



ARAŞTIRMA / RESEARCH

Developing an environmental health plan during pre-disaster period: an example from Central District of Yalova City, Turkey

Afet öncesi süreçte bir çevre sağlığı planı geliştirmek: Yalova İli Merkez İlçesi'nden bir örnek

Ebru İnal¹, Songül Acar Vaizoğlu²

¹Civil Defence and Firefighting Programme, Yalova Vocational High School, University of Yalova, Yalova, Turkey

²Near East University School of Medicine, Department of Public Health, Nicosia, Mersin, Turkey

Cukurova Medical Journal 2017;42(4):643-657

Abstract

Purpose: This study aims to prepare an environmental health plan for the Central District of Yalova City during pre-disaster period. It also aims to determine deficiencies of the current situation for disaster preparedness.

Material and Methods: A control list was formed by the researchers after literature review. The control list consists of a total of 62 criteria under seven headings. The control list was delivered to and collected from three related institutions via official correspondence. During evaluation, criterion were classified as “number of proper criteria”, “number of improper criteria” and “number of unanswered criteria”.

Results: We found that sensitivity analysis on waterworks has not been done and disaster regions were not divided into sub-regions. No criterion in chemical stores in the city heading was available. According to the answers of the three institutions; the number of unanswered criteria number was 14, while proper criteria number was 31 in total and improper criteria number was 17 in total.

Conclusion: It was determined that 17 criteria which are in control list were not available by the related institutions. These criteria are important issues in environmental health plan. The awareness studies, appropriate organization and committee with the related institutions should be carried out.

Key words: Disaster, environmental health, plan, pre-disaster.

Öz

Amaç: Bu çalışma Yalova İli Merkez İlçesi için afet öncesi süreçte çevre yönetimi planının oluşturulmasını amaçlamaktadır. Ayrıca çalışma, afete hazırlık için mevcut durumun eksikliklerinin belirlenmesini amaçlamaktadır.

Gereç ve Yöntem: Araştırmacılar tarafından literatür taraması sonrası bir kontrol listesi oluşturulmuştur. Kontrol listesi yedi başlık altında toplam 62 kriterden oluşmaktadır. Kontrol listesi resmi yazışma ile ilgili üç kuruma dağıtıldı ve bu kurumlardan toplandı. Değerlendirme sırasında, her bir kriter “uygun kriter sayısı”, “uygun olmayan kriter sayısı” ve “cevaplanmayan kriter sayısı” olarak sınıflandırıldı.

Bulgular: Su sistemlerindeki duyarlılık analizlerinin gerçekleştirmediğini ve afet bölgelerinin alt bölgelere ayrılmadığını belirledik. Kentteki kimyasal depolar alt başlığında ki hiçbir kriter mevcut değildi. Üç kurumun cevaplarına göre, cevaplanmayan kriter sayısı 14, uygun kriter sayısı toplamda 31 iken, uygun olmayan kriter sayısı toplamda 17 idi.

Sonuç: Kontrol listesinde yer alan 17 kriterin ilgili kurumlar tarafından mevcut olmadığını belirledik. Bu kriterler çevre sağlığı planında önemli konulardır. Bilinçlendirme çalışmaları, uygun organizasyon ve ilgili birimlerle uygun kurul ve organizasyon gerçekleştirilmelidir.

Anahtar kelimeler: Afet, çevre sağlığı, plan, afet öncesi.

INTRODUCTION

Disaster is defined as “a serious disruption of the functioning of society, causing widespread human, material, or environmental losses which exceed the

ability of affected society to cope using only its own resources”¹. Every year, more than 100.000 people lose their lives because of natural disasters while millions of people are hurt and get disabled ². Disasters also damage environmental health facilities

Yazışma Adresi/Address for Correspondence: Dr. Ebru İnal, Civil Defence and Firefighting Programme, Yalova Vocational High School, University of Yalova, Yalova, Turkey. E-mail: ebruinal34@hotmail.com
Geliş tarihi/Received: 15.12.2016 Kabul tarihi/Accepted: 16.03.2017

and services such as water sources, waste disposal, food handling and vector control services. It is important to strengthen the ability to withstand the disruption of infrastructures and environmental health systems (shelter, water supply, sanitation, vector control etc.) and to recover rapidly after disasters at the provincial/district³.

The impact of disaster is on the rise worldwide and there is an urgent need to stop the rise and reduce disaster impact⁴. Predisaster activities enable a reduction in the number and impact of disasters. One of the goals of predisaster activities is to strengthen the technical and managerial capacity of governments, organizations, institutions and communities³. Programmes such as planning and procedures for disaster management and the coordination of emergency response at international, national and subnational levels are necessary for to achieve this goal. Efforts in planning and preparedness can yield great benefits in terms of preventing losses³.

Environmental health planning is a process through which vulnerabilities are determined and procedures are established prior to a disaster³. This plan is helpful to determine the vulnerability of communities to hazards and to increase the ability to withstand disruption. It also serves to minimize potential health effects of disasters. In this plan, all agencies dealing with environmental health should be included in the evaluation of public health status and risks, evaluation of damage to public sanitary installations, evaluation of shelter and food needs, the mobilization of personnel and equipment, the emergency restoration of water supply, waste disposal systems and potential chemical incidents^{3,5,6}.

In Turkey, the earthquake disasters that occurred in August 17, 1999 in Kocaeli (Mw = 7.6) and November 12, 1999 in Duzce (Mw = 7.2) hit extensive area covering the cities of Kocaeli, Sakarya, Düzce, Bolu, Yalova, Eskişehir, Bursa and Istanbul. The heaviest damage was in Kocaeli, Sakarya, Bolu and Yalova⁷. The Kocaeli earthquake caused about 17 500 fatalities and 44 000 injured, it also affected 15 million people, and resulted in total property damage of over 15 billion USD⁸. It also caused significant structural damage, machine and equipment loss at industrial facilities and had impact

on energy and telecommunication infrastructures. Yalova province and its surroundings, shaped in Neo-tectonic period, are located in an area where tectonic activity is intensely felt, as such, it carries the risks of landslides and other disasters⁹ thus environmental health planning gains favor to cope with disaster effects.

This study aims to prepare an environmental health plan for the Central District of Yalova City during predisaster period. It also aims to determine deficiencies of the current situation for disaster preparedness.

MATERIAL AND METHODS

This study was conducted between 10.12.2015 and 15.01.2016 in the Central District of Yalova City. The control list was formed by the researchers after literature review^{3,5,6,10-15}. The control list consists of a total of 62 criteria under seven headings. There is no standard form on environmental health plan during predisaster period. There is also few published literature in this area. After literature review questionnaire was prepared. The headings and numbers of criteria under headings prepared by the researchers are shown in Table 1.

In the control list 'current situation' and 'explanation related to the criteria if necessary' is presented (Appendix Table 1). The control list was sent to the related institutions; Disaster&Emergency Management Authority of Yalova City, Public Health Authority of Yalova City and Environmental and Urban Planning Directorate of Yalova City. The control list was delivered to and collected from related institutions via official correspondence. Disaster units of the selected institutions were responsible for returning the control list after they are filled in. Some of the criteria were not applicable for some institutions. If one of the three institutions declare that they perform the criteria, it is accepted as "adequate preparedness" for that criterion. Furthermore, during evaluation, criterion were classified as "number of proper criteria", "number of improper criteria" and "number of unanswered criteria" (Table 2).

Since the study is conducted only in three institutions, no statistical analysis was conducted.

Table 1. Headings in the control list

	Headings	Numbers of criteria
1	Institutional Arrangements	5
2	Measures for Community Members	8
3	Public Health Services in Disaster Area	6
4	Necessary Human Resources Planning in Disaster Area	13
5	Public Health Laboratory	7
6	Chemical Stores in the City	3
7	Regions of Shelter	20

RESULTS

According to the answers of the three institutions; we found that sensitivity analysis on waterworks has not been done and among the institutional arrangements it is found that treated and stored water loss could not prevented, sufficient drinking water and water for fire extinction could not be provided. Furthermore, we found that disaster regions were not divided into sub-regions and experts who were determined for each sub-regions could not work with related public health professionals under criteria which falling under the public health services in disaster area heading. Adequate number of public health specialists was

not available in accordance with the criteria necessary for human resources planning in disaster area heading. While we found that all criteria in the measures for community members heading was available, no criteria in chemical stores in the city heading was available. Appropriate sewerage system were not projected in shelter camping sites and were not marked on the map in accordance with the criteria for regions of shelter heading and also established shelter city has been inadequate in terms of site selection (Appendix Table 1). According to the answers of the three institutions; the number of unanswered criteria number was 14, while proper criteria number was 31 in total and improper criteria number was 17 in total (Table 2).

Table 2. The evaluation of the criteria in according with availability of the control list

Headings	Proper Criteria Number	Improper Criteria Number	Unanswered Criteria Number	Total Criteria Number
1. Institutional Arrangements	3	2	-	5
2. Measures for Community Members	8	-	-	8
3. Public Health Services in Disaster Area	5	1	-	6
4. Necessary Human Resources Planning in Disaster Area	5	1	7	13
5. Public Health Laboratory	-	-	7	7
6. Chemical Stores in the City	-	3	-	3
7. Regions of Shelter	10	10	-	20
Total	31	17	14	62

DISCUSSION

This study evaluated deficiencies of current situations in terms of environmental health plan for Central District of Yalova City and the number of improper criteria was 17 in the total control list. The 1999 Marmara earthquake is a milestone in disaster management and coordination. This devastating disaster demonstrated the need to reform disaster management and it compelled the country to

establish a single government institution and to single-handedly coordinate in cases of disaster and emergencies. The Turkish Parliament passed Law No.5902 in 2009 to form the Disaster and Emergency Management Authority (AFAD). This law covers the matters of taking necessary measures for services related with disasters, emergencies and civil defense, making preparations prior to occurrence of incidents, providing coordination among related institutions which manage the

responses during incidents, and implementing policies on these matters¹⁶. Turkey Disaster Response Plan (TAMP, No.28871) was accepted in 2014 for fast, effective and comprehensive response organization for all types of disasters and emergencies¹⁷.

Water sources are polluted with a variety of chemical hazards during disasters. Community members may be exposed to pesticides and toxic chemicals via polluted water sources. In Kocaeli earthquake (Mw = 7.6) the water supplies were damaged thoroughly¹⁸. Also, there are a lot of studies indicating the destructive effects of essential services including water supply, power, telephone, health care services and main roads after disasters^{3,19-21}. Water supplies can be maintained better to reduce the health impacts of disasters³. But it is not possible to comment on preparedness regarding water supplies because related criteria were unanswered in this study. Adequate number of maintenance related to water supply, sufficient number of technicians for water delivery points, adequate number of staff responsible for the maintenance and repair of drinking water treatment devices are not known. For this reason, it is possible to say that these activities have not been carried out in this area. Those authorities in Yalova should be aware of the specific hazards which water sources might come across and should be able to formulate appropriate services and necessary human resources based on the information about hazards and vulnerability. We need information about systems and services that are affected in disasters to prevent and manage illnesses if they occur²⁰. Furthermore, public health laboratory is capable of rapidly identifying causative agents of selected disease, maintenance of a chemical laboratory to assess potential exposures, provision of training and tools for emergency response and strengthening ways to get information and guidance to the public quickly and effectively²². In this study, we cannot comment on the public health laboratory because this criterion was not answered. As it was stated in the control list, public health laboratories should continue to function in the tent with the necessary laboratory equipment.

World Health Organization defined public-health chemical incident as “where two or more members of the public are exposed to a chemical”³. The Kocaeli earthquake struck one of the most important industrial areas of the country. The

earthquake caused significant structural damage, equipment and economical loss at industrial facilities²³. After the earthquake, two enormous fires happened at the TUPRAS Izmit refinery in Korfez, Kocaeli and the acrylonitrile spill at the AKSA acrylic fiber production plant in Ciftlikkoy, Yalova. These events harmed domestic animals, affected agricultural activities, endangered public health, and resulted in environmental pollution^{8,24}. Similarly, in August and September 2005, hurricanes Katrina and Rita in Gulf Coast left numerous and unresolved health effects and a deleterious impact on the quality of life which continues for a long time²⁰. The criteria which are under the chemical stores in the Yalova city were determined as improper. The location of all kinds of chemical warehouses in the city was not determined individually. These are important deficiencies in the environmental plan about disasters. Effective and comprehensive planning is necessary to reduce such negative effects of chemical incidents. Health risks that people have exposure to and the environment are identified in the integrated management. All related organizations should be involved in the planning and response phases of the integrated management.

Human resources planning in disaster area are an important issue in environmental health plan. Professional staff and community-based volunteers are required to respond effectively in disaster area. Medical units, local security forces, volunteers, technical and managerial staff, public health specialists and military play important roles during emergencies. Also, experiences in environmental health interventions in disaster situations for public health services are helpful to understand their individual roles. Training and tabletop exercises are held at all levels all over Turkey on a regular basis to ensure the operability of the system and to increase public awareness by TAMP¹⁷.

In this study, it was reported that some of the staff have experienced the 1999 earthquake so this experience will help provide benefits and convenience to coordinate public health services in disaster area. It was determined in this study that adequate number of public health specialists, maintenance personnel related to water supply and public toilets and maintenance personnel were not available. Disaster regions were not divided into sub-regions and experts who are responsible for each sub-region could not be able to work in coordination with public health professionals. These

criteria are required to ease activities from monitoring and surveillance, through prevention and mitigation, to post-disaster activities. For interventions, human resources should be planned for every activity in disaster management and information about the risks and skills should be given to the staff at the local level.

People are obliged to live in shelters for days, weeks or months after a disaster and they are affected with environmental health conditions in the location and organization of the site. The quality of shelter areas has an important impact on health and protecting people from epidemic diseases^{3,25}. “The Sphere Project” which defines the standards of humanitarian relief operations has identified a set of minimum standards including a) water supply, sanitation and hygiene promotion; b) food security and nutrition; c) shelter, settlement and non-food items; and d) health action. Establishing shelter areas needs standards in disaster recovery²⁶. Approximately 176,000 earthquake victims needed shelter on 17 August and 12 November 1999 earthquakes in Turkey²⁷. One of the factors that support TAMP is the 22 Logistics Warehouses (or Centers) built all around Turkey to transport temporary housing and shelter equipment to the disaster zone in a timely manner. A truck can be dispatched from a warehouse in a matter of minutes and the equipment can be tracked and controlled remotely¹⁷.

In Yalova, recreation areas or available areas for shelter camp are localized in disaster situation. It was stated that there are two places; one is in bus station area and the other is in Kazimiye. In this study, it was determined that selected camping sites are parks, stadiums, open spaces and none of them had sewage water network connection. Appropriate canalizations were not projected.

The fact that the beds were not at least 90 cm away from each other and at least 30 cm above the ground in shelter were not planned in written. And also in shared shelter, “there could not be a stove for each families or a stove for ten people” condition was not planned in written. It is necessary to make arrangements for regions and settlement of shelter in the preparedness period. Because of the importance of shelter areas, environmental health managers, sector specialists and community should consider long-term economic, social and environmental impacts of shelter areas and they

should be involved in decision-making process about selecting and equipping.

This study has some limitations. This is a single-center study and includes only the Central District of Yalova City. The control list was formed by the researchers and it was not a standard form. In addition, the control list was sent to only 3 related institutions. It could have been sent to other institutions (municipal authority, etc.) to make certain situation determination.

It was determined that 17 criteria which are in control list were not available by the related institutions. These criteria are important issues in environmental health plan. We gave feedback to the related institutions in Yalova. This study shows that some arrangements are urgently needed for the following issues; The related institutions should make collaboration to make the most effective environmental health plan for Yalova during the predisaster period as soon as possible. The awareness studies, appropriate organization and committee with the related institutions should be carried out. Necessary equipment should be supplied and personnel in the institutions should have the skills, knowledge, and experience to manage, implement, and evaluate an all-hazard preparedness program and they should conduct drills at least annually together.

The criteria may be varified functionally in accordance with Yalova city and this variation may lead to proper consideration of hazards in emergency response planning activities, the reduction of deficiencies in predisaster practices. When the environmental health plan is prepared by the related institutions, evaluating stated issues with integrated management and community participation will make significant contribution. Laws and regulation on environmental protection and plan should be carried out sufficiently for proper preparedness and response to the disasters.

Acknowledgements

This study was published as oral presentation in 1st International Urban, Environment and Health Congress 2016.

REFERENCES

1. United Nations (UN) Department of Humanitarian Affairs. Internationally Agreed Glossary of Basic

- Terms Related to Disaster Management (DNA/93/36). Geneva, United Nations, 1992.
2. World Health Organization (WHO). Care of the dead in disasters. http://www.wpro.who.int/mediacentre/factsheets/fs_20061207/en/ (Accessed March 2016).
 3. Wisner B, Adams J. Environmental Health in Emergencies and Disasters: A Practical Guide. Geneva, WHO, 2002.
 4. United Nations (UN). Making Disaster Risk Reduction Gender Sensitive Policy and Practical Guideline. Geneva, United Nations, 2009.
 5. O'Sullivan F, Abbott D, Everly V, Spangler L, Toshitsune R. Environmental Health Disaster Preparedness Model Planning Guide. California, California Conference of Directors of Environmental Health, 2006.
 6. Vaizoglu AS. Environmental health management in disasters In Health Management in Emergencies and Disasters. (Ed KH Altintas):209-24. Ankara, Hacettepe University Press, 2013.
 7. Akgiray V, Barbarosoglu G, Erdik M. The 1999 Marmara Earthquakes in Turkey. Organisation for economic co-operation and development. Lessons learned in dealing with large-scale disasters. Annex 4. SG/AU 1/ANN4, 2003.
 8. Girgin S. The Natch events during the 17 August 1999 Kocaeli Earthquake: Aftermath and lessons learned. Nat. Hazards Earth Syst. Sci. 2011;11:1129-40.
 9. Kurt S, Haybat S. Urban and urbanization. Evaluation of location selection in Yalova in terms of geomorphologic features and natural risks (Eds R Efe, T Onay, I Sharuho, E Atasoy):673-89. Klimont Ohridski University Press, 1985.
 10. Güler C, Cobanoglu Z. Disasters, Environmental Health Basic Resources, Series No. 33. Ankara, Turkish Ministry of Health, 1994.
 11. Güler C, Cobanoglu Z. Environmental Health Precautions in Disasters Environmental Health Basic Resources. Series No. 39. Ankara, Turkish Ministry of Health, General Directorate of Primary Health Care, 1997.
 12. Altintas KH. Basics of public health. In Disaster and Disaster Medicine (Eds C Güler, L Akin):1106-29. Ankara, Hacettepe University Press. 2012.
 13. Güler C, Vaizoglu AS. Basics of Public health (Eds C Güler, L Akin) Chapter 10. Ankara, Hacettepe University Press. 2012;776-808.
 14. Istanbul Provincial Disaster and Emergency Directorate (IPDED). Disaster Preparedness Training Materials, Handbook of Non-Structural Risk Reduction if Earthquake. Istanbul, IPDED, 2011.
 15. Güler C. Environmental Health Precautions for Earthquake Probability. Ankara, Yazit Press, 2008.
 16. Republic of Turkey. 5902 Law on the Organization and Functions of Disaster and Emergency Management. Republic of Turkey Official Newspaper. Number: 27261, Ankara, May, 29, 2009.
 17. Republic of Turkey. Turkey National Disaster Response Plan, published at Official Gazette, Number: 28871.
 18. EQE Briefing International 1999. Izmit Turkey earthquake of August 1999 (M7.4). http://www.absconsulting.com/resources/Catastrophe_Reports/Izmit-Turkey-1999.pdf (Accessed March 2016).
 19. Akbari EM, Farshad AA, Lari AM. The devastation of Bam: an overview of health issues 1 month after the earthquake. Public Health Journal. 2004;118:403-8.
 20. Rogers B, Lawhorn E. Disaster preparedness: occupational and environmental health professionals' response to Hurricanes Katrina and Rita. AAOHN J. 2007;55:197-207.
 21. Bullard DR, Wright B. Race, Place, and Environmental Justice after Hurricane Katrina: Struggles to Reclaim, Rebuild, and Revitalize New Orleans and The Gulf Coast. Connecticut, Westview Press, 2009.
 22. Center for Threat Preparedness (CTP). <http://www.dhhr.wv.gov/healthprep/programs/publichealth/Pages/default.aspx> (Accessed:16.04.2016).
 23. Durukal E, Erdik M. Physical and economic losses sustained by the industry in the 1999 Kocaeli, Turkey earthquake. Nat Hazards. 2008;46:153-78.
 24. Zambak C. Aquifer remediation and chemical recovery following a spill due to an earthquake in Turkey, in: Methods and techniques for cleaning-up contaminated sites, NATO Science for Peace and Security Series C: Environmental Security, (Ed MD Annable, M Teodorescu, P Hlavinec, and L Diels):91-101. Netherlands, Springer, 2008.
 25. Kilci F, Kara YB, Bozkaya B. Locating temporary shelter areas after an earthquake: a case for Turkey. Eur J Oper Res. 2015;243:323-32.
 26. Sphere Project. Sphere Project Humanitarian Charter and Minimum Standards In Disaster Response. Geneva, Sphere Project, 2011.
 27. UNICEF. Turkey: What UNICEF is doing. <http://www.unicef.org/turkeyquake/> (date accessed March 2016).

Appendix Table 1. Status of institutions in accordance with the criteria in control list

Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
1. Institutional arrangements;						
There are laws/regulations/instructions which load with a charge to our institution about disaster hazard mitigation.	+	Disaster and Emergency Management Presidency has been established by Law No. 5902 and all disaster and emergency laws have been gathered under this law framework.	+	Civil Defense Plan Law on Civil Defense, No:7126, Decree on personal liability, evacuation, thinning, planning and other services, decree on measures related to civil defense, No:6/3150.	+	Turkey Disaster Response Plan, January 3, 2014, Number: 28871 Official Newspaper
Disaster organization has been taken place both nationally and regional.	+	Turkey Disaster Response Plan (TAMP) Local Disaster Management Plan (YAMP) will be made.	-		+	This organization is organized with Turkey Disaster Response Plan.
Global drought, earthquake, and volcanic eruption have been shown on the map.	+	Drought and volcanism are not observed in our city but there is active fault.	-			
Sensitivity analysis on waterworks has been done.			-			
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
Losses of warehoused, treated waters have been prevented, sufficient amount of drinking water has been provided, and sufficient amount of water has been provided for fire extinction.			-			
2. Measures for community members;						

Books and booklets have been prepared for before measurements of disasters.	+	Books are prepared for pre-school and 1st grade children by provincial directorate. Posters are printed for schools. Disaster Ready Individual and Family Disaster Ready Schools and Disaster Ready Commercial brochures printed by AFAD Presidency and used them in training for first 72 hours.				
Disaster trainings have been arranged.	+	It is organized for schools, public-organizations, institutions, volunteers and members of non-profit organizations.				
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
If trainings have been arranged;						
Safe and dangerous places in house, school and work are taught to all family members.	+	These rules are taught with disaster awareness trainings.				
First-aid rules are thought to all society members.	+	Since the responsibility of first-aid trainings belong to Health Directorate, we only train civilian search and rescue teams, set up in school disaster teams and light search and rescue teams.				
3. How to make contact with the other family members and where they should be are thought to all family members when in danger.	+	These topics are explicated in the trainings in which are organized for trained-families for disasters.				

4. Urgent phone numbers are thought to all society members.	+	These topics are explicated in the trainings in which are organized for trained-families for disasters.				
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
5. Determination of family members who are outside of the case to lock the phone line, and are taught to report the situation to his family members.	+	These topics are explicated in the trainings in which are organized for trained-families for disasters.				
6. Electricity in buildings, gas, and the importance of the status of the switch to turn off the water system is indicated. The importance of the bag containing the necessary ingredients for a disaster is described.	+	These topics are explicated in the trainings in which are organized for trained-families for disasters.				
3. Public health services in disaster area;						
Public health officer are predetermined.					+	It is indicated in Provincial Health Disaster plan.
Public health services responsables have experience in environmental health interventions in disaster situations.					+	Some of staff have experienced the 1999 earthquake.
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
Authentication is done in advance and they will be the beginning of the mission in time of disaster.					+	Assignment and invitation procedure is made by Provincial Health Disaster plan.

How the relationship will with local authorities in such authorization is decided in advance.					+	Coordination with local government is indicated in Turkey Disaster Response Plan.
Disaster regions are divided into sub-regions and experts who are determined for each sub-region can be able to work dependent to public health professionals.					-	
Environmental health officers in the region to provide technical support are able to establish a technical center 24-hour service.					+	Emergency Management Crisis Center and Provincial Health Disaster Response Coordination Center will be established.
4. Necessary human resources planning in disaster area;						
An adequate number of public health specialists are available.					-	
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
An adequate number of maintenance related to water supply and distribution pipelines maintenance and construction elements are available.						
A sufficient number of technicians are available for water delivery points.						
An adequate number of staff responsible for the maintenance and repair of drinking water treatment devices are available.						
To make a sufficient number of public toilets and maintenance personnel are available.						

A sufficient number of officers to make waste collection and harmless elements are present.						
Sufficient number of personnel responsible for the hygiene of health units (toilet cleaning, waste removal, spraying, preparation of chlorine solution) is available.					+	
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
Sufficient numbers of the person responsible for community education about hygiene are available.					+	
Sufficient number of environmental health indicator staff who could track is provided.					+	
An adequate number of samples can be taken and will be responsible to the laboratory staff are available.					+	
An adequate number of public health laboratory technicians and experts are available.					+	
Vehicle components sufficient to use heavy vehicles 24 hours a day in shifts in the park are available.						
Staff to provide care and hygiene to especially wheelchairs of the disabled people is available.						
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
5. Public health laboratory;						

Roaming public health laboratories and public health can continue to function in the tent is ready with the necessary materials and laboratory equipment.						
Methods used in these analyses are standardized and the necessary mass is prepared in advance.						
Fundamental analysis will be performed by independent standard method of the kit.						
The bacteriological contamination of the water will be put into mass application that shows quickly.						
Using staff from time to time prior to the disaster area to work on is to make site assessments.						
Since these kits are expensive, there are scheduled to be developed in cooperation with universities.						
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
Since chemical pollution in urban areas is very high, laboratories have the infrastructure to evaluate heavy metals and toxic chemicals.						
6. Chemical stores in the city;						
The locations of all kinds of chemical warehouse in the city are determined individually.	-					
In time of disaster, the cities that have risk of leakage, explosions etc are moved out of the city.	-					

When a large number of birds and animal death and drying plan are observed in specific area, required assessments are conducted by suitably equipped qualified personnel and the cause is determined.	-					
7. Regions of shelter;						
Recreation areas or available areas for shelter camp are determined in disaster situation.	+	There are two places in which one is in bus station area and the other is in Kazimiye.				
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
Shelter camping sites selected as parks, stadiums, open spaces and sewage water network connections are made, observed their last port of prepared, marked on the map.	-					
Toilet in place of shelter camping, sewer connection of sewage feet, the water system will be connected to the network.	+					
Appropriate canalizations are projected.	-					
If shelter city has been established; has it been paid attention to below aspects in site selection?						
The fact that selected sites are well-drained land and does not include hollows for unwanted backwater is planned in written.	-					
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation

2. Camping place 60 m near the small pond, marshes drained order, filling; subjecting the process to prevent mosquito breeding is planned in written.	-					
The fact that shelter city residential area does not have a bed smell, flies, noise, traffic, and overcrowding and have fire safety is planned in written.	-					
The fact that there are not poisonous plants, poisonous animals, and plants etc uncontrolled growth in area where the camp is established is planned in written.	-					
30 square meter living space (household, sanitation, service, societal activities, store etc.) is planned for per person in written.	+	~30 meters				
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
30 square meter living space (household, sanitation, service, societal activities, store etc.) is planned for per person in written.	+	~30 meters				
The fact that privacy is provided effectively in family-used shelter is planned in written.	+					
The fact that there are curtains in order to separate divisions for different families is planned in written.	-	Shelter-use is not taken into consideration in common.				
The fact that spaces for insect repeller are not used for living is planned in written.	-					
Trained teams are provided for setting up a shelter.	+					

At least 2 meters between two shelters is planned in written.	+					
Criteria	Institutions					
	Disaster&Emergency Management Authority		Environmental and Urban Planning Directorate		Public Health Authority	
	Current situation	Explanation	Current situation	Explanation	Current situation	Explanation
Safety zones for playing for children are planned in written.	+					
The fact that each shelter includes at least a window is planned in written.	+					
Transportation order in the camp is planned to be written in feature that will allow easy movement of the disabled.	+					
The fact that the beds are at least 90 cm away from each other and at least 30 cm above the ground in shelter is planned in written.	-					
The shelter floor boards will be asphalt or cement.	+					
In shared shelter, there will be a stove for each families or a stove for ten people is planned in written.	-					