging Earthquakes**
North Anatolian Fault	36
East Anatolian Fault	11
Aegean Grabens System	33
East Anatolian Contractional Province	22
Cyprus-Hellenic Arc	13
Central Anatolian Ova Province	4

Adapted from Demirtas and Yilmaz (1996)

These tectonic belts are the North Anatolian fault line, East Anatolian fault line, Aegean Grabens System, Hellenic Cyprus Arc, East Anatolian Contractional Province, and Central Anatolian Ova Province. Especially the North Anatolian Fault line has produced the most destructive earthquakes in the last century. This fault line is responsible for the 1992 Erzincan, the 1999 Marmara, and 1999 Duzce earthquakes. While Aegean Graben systems were responsible for the 1995 Dinar earthquake (Demirtas 1996), the East Anatolian Fault was partly responsible for the 1998 Ceyhan/Adana earthquake (Demirtas 2002).

3. IMPACTS OF EARTHQUAKES

The frequency of damaging earthquakes in Turkey and its neighbors is an earthquake every 1.1 years in the last two thousand years. As shown in Table 2, earthquakes are the most dangerous and most frequent natural disaster in Turkey. Destructive earthquakes occurred 131 times and represented 61 percent of all natural disasters between 1902 and 1999.

Table 2: Natural Disasters in Turkey

Type of the Natural Disaster	N	%
Earthquake	131	61%
Flood	30	14%
Landslide	32	15%
Rock falls	11	5%
Fire	9	4%
Avalanche, Storm, and Rain	2	1%
Total	215	100%

Source: Adapted from Ergunay (1999)

Earthquakes cause many complex problems that affect the whole society. Some impacts of the major earthquakes between 1992 and 1999 are summarized in Table 3.

Table 3: Earthquake Losses in Turkey: 1992-1991

Earthquakes	Deaths	Housing Units Damaged	Housing Units Collapsed or Razed	Estimated Cost in $Billion
1992 Erzincan	645	8000	1450	0.75

1995 Dinar	100	6500	2043	0.25
1998 Ceyhan	150	21000	2000	0.5
1999 Marmara	>18000	320000	26000	>20
1999 Duzce	812	10100	800	1
Total	19707	365600	32293	22.5

Source: Adapted from Gulkan (2002)

According to the table, earthquakes claimed for killing more than 19,707 people, damaged 397,893 housing units and cost more than 22.5 billion US dollars. Earthquakes also inhibited the economic development because of the damage to property, industry, commerce, and infrastructure. A recent study by Health Ministry (2004) indicates that the average yearly cost of the earthquakes to Turkish economy has been about 2 percent of the GDP.

The protection of human lives and properties against seismic risk is an essential responsibility of government. Complexity and change in disaster environments requires complex approaches in organizing and using public resources.

4. COMPLEXITY IN DISASTER AFFAIRS

Change and complexity have marked today's organizational environments. Most organizations are susceptible to continuing change occurring simultaneously at local, national, and international levels (Comfort 1994). Traditional bureaucratic organizations prove to be ineffective in dynamic environments (Merton 1940, Senge 1994, Marion 1996, Axelrod and Cohen 1999, Stacey 2000), especially in emergencies (Comfort 1999, Mileti 1999, Wildavsky 1988). Reviewing the literature, Garnett (1992) has asserted that emphasis on hierarchy, linear plans and procedures developed in advance often fails to implement government strategies and policies effectively[1].

Complex systems are dynamical and nonlinear, which means that inputs and outputs are not proportional. As a result, "if A, then B" statements in which outcome is the simple function of input are not true (Uri 1995). Disasters create uncertainty, rapid change, and unique conditions. The assumptions and rules that public organizations hold for their regular

[1] Linear policies are a reflection of Newtonian philosophy of science. Newton and his followers believed that once we know the initial conditions, we could calculate all following steps as well as preceding ones (Prigogine 1997). The linearly designed plans and procedures through laws and regulations determine the principles of organization without paying attention to the dynamic and uncertain conditions of organizational environments.

activities and work environments do not apply to emergencies (Mileti 1999). The existing gap between disaster plans and their implementation in nonlinear multi-organizational disaster environments require the employment of nonlinear methods of problem solving for seismic response systems (Rosenthal, Boin and Comfort 2001, Mileti 1999, Comfort 1999). This refers to changing the traditional rule-bounded and inflexible organizational structures into adaptive organizational systems for responding to changing conditions (Kauffman 1995, Wildavsky 1988, Comfort 1999).

An adaptive organizational system through organizational flexibility and technical infrastructure enables its organizations to relax or eliminate other functions temporarily, when needed. As a result, the organizational structure is continually modified through actions, as interdependent disaster organizations interact with their dynamic environments (Comfort 1993). As well as considering the uncertainty in their environments, an adaptive system also emphasizes internal dynamics and the interaction between organizations through lateral coordination (Morcol 2001).

The flexibility helps line managers or team leaders to take appropriate actions and make necessary changes in the course of generally defined policies. However, this is not only a one-way relationship. The feedback provided by line positions may influence necessary changes in policies and strategic goals (Comfort 1994, Levin & Sanger 1994).

Adaptive organizational behavior is closely related with an increased capacity for communication and coordination through information processing (Comfort 2002). The interorganizational communications, especially during the first three days after a major disaster, inhibit intergovernmental coordination and effective response in Turkey (Comfort and Sungu 2001, Corbacioglu 2004). The availability of continuous search, exchange, and dissemination of information between organizations from different jurisdictions and sectors are the lifeblood of an adaptive disaster system. Investments in Geographic Information Systems, Global Positioning Systems, Intelligent Reasoning, satellite systems, Intranet, Internet and computers facilitate information search, exchange, and dissemination before and after emergencies (National Research Council 1997).

Despite the importance of sufficient organizational and technical capacities, supported by a change oriented organizational culture, for a complex adaptive disaster system, achieving this goal is a big challenge. Public policies with insufficient infrastructures create a linear approach that wrongly assumes the effectiveness of seismic response just because it is mandated by a law or regulation. As this paper discusses, this is a critical problem of Turkish disaster policies, despite recent attempts, for decades.

5. THE FORMAL TURKISH DISASTER RESPONSE SYSTEM

Turkey has a formal disaster response system to coordinate major public organizations at central and local levels. The response system can be classified under two categories considering the regular and crisis times.

a. The Regular Organizational Structure

There are four central disaster organizations that serve for minimizing the vulnerability of local communities to disasters at the central level. These organizations are the General Directorate of Disaster Affairs (GDDA) of Public Works and Settlement Ministry, the General Directorate of Civil Defense (GDCD) of Interior Ministry, the General Directorate State Hydraulic Works (SHW) of Energy Ministry, and the recently founded Turkey Emergency Management General Directorate (TEMGD) of Prime Ministry. Although these four are the most critical public organizations that are directly involved with disaster affairs, response to a major disaster are much beyond these four organizations. Organizations from different ministries, public agencies, provinces, military as well as nonprofit and private sectors involve in response and recovery operations (Corbacioglu 2004). Multiple organizations with different organizational cultures and work methods arrive to a disaster site from different parts of Turkey. International aid and rescue organizations also take responsibility and increase the complexity in disaster environments.

The General Directorate of Disaster Affairs (GDDA), founded in 1964, is specifically concerned with nation wide disaster management and the implementation of the policies for minimizing risk of disasters by using preventive and protective measures (General Directorate of Disaster Affairs 1998). The main duties of GDDA are as follows:

- To investigate measures to reduce the damages resulting from natural disasters
- To determine the basic requirements, aims and policies regarding this objective
- To coordinate scientific, technical and administrative investigations
- To bring the output obtained from such studies into implementation through laws, regulations, and training
- To review and develop the implementation

The Directorate of Civil Defense, founded in 1964, has direct responsibility in seismic response operations since 1959. Its mission requires the directorate to take measures for reducing casualties and damages in case of enemy attacks, natural disasters, and big fires. The directorate has offices in both provinces and districts. The local offices are responsible for the

organization of civil defense in an event of a disaster.

Directorate of State Hydraulic Works (DSHW) has been operating since 1953 and primarily concerned with floods. DSHW's responsibility involves preventing or minimizing the risk of floods.

The 1999 Marmara earthquake that hit the Marmara region of Turkey has shown how linear policies that ignore the complexity and chaotic conditions of a major disaster fail in coordinating the multiple organizations from different jurisdictions and sectors. Insufficient coordination during the regular times did not produce better coordination after the Marmara earthquake. However, the failure in regular times was not because of the lack of a coordinating body. Turkey had the Natural Disasters Coordination Council and the Disaster Central Coordination Council at the central level[2] and rescue and aid committees at provincial and district levels to coordinate public organizations and national resources. Instead, the problem was the disfunctionality of these coordinating bodies. According to the former director of the General Directorate of Disaster Affairs, the commissions and committees for coordination at central and local levels were not more than a blue print (Ergunay 1999).

To solve the intergovernmental coordination before and after disasters, the Cabinet decision numbers 583/1999 and 600/2000 established a new organization, Turkey Emergency Management General Directorate of Prime Ministry. Similar to previous coordinating bodies TEMGD's mission is to coordinate public organizations for emergencies that threaten the national security. The regulation cites the emergencies as earthquakes, landslides, rock falls, fires, accidents, meteorological disasters, nuclear and chemical accidents, and demographic movements. To achieve this goal, TEMGD is supposed to perform following responsibilities:

- Having public organizations establish emergency management centers and providing coordination among them
- Watching and evaluating efforts of public organizations in minimizing the risk of emergencies, making short and long term plans, and establishing databanks
- Coordinating all available public and private transportation means, rescue and aid resources
- Encouraging volunteer aid organizations and individuals
- Coordinating the activities for receiving, protecting, and distributing donated materials.

Although the establishment of TEMGD is an important step, it is still short to achieve the coordination of central disaster organizations and ministries, since it is given the coordination responsibility without any authority

2 Although these councils have not been legally abolished, they do not meet or work in practice any more.

over the major disaster organizations and other public organizations in a bureaucratic system driven by hierarchic relations. Moreover, TEMGD, with a limited number of personnel at the central office in Ankara, does not have any local organization and must rely on existing provincial and/or district rescue and aid committees[3].

b. National Emergency Plan

The Disaster Law 7269 and the Regulation number 12777, which concern with the principles of emergency aid organization and planning, attempts to create a planning process to coordinate all resources of the public organizations ahead of time for the fastest and the most effective disaster response operations. According to the Disaster Law 7269 and the regulation number 12777, response and recovery operations are the responsibility of provinces and districts. Province and district rescue and aid committees must plan the response operations principally with the provincial and district resources before disasters occur. The local military garrisons or military forces prepare their own plans in coordination with the provincial and district plans. The provincial and district crisis management centers can ask help from neighboring provincial and district organizations, local and regional military forces, private organizations or individuals, if the local resources are inadequate for timely satisfaction of the stricken community needs. When this is the case, incoming organizations are supposed to work under the coordination of local rescue and aid committee/s. The national disaster plan also requires the central public organizations to prepare supplementary plans to aid stricken provinces and/or districts.

The main problem with this national plan is its assumption that disasters will not occur in province centers and the province resources will principally be sufficient for response and recovery efforts[4]. This assumption has been proved to be false by the long history of natural disasters that have hit the province centers and required the help of other neighboring provinces, municipalities as well as central organizations. The 1992 Erzincan and 1999 Marmara earthquake are recent examples of such disasters.

Perceiving the difficulty of implementing such a master plan, especially in case of major disasters, the Interior Ministry divided provinces into 11 groups after the 1999 Marmara Earthquake. The ministry asked provinces in each group to collectively respond to a disaster site. However, this order was still short in achieving interprovincial coordination and collaboration since the failure for developing any significant technical and organizational infrastructures for interprovincial action in advance. Without sufficient

3 Interview with the General Directorate of Disaster Affairs

4 Interview with Erzincan Province

organizational and technical capacities and collective preparedness,

knowing who to help who does not make any major difference for interprovincial timely response operations.

c. The Crisis Management Structure

Crisis Management Structure was introduced by the Regulation 8716 in 1996. This structure is used only if the prime minister declares crisis management for an important problem or event. The Regulation describes crisis as a foreign threat, wide spread harmful (terrorist) attacks, natural disasters, refuge and big immigration movements, epidemics, big fires, chemical and technologic disasters such as radiation and air pollution, heavy economic crisis, and other similar situations. The crisis management structure is normally an exceptional way of managing public organizations in case of a crisis. However, it has been used to coordinate response operations in almost all destructive disasters such as earthquakes and floods, even after the establishment of TEMGD. Even though TEMGD has the responsibility, it does not have the necessary authority, resources, and technical capacity to command and coordinate the state bureaucracy in case of a crisis. This makes TEMGD a side organization of the Prime Ministry Crisis Management Center for the activities that take place in regular times.

The crisis management structure involves different levels of organization; Prime Ministry Crisis Management Center at the central level and the local crisis management centers at the local level.

i. Central Crisis Management

The central crisis management, known as the Prime Ministry Crisis Management Center is supposed to provide nation wide coordination of organizations and resources in helping a stricken local community.

The Prime Ministry Crisis Management Center has three administrative bodies. These administrative bodies are Crisis Coordination Committee (CCC), Crisis Evaluation and Management Committee (CEWC), and the Secretariat. Crisis Coordination Committee (CCC) primarily consists of political members, ministries, as shown in Table 4.

Table 4: Crisis Coordination Committee

Chair: Prime Ministry or A State Ministry		
National Defense M.		Finance M.
Interior M.		Health M.
National Education M.		Agriculture and Forestry M.
Transportation M.		Industry and Trade M.
Labor and Social. Security M.		Environment M.
Energy and Natural. Resources M.		Secretary of National Security

Foreing Affairs M. Public Works and Settlement M.
Source: Basbakanlik Kriz Merkezi (2000)

This committee is the highest-level decision making body at the Prime Ministry Crisis Management Center. CCC can take the form of a Ministers Cabinet in a smaller scale, when headed by prime minister. In addition to ministries, the National Security Council is represented by its secretary in CCC.

CCC's primary responsibilities are as follows:

- Upon received information from domestic and international sources, making political, decisions or changes in the National Security documents regarding the crisis
- Making decisions for solving crisis related problems and having them implemented
- Deciding on the activation of crisis centers in Turkish armed forces, ministries, public agencies, provinces, districts, or in a region
- Providing coordination and collaboration among responsible organizations
- Recommending the declaration of emergency law, marital law, preparation for war, or war, and
- Authorizing Crisis Evaluation and Watch Committee for needed services and activities.

As shown in Table 5, Crisis Evaluation and Watch Committee (CEWC) primarily consists of deputy undersecretaries of the member ministries. CEWC is hierarchically below the Crisis Coordination Committee and implement the policies made by the politicians. CEWC's primary responsibilities are as follows:

Table 5: Crisis Evaluation and Watch Committee

Chair: Prime Ministry Undersecretariat	
National Defense M. Und.	Finance M. Und.
Interior M. Und.	Health M. Und.
National Education M. Und.	Agriculture and Forestry M. Und.
Transportation M. Und.	Industry and Trade M. Und.
Labor and Social Security M. Und.	Environment M. Und.
Energy and Nat. Resources M. Und.	Red Crescent Society
Foreign Affairs M. Und.	National Security Council
Public Works and Settlement M.Und	

Source: Basbakanlik Kriz Merkezi (2000)

- Upon the received information taking the necessary measures and assigning duties
- Providing coordination and collaboration among Turkish Armed Forces, ministries, and other necessary organizations
- Reallocating the resources provided by public organizations for service
- Implementing and watching the implementation of the decisions of Ministers Cabinet and Crisis Coordination Committee (CCC)
- Recommending CCC to declare emergency law, marital law, preparation for war, and war, when needed
- Authorizing the Secretariat of Prime Minister Crisis Management Center for necessary services.

The third part of the central administration is the Prime Ministry Crisis Management Secretariat which is composed of senior level bureaucrats and personnel from ministries, public agencies, and Turkish Armed Forces. Led by a Prime Ministry Deputy Undersecretary, the secretariat works as a lower level committee for collecting and distributing information, preparing alternative solutions for the crisis, coordinating and managing related domestic crisis centers, and serving for coordination and collaboration between Turkey and the crisis management centers of the international organizations of which Turkey or other party is a member.

The organization of the central crisis management of Turkish disaster system is similar to the previously used Natural Disasters Coordination Council and Disaster Central Coordination Council that did not function effectively in the past. Both structures have similar ministries (the numbers of members ministries higher in the new system) and public agencies as members. There are two important differences between two organizational structures. First, leadership shifts from the Public Works and Settlement Ministry (PWSM) to the Prime Ministry at the crisis management structure. Second, Office of Prime Ministry Deputy Undersecretary performing the secretariat services instead of the General Directorate of Disaster Affairs that was in charge in the previous system. Therefore, the Crisis Management Structure introduces more power, through Prime Ministry's position in the state bureaucracy, for intergovernmental coordination, which is a main assumption of command and control oriented bureaucratic organizations.

ii. Local and Regional Crisis Management

Provincial or district crisis management centers are supposed to coordinate organizations and resources in districts and provinces before and after earthquakes. A province rescue and aid committee involves the members as shown in Table 6.

Table 6: Province Rescue and Aid Committee

Chair: Province Governor or Her Deputy
Mayor

Province Gendarmerie Commander
Police Chief
Director of Civil Defense
Director of National Education
Director of Public works and Settlement
Director of Agriculture
Red Crescent Society
Military Garrison

Source: Adapted from Ergunay (1999)

Provincial/district rescue and aid committees, also a component of the regular disaster organizational structure, must prepare for disasters in advance. When crisis management is declared, rescue and aid committees function as the local crisis management centers. Prime Ministry Crisis Management Center can also establish a regional crisis management center for the coordination of the response and recovery operations in more than one disaster site according to the Regulation 96/8716.

The Disaster Law 7269 and the Disaster Regulation 12777 requires nine service groups to work under rescue and aid committees. These service groups are composed of local public servants that are employed by various public organizations in provinces or districts as shown in Table 7.

Table 7 : Emergency Aid Service Groups

Chair: Province Rescue and Aid Committee
First Aid and Medical Services
Preliminary Damage Assestment Services
Public Security Services
Acquisition, Rental, Confiscation, and Delivery Services
Communication Services
Transportation Services
Rescue and Debris Removal Services
Agricultural Services
Lifeline Services (Electricity, Water, and Sewage)

Source: Adapted from Ergunay (1999)

Although the national plan assigns certain roles and responsibilities for rescue and aid committees, their preparation for disasters are on paper or insufficient if ever exist, in most places.[5] The provincial emergency plans do not still involve neighbor provinces and regional military forces despite the recent attempt by the Interior Ministry that has placed 81 provinces of

5 Interview with the General Directorate of Disaster Affairs

Turkey into 11 groups. Moreover, the disaster law and regulation recognizes only one nonprofit organization, the Red Crescent Society, even other critical nonprofits such as AKUT and Turkish Radio Amateurs significantly contribute to the response and recovery operations (Corbacioglu 2004).

6. RECENT REFORMS

The symmetry breaking effects of the 1999 Marmara earthquake started a change process in Turkish disaster affairs (Balamir 2001). The result was important but still insufficient attempts to improve the organizational and technical capacities of Turkish disaster management.

In addition to the foundation of Turkey Emergency Management General Directorate and the grouping of provinces into 11 groups for response operations, another initiative, The Cabinet Decision Number 586 increased the number of professional rescue personnel and the emergency centers at the General Directorate of Civil Defense (GDCD) from three to eleven with the foundation of new centers in Adana, Afyon, Bursa, Diyarbakir, Izmir, Sakarya, Samsun, and Van provinces in 1999. GDCD initially appointed 120 rescue personnel with modern equipment and vehicles to each of these centers. Parallel to this initiative, Interior Ministry divided provinces into 11 groups to coordinate disaster response operations.

Turkish Armed Forces assigned search and rescue responsibility to one battalion at each of its 17 regional command centers. Turkish General Staff founded a Natural Disaster Search and Rescue battalion with military personnel from Army, Navy, Air Forces, and Gendarmerie. Additionally, Turkish Ground Forces (TGF) founded the Natural Disasters Search and Rescue Troop that involved five separate teams with all modern equipment. Perceiving the importance of information flow, TGF provided communication teams with helicopters and founded a central coordination center with enhanced communication capacity at the command center in Ankara.

The 1999 Marmara Earthquake was also a turning point for search and rescue organizations. Many stricken municipalities, such as Duzce, Derince, Erzincan, Izmit, Adana, Kocaeli, and Istanbul founded search and rescue units and/or strengthened their fire departments. Additionally, many volunteer search and rescue teams have been founded in local communities. In an attempt to coordinate the volunteer organizations, the General Directorate of Civil Defense issued a regulation asking volunteer organizations to register with its local offices in 2000.

The 1999 Marmara and Duzce earthquakes showed the importance of information infrastructure in emergency management. Most stricken

communities founded modern crisis management centers with Geographic Information Systems. The General Directorate of Disaster Affairs (GDDA), Sakarya, Duzce, Kocaeli, Bursa, Yalova, and Istanbul provinces developed Geographic Information Systems. The central government provided each provincial government with at least a satellite phone to be used in case of emergencies. The Red Crescent Society, the most criticized nonprofit mass care organization started using high-tech communication vehicles with short and long wave two-way radio and satellite systems for transmitting pictures of the disaster sites. Seeing the insufficiency of the strong ground motion recording system, the General Directorate of Disaster affairs also installed many new seismic stations. Finally, Turkey sent a satellite to the space in 2003 for transmitting information about the stricken sites in case of earthquakes.

Despite the improvements in organizational and technical capacities after 1999, the changes are still insufficient to integrate the formal disaster response system and its actors. Most organizational changes have been made to increase the number of professional rescue personnel instead of integrating public organizations. While interorganizational and interjurisdictional relations are still limited for mitigating and preparing for disasters, investments in information infrastructure are not compatible with different organizations and sectors. The investments have mainly concentrated on the needs of some local and central organizations rather than increasing interactions and information flow between different organizations and jurisdictions. Moreover, linearly designed and unimplemental plans along with hierarchic organizational structure inhibit a coordinated and timely interprovincial action and adaptation to rapidly changing disaster environments.

7. REORGANIZATION OF TURKISH DISASTER MANAGEMENT

Despite the recent developments, Turkish disaster management does not have sufficient capacity for coordinating the organizations from different jurisdictions and sectors. The new policies change some strategies without dealing with the core of the problem; adopting linear policies for a complex problem. Bureaucratic organizational structure and hierarchy based relations simply do not work in emergencies. Well designed organizational charts and rules for the regular times can not be adapted to the rapidly changing conditions of disaster environments.

Public policies assign certain responsibilities to public organizations and the Red Crescent Society, yet these policies fail to integrate organizations and jurisdictions in emergency response operations. Recent five destructive earthquakes (the 1992 Erzincan, 1995 Dinar, 1998 Ceyhan, 1999 Marmara,

and 1999 Duzce earthquakes) have shown the fallibility of the disaster law and regulations concerning organization and emergency planning. The assumptions that may work for the routine administrative times have usually failed their validity if not caused contradictory results after the recent earthquakes (Corbacıoğlu 2004). Disaster environments require developing significant organizational and technical infrastructures to facilitate coordination and communication in the rapidly changing complex disaster environments of Turkey.

The contemporary disaster law and regulations generally perceive the disaster response as the responsibility of provinces and districts with the support of central government, when necessary, rather than a system level collective action. Regrettably, the disaster response, as well as mitigation and preparedness go beyond the capacities of provincial and district administrations (Corbacioglu 2004). Therefore, the policy maker needs to consider all critical organizations from different jurisdictions and sectors, and integrate them as subsystems of a complex and adaptive disaster system.

The central disaster management is not integrated for the effective coordination of organizations and resources. This is itself an inhibiting factor in Turkish public administration in which the hierarchy is central to coordination. Second, the introduction of TEMGD has made the intergovernmental coordination more complex. Other than TEMGD, the GDDA, GDCD, and Prime Ministry Crisis Management Center (PMCMC) have similar responsibilities before and after disasters. Uniting the PMCMC and TEMGD under a Prime Ministry Emergency Management Undersecretariat, and bringing GDDA, SHW and GDCD under this new organization can create an institution for facilitating coordination and collaboration between public organizations and jurisdictions.

Interior Ministry's division of the nation into 11 regions for response operations after the 1999 Marmara earthquake is an important but insufficient step. Such an initiative does not reduce the vulnerability of local communities. The integration of the provinces through implemental interprovincial plans, practices and necessary information technologies is crucial to create regional disaster response subsystems. Moreover, the local and regional military forces, which significantly contribute to response operations in case of a disaster, must be involved in the interprovincial plans and preparations.

The contemporary disaster law and the national emergency plan ignore nonprofits except the Red Crescent Society. The inclusion of important nonprofit actors in emergency organization and planning at the central and provincial levels will also contribute system level integration of critical actors.

Information and communication technologies are a key for intergovernmental collective action before and after earthquakes. Timely and sufficient information as well as its exchange can facilitate reorganization of various actors in addressing the problems of disaster environments. Many stricken communities of the Marmara Earthquake have already invested in information Systems. The nation wide investments of communication and information technologies in other risk prone communities, public and nonprofit organizations need to be achieved. The integration of these information systems through organizational flexibility will create a complex-adaptive system of disaster response and recovery.

8. CONCLUSION

Seismic risk is a constant and significant threat for the lives and properties of most communities in Turkey. The extent and degree of risk requires an effective way of addressing this complex policy problem. The policy makers have adopted various linear policies to deal with this problem. Regrettably, these policies have been ineffective in minimizing seismic risk. They have failed to develop any significant organizational, technical, and cultural capacity to decrease vulnerability of local communities.

The symmetry breaking 1999 Marmara earthquake started a change process that has partly increased the organizational and technical capacities of Turkish disaster management. The central government has established new organizations and attempted to increase coordination among public organizations. There have been investments and initiatives to increase technical capacity especially in stricken local communities, along with lessons learned from the Marmara earthquake. However, the changes have also been the reflections of new linear policies. Control and command oriented organizational structure as well as organizational culture is still dominant in Turkish disaster management. Moreover, most provincial linear plans still have linear characteristics that fail to integrate organizations from different jurisdictions and sectors for mitigating, preparing for and responding to disasters.

A new organizational design for integrating critical public and nonprofit actors through organizational flexibility, sufficient information and its flow is necessary. Organizations from different jurisdictions must constantly communicate, plan and allocate their resources for collective preparation and response to natural disasters. The policy makers need to transform insufficiently connected disaster organizations into a complex adaptive disaster system, instead of relying on new organizational charts and regulations based on the principles of traditional bureaucratic organizational structure. Constant interactions supported by timely and sufficient information exchange can facilitate interorganizational learning

and adaptation as well as timely and coordinated collective action in response to disasters.

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