THE REPUBLIC OF TURKEY
MINISTRY OF PUBLIC WORKS AND SETTLEMENT

NATIONAL PLAN OF TURKEY
1990 - 2000

TURKISH NATIONAL COMMITTEE FOR
INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

August 1989

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TURKISH NATIONAL COMMITTEE

General Introduction

The Republic of Turkey is located within the sector bounded approximately by the latitudes 36 - 42 deg N and longitudes 26 - 44 deg E occupying an area of 775 000 sq. km with a population of approximately 55 million. It lies betwen the Black Sea and the Mediterranean Sea, bridging Europe and Asia.

As a result of its geology, seismicity, topography and climate, Turkey is exposed to various kinds of natural hazards sometimes causing substantial losses of life and property. The percentage of houses damaged by natural disasters in Turkey in the last 50 years is indicated in Table 1.

Table 1. Number of Houses Damaged in Turkey by Natural Disasters during the Last 50 years

Type of Natural Disaster	Percent of the Total Number
Earthquakes	61
Floods	14
Landslides	15
Rock Falls	5
Fires	4
Avalanches, Storms, Excessive Rain	1

The data in this table indicates that of all types of natural disasters earthquakes represent the greatest hazard, causing about two-thirds of dwelling destruction and a higher share of fatalities and monetary losses. In the period since 1960 the impact of floods, landslides and rock falls has had a decreasing tendency as a result of regulating river flow and more effective land use planning measures. We can anticipate that the major natural threat which faces Turkey in the future will be engendered by earthquakes. We will be providing additional information under each type of disaster in the sections that follow.

Turkey has defended and supported the idea expressed in 1984 by Dr. Frank Press that the timeframe beginning in 1990 be declared as the "International Decade for Natural Disaster Reduction." A national-level organization was undertaken soon after the resolution to this effect was adopted during the 42nd Assembly of the United Nations.

In Turkey the Ministry of Public Works and Settlement is legally required, through Act No. 7269, to serve the public in its needs for protection from consequences of all types of natural disasters, and to take all preventive and protective measures for this purpose. It was accepted, therefore, that this ministry should serve as the national host organization and general coordinator in implementing the IDNDR. Other national institutions

were invited to contribute to the overall program in their own areas of responsibility or expertise. The Turkish National Committee for the International Decade for Natural Disaster Reduction has been convened under the chairmanship of the Deputy Undersecretary of the Ministry of Public Works and Settlement. Its members and their affiliations are listed below:

İsa Kalkan (Chairman): Deputy Undersecretary, Ministry of Public Works and Settlement (MPWS)

Sayhan Bayoğlu (Secretary General and Chairman of the Working Group for Other Disasters): General Director for Disaster Affairs, MPWS

Orhan Baltan (Chairman of the Working Group for Landslides and Rockfalls): Assistant General Director for Disaster Affairs, MPWS

Oktay Ergünay (Chairman of the Working Group for Earthquakes): Head of the Earthquake Research Division, General Directorate for Disaster Affairs,MPWS

Yüksel Ayhan (Chairman of the Working Group for Fires): Assistant General Director of Civil Defense, Ministry of the Interior (MI)

Özden Bilen (Chairman of the Working Group for Floods): Assistant General Director, General Directorate of State Waterworks (DSİ)

Yücel Özgün: General Directorate of Civil Defense, MI

Nilüfer Ünver: General Directorate of Basic Health Services, Ministry of Health (MH)

Kubilay Örten: General Directorate of Basic Health Services, MH

İ. Turan Çakmak: Head of the Geological Investigations Division, General Directorate of Minerals Research and Exploration

H.Tekin Sevil: Advisor to the Director, Turkish Red Crescent

Nahit Kumbasar: Professor of Civil Engineering, Istanbul Technical University (İTU)

Polat Gülkan: Professor of Civil Engineering, Middle East Technical University (METU)

Doğan Altınbilek: Professor of Civil Engineering, METU

Nurettin Sonel: Professor, Faculty of Science, Ankara University, and Scientific and Technical Research Council of Turkey (TÜBITAK)

Alkut Aytun: Acting Head, Building Research Institute, TÜBİTAK

Rifat Yarar: President of the Turkish National Committee for Earthquake Engineering, Professor Emeritus, İTU

Kemal Erguvanli: President of the Turkish National Committee for Engineering Geology, Professor Emeritus, İTU

Muammer Dizer: Professor and Head of the Kandilli Observatory and Earthquake Engineering Institute, Bogaziçi University

The National Committee has determined in its first meeting that natural disasters of the greatest significance for Turkey could be grouped under the following five headings:

1. Earthquakes

2. Landslides and Rockfalls

3. Floods

4. Fires

5. "Other Disasters" (Avalanches, windstorms, tsunamis and volcanoes)

A Working Group has been named for each task, and these have prepared workplans describing the primary objectives, plans and programs for activities that will be undertaken during the Decade in conjunction with reducing natural disasters in Turkey.

This report contains Primary Objectives and Work Programs determined by each Working Group. Names of contributory individuals are listed in the introductory part of the workplan for each group. It is to be emphasized that these groups consist of representatives from related non-governmental organs such as public institutions, universities, and special purpose national professional groups. The National Committee and the five Working Groups count a total of 65 scientists and researchers as members.

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION
TURKISH NATIONAL WORKING GROUP ON EARTHQUAKES

Background Information

Preliminary information was provided in the introductory part to underline the relative severity of earthquake-caused damages in Turkey. Rural dwellings built with locally available materials according to traditional practices are easily damaged during even small earthquakes. Damage statistics show that these cause the greatest number of casualties. Much importance is attached to the improvement of the existing housing stock in rural areas.

A few other facts and statistics related to the earthquake hazard in Turkey may be in order. Destructive earthquakes in the period 1925-1988 caused an average of 1 100 fatalities and 5 600 destroyed houses per year. Earthquake losses during the same interval have amounted to an annual average of 1 percent of the GNP, with all other forms of natural disasters combined claiming 0.2 percent of the same total.

According to the currently in effect official earthquake hazard zoning map, Turkey is divided into following five zones (See Figure 1):

First degree hazard zones	I	> IX	MSK
Second degree hazard zones	I	= VIII	MSK
Third degree hazard zones	I	= VII	MSK
Fouth Degree hazard zones	I	= VI	MSK
No hazard zones, or zones which show negligible seismic activity	I	< V	MSK

Studies related to preparation of earthquake zoning maps are based mainly on earthquake catalogues, tectonic and seismotectonic maps, observed and expected maximum intensiy maps and earthquake epicenter maps. In other words, the map has been prepared using a deterministic approach. The location, time of occurrence, magnitude and other characteristics of future earthquakes are uncertain, so that the principles of probabilistic forecasting and decision making are the appropriate tools for the evaluation of seismic hazard. During the last few years increasing interest has been shown in the application of probabilistic procedures for the quantitative evaluation of seismic hazard in Turkey.

In Table 1 we summarize the distribution of such vital statistics are population, major industrial installations etc. with respect to their location within the earthquake hazard zones.

Table 1. Distribution of Population, Land Area, Industry and Dams with Respect to the Seismic Hazard Zones

Earthquake Zone	Population (Percent)	Surface Area (Percent)	Major Industrial Centers (Percent)	Dams (Percent)
First degree I › IX	22	15.0	24.7	10.4
Second degree I = VIII	29	28.4	48.8	20.8
Third degree I = VII	24	29.0	12.0	33.3
Fourth degree I = VI	20	19.6	12.6	27.1
No hazard Zone I ‹ V	5	8.0	1.7	8.4

Organizational Structure within IDNDR

The Ministry of Public Works and Settlement has been given the task of organizing on a national level activities concerning the International Decade for Natural Hazard Reduction. The General Directorate of Disaster Affairs within this Ministry is responsible for the coordination of activities concerning the earthquake disaster. The Working Group on Earthquakes which has prepared this part of the document and formulated the policy for IDNHR consisted of the following persons:

Oktay Ergünay (Chairman): Head, Earthquake Research Division, General Directorate of Disaster Affairs, Ankara

Polat Gülkan: Professor of Civil Engineering, Middle East Technical University, Ankara

A.Meţe Işıkara: Professor of Geophysics, Boğaziçi University, İstanbul

Erçin Kasapoğlu: Professor of Geological Engineering, Hacettepe University, Ankara

Nahit Kumbasar: Professor of Civil Engineering, İstanbul Technical University, İstanbul

Ömer Alptekin: Professor of Geophysics, İstanbul University, İstanbul

Alkut Aytun: Acting Head, Building Research Institute, Scientific and Technical Research Council of Turkey, Ankara

Hülya İlgen: Director, European Natural Disasters Training Center (AFEM), Ankara

PRIMARY OBJECTIVES FOR THE REDUCTION OF THE EARTHQUAKE DISASTER

A - Identification of Hazard and Risk

1. Increased emphasis and priority will be given to studies on the seismicity and active recent tectonics of Turkey. Information and experience on these subjects will be collected.

2. The current earthquake hazard zones map will be revised in conformance with the state-of-the-art.

3. Micro-zoning surveys will be encouraged for areas where important structures will be built or where settlements are to be established. Standart guidelines will be developed for these studies.

4. Priority will be given to counter measures intended for reducing earthquake damages during regional and urban planning work, legislation in these areas will be reviewed and the necessary legal arrangements realized.

5. Vulnerability and damageability analyses for different building types and urban settlements will be developed and models will be constructed for probable degrees of damage and economic loss.

B - Monitoring, Prediction and Early Warning Systems

1. The existing seismographic network will be upgraded and expanded so that all earthquakes with magnitude 3 or greater will be immediately recorded and the seismic parameters determined accurately and quickly.

2. The number of currently deployed strong motion accelerographs will be increased to 250 and a rapid program will be undertaken in order to equip such significant engineering structures as tall buildings and dams with these devices.

3. The information processing center established within the Earthquake Research Division of the General Directorate of Disaster Affairs will be expanded so that a standardized database exists for earthquake records of all types and that this information can be transmitted to all users.

4. Special-purpose strong ground motion networks will be established at pilot sites in eastern and western Anatolia for the purpose of providing basic data for soil-structure interaction, ground amplification and attenuation characteristics.

5. The scope of multidisciplinary pilot studies for earthquake prediction presently underway in north-western Anatolia will be widened to include seismic gaps in the east and southeastern parts Anatolia where different stress patterns and

rupture characteristics exist.

6. A Scientific Advisory Board will be formed under the coordination of the Ministry of Public Works and Settlement in order to evaluate results of the prediction studies and develop implementation recommendations.

7. On a countrywide scale "Early Earthquake Disaster Information Centers" will be put up so that a quick and effective rescue and relief work may be undertaken.

C - Short-Term Protective Measures and Preparedness

1. Pilot exercises will be performed and guiding booklets will be prepared so that existing "Province-Level Rescue and Relief Plans" will be made more realistic and directly applicable. Annual drills will be organized to review these plans and improve them.

2. Legistlation and organizational matters will be reviewed concerning management of long-term disaster planning and preparedness. Central coordination bodies which function only after an earthquake happens will be replaced by bodies which meet regularly even in the absence of disaster and manage and improve these policies.

3. Alternative communication networks will be utilized so that a rapid flow of information and communication is possible even as existing networks may in fact themselves be inoperative.

D - Long-Term Preventive Measures

1. The earthquake-resistant building construction code currently in effect will be constantly updated in keeping with developments in earthquake engineering.

2. A guiding seismic design code will be developed for special engineering structures.

3. Legislation in building inspection will be reviewed with the intent of implementing a realistic control system including building or earthquake insurance.

4. Critical engineering facilities including dams, bridges and transformation switches will be evaluated under a special program and those that are judged be unsafe will be strengthened and retrofitted.

5. Essential facilities such as hospitals, fire stations, water disribution networks, post and telecommunications systems which must be in operation immediately after earthquakes will also be assessed for seismic strength and those which are judged to be inadequate will be retrofitted or repaired.

6. A new program will be initiated for replacement or repair of hazardous rural houses in high seismic risk areas and determine the corresponding priorities.

7. Central plants producing good guality concrete will be encouraged as incentive and support for ensuring the use of better concrete in buildings.

8. Further emphasis will be placed on instrumental determination of the seismicity for damsites during the planning phases and the improvement of seismographic networks in the vicinity of existing ones.

E - Public Education and Information

1. Emphasis and priority will be accorded to large scale public education programs in earthquake-resistant construction practices and efforts will be made to ensure that such information is made available to even remote areas through proper cooperation and coordination.

2. Assistance provided to citizens who build their own homes or to local workers and builders will be enhanced through training courses, the training of technicians who will be providing such training themselves will be given priority.

3. Mass media means (TV, radio, etc.) will be utilized fully to inform communities in easily understandiable terms about earthquakes and associated forms of natural disasters.

4. "National Congresses on Natural Disasters" will be organized regularly to inform the public at large in Turkey about research, application, know-how and experience concerning disasters.

5. Education and research in seismology and earthquake engineering will be encouraged in universities providing training in the fields of earth sciences, civil engineering or urban planning. Support will be provided for improvement of laboratory and experimental facilities.

6. Means of international cooperation will be investigated so that experience and information on earthquakes in other countries may be imported to Turkey and errors committed elsewhere may be avoided and accumulated knowledge be fully used.

7. National and international projects by educational and research institutions aimed at reduction of earthquake damage will be encouraged and supported.

8. A wide spectrum of statistical data on earthquakes and other disasters will be collected and periodically published.

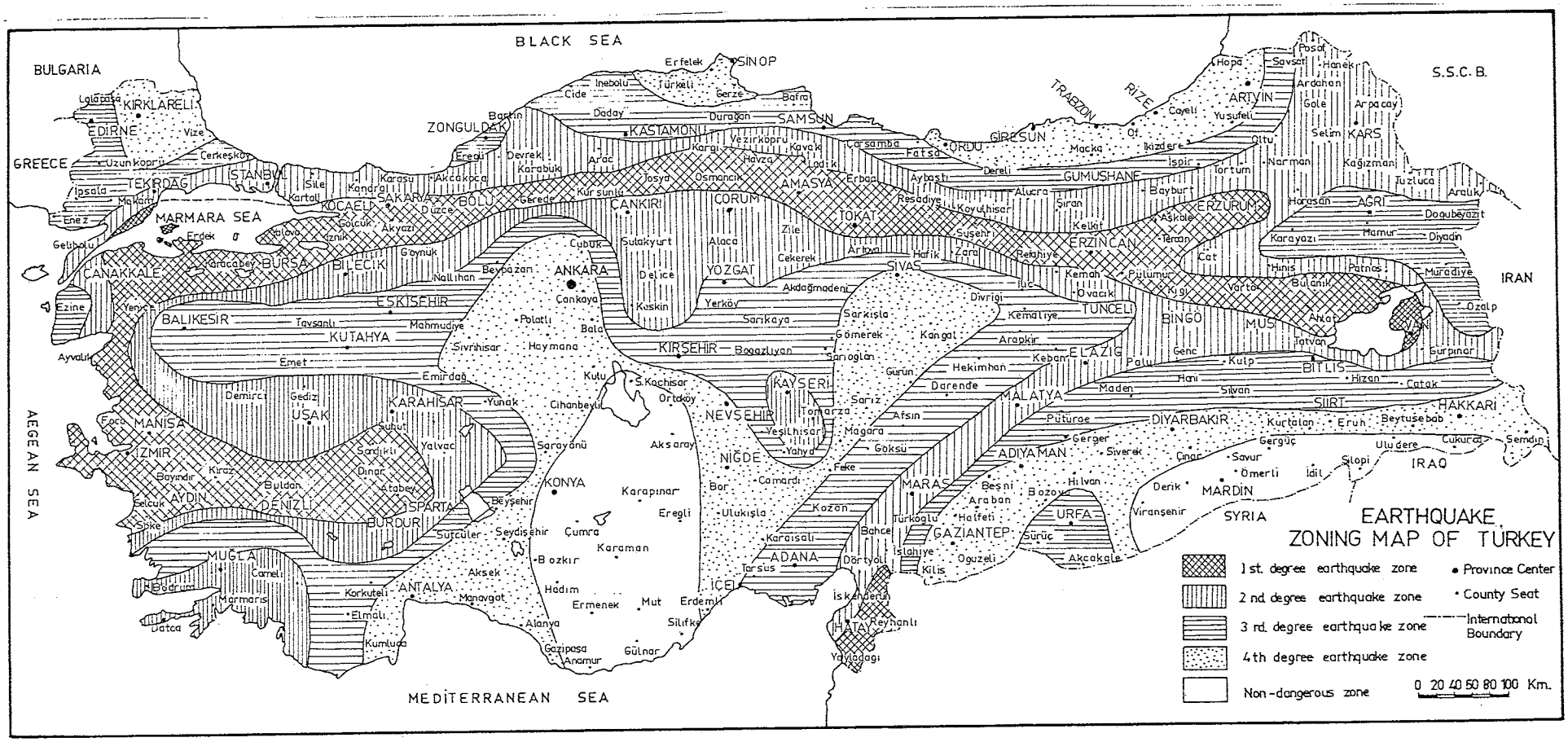

Figure 1. Official Earthquake Zoning Map of Turkey

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON EARTHQUAKES

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Identification of Hazard and Risk											
1.											
2.											
3.											
4.											
5.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
2.											
3.											
4.											
5.											
6.											
7.											
C. Short-Term Protective Measures and Preparedness											
1.											
2.											
3.											
D. Long-Term Preventive Measures											
1.											
2.											
3.											
4.											
5.											
6.											
7.											
E. Public Education and Information											
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION
TURKISH WORKING GROUP ON LANDSLIDES AND ROCK FALLS

Problems of Landslides and Rock Falls in Turkey

From the point of geological, morphological and climatological criteria, Turkey has regions which are substantially different from each other. Historically when city planning did not exist and when the only aim was to prevent cities from enemies, old cities and towns were built on hillsides or under straight inclined slopes.

Additionally, the current housing problem, due the population increase (2.5 percent per year) and rapid urbanization (5.5 percent per year), has caused the problem of squatter settlements which are generally built on cheap and public or private land. On these hillsides and sloped areas, natural disasters like landslides, sliding of rock blocks, and rock falls will naturally occur.

Thus, during the last 25 years (1960 - 1985), geological surveys were made in 5 500 settlements because of landslides and in 720 settlements because of rock falls. It was proposed to evacuate 58 500 houses exposed to landslides and 26 500 houses exposed to rock falls (total number was 85 000 houses). Because of these disasters total life loss was 200.

In Turkey the Black Sea Region, Central Anatolian Region and Eastern Anatolian Region are affected from landslides. The Mediterranean Region, the Central Anatolian Region and Eastern Anatolia are affected from rock falls.

Prevention and reduction of the damages of natural disasters mentioned earlier and arrangement of the legal measures are aimed under the frame of the **International Decade for Natural Disaster Reduction**.

Organizational Structure within IDNDR

Overall coordination for work to be undertaken in this Working Group was entrusted to the General Directorate of Disaster Affairs. Members of the Group were as follows:

Orhan Baltan (Chairman): Assistant General Director for Disaster Affairs

Kemal Erguvanli: President of the Turkish National Committee for Engineering Geology, Professor Emeritus, İstanbul Technical University

Okay Eroskay: Professor of Geology, İstanbul University

Erdoğan Yüzer: Professor and Dean, Faculty of Mines, İstanbul Technical University

Vahit Kumbasar: Professor of Civil Engineering, İstanbul Technical University

Remzi Ülker: Professor of Civil Engineering, İstanbul Technical University

PRIMARY OBJECTIVES FOR THE REDUCTION OF THE DISASTER OF LAND SLIDES AND ROCKFALLS

A - Identification of Hazard and Risk

1. Constitution of an Operation Center to collect and to evaluate the available data in one location will be done.

2. Studies for the determination of landslide regions of Turkey will be accelerated.

3. Standardization of the classification of risk regions, to provide a base for detailed landslide studies will be undertaken.

4. Landslide hazard maps at different scales will be prepared.

5. New areas suitable for settlement around the regions of potential landslides and rock falls will be determined.

B - Monitoring, Prediction and Early Warning Systems

1. Establishment of observation and measurement systems using geodesical, photogeological and remote sensing techniques in high risk regions will be initiated.

2. Emplacement of early warning systems and performing deformation surveys will be programmed.

3. Counter measures on local and regional scales will be evaluated.

4. Establishment of communication networks and broadcasting hazard warnings will be proposed.

5. Using meteorological data rainfall characteristics for forecasting unexpected rainfalls and their priods will be attempted and these will be compared with measurements.

C - Short-Term Protective Measures and Preparedness

1. Increased emphasis will be given to providing the plans related with urgent relief, rescue and temporary housing during the disaster and determination of institutions and committees that are appointed in practice.

2. Studies will be done to increase the practical capacity of Province-Level Rescue and Relief Plans.

D - Long-Term Preventive Measures

1. Additional studies will be undertaken for the determination of the relations and interactions between

landslides and rock falls with other disasters (earthquakes, eruption of volcanoes, storms, etc.)

2. A Research Centre for Landslides and Rock Falls will be established and training of specialists on these subjects, providing international scientific and technical relationships will be achieved.

3. Investigation of building types and measures which must be taken in potential landslide areas where settlement is unavoidable will be undertaken.

4. The organization necessary for the studies related with making continuous monitoring and evaluating them in regions where the risk of landslides and rockfalls is higher will be established.

5. Investigation of relationships between land deformation and building damages and determination of structural criteria will be encouraged and supported.

6. Settlements with potential landslide zones will be identified.

7. Determination of the areas exposed to landslides and rock falls in urban plans and determination of technical measures which must be taken will be widened.

E - Public Education and Information

1. Training and informing the public through the mass media (TV, radio, press etc.) organization of scientific and technical meetings such as seminars symposia and conferences will be accorded priority.

2. Coordination of duty, authority and responsibility between the local and central authorities and other responsible institutions will be studied in a critical way.

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON

LANDSLIDES AND ROCK FALLS

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Identification of Hazard and Risk											
1.											
2.											
3.											
4.											
5.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
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3.											
4.											
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C. Short-Term Protective Measures and Preparedness											
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1.											
2.											
3.											
4.											
5.											
6.											
7.											
E. Public Education and Information											
1.											
2.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION
TURKISH WORKING GROUP ON FLOODS

Background Information

In Turkey flood areas are distributed all over the country and floods take place along river valleys. Slopes of the rivers are generally steep and their surface run-off regimes are not stable.

Floods have inflicted considerable damage and caused loss of lives and economic losses. Flood damages increase on one hand because flood plains are developed and decrease on the other because structural counter-measures are taken. It should be mentioned that structural measures decrease the flood risk up to a certain extent, but increase the damages for the floods having higher frequency, especially if flood plains are developed because they have less flood risk. Operation and maintenance of flood control structures are also important for decreasing flood damages.

Organizational Structure within IDNDR

Names and affiliations of individuals who have contributed to this part of the report are as follows:

Özden Bilen (Chairman): Assistant General Director, State Waterworks (DSİ)

Süleyman Bozkurt: Division Head for Investigations and Planning, DSİ

Hüseyin Yavuz: Deputy Divsion Head for Investigations and Planning, DSİ

Ayhan Teker: Section Chief for Observations, DSİ

Necati Özçirpici: Section Chief for Hydrology, DSİ

Fikret Erdoğan: Section Chief for Operational Hydrology, DSİ

Şahin Bekişoğlu: Section Chief for Repair and Maintenance, DSİ

Arif Gafur: Section Chief for Hydrology, General Directorate of Meteorology (DMİ)

Nural Dalgün: Chief Engineer for Hydrology, DMİ

Hazım İnan: Assistant Director, Civil Defense School, Ministry of the Interior

Orhan Gedikli: Engineer, General Directorate of Basic Health Services, Ministry of Health

PRIMARY OBJECTIVES FOR THE REDUCTION OF FLOOD DISASTERS

A - Identification of Hazard and Risk

1. Floods which have occurred will be reanalyzed.

2. Hazard zones will be identified using hydrological data and by analyzing the floods which have occurred. Flood risk maps for hazard zones will be prepared.

3. A flood frequency atlas will be prepared for hazard zones.

4. Flood zones will be classified by considering the land use and plantation characteristics

B - Monitoring, Prediction, and Early Warning Systems

1. Hydrological observation networks and gaging stations will be revised, and if necessary, reinforced by installing new equipments.

2. A data bank will be established for easy access and use of hydrometeorological data for hydrological computations.

3. In order to increase the effectiveness of warning systems the data from gaging stations must be transmitted to the data bank rapidly. The hydrological stations in hazard zones will be provided with telemetering and radar systems. Telemetering, radar, and flood warning systems will be installed in a selected watershed as a sample, and the experience drawn from that case will be disseminated to all hazard zones.

4. Local flood offices at the hazard zones will be established for evaluation of hydrological data. These offices will be equipped with personal computers and the necessary software will be developed or provided for the computation of different frequency rainfall and runoff forecasts.

5. The regulations for the operation of flood control and warning systems will be issued, considering the output of the studies of the local flood offices.

6. Flood warning systems for public safety will be installed at hazard zones.

C - Short-Term Protective Measures and Preparedness

1. Plans which will cover the works to be carried out during floods to reduce the vulnerability of people and property will be prepared.

2. Local offices to coordinate the measures which will be

taken by the units according to the plans and communication between these units will be established.

3. Flood management plans covering governmental as well as non-governmental organizations, and regulations for non-structural measures to be taken during and after floods will be prepared to mitigate flood losses.

4. Existing flood management plans and regulations will be revised as needed.

5. Land use plans and regulations in flood zones will be prepared to mitigate flood losses.

6. Existing instructions for operation of flood control structures will be revised and updated for increased safety.

D - Long-Term Preventive Measures

1. New flood control projects will be developed to minimize flood losses. Structures such as storage reservoirs, detention basins, levees, dykes, etc., will be constructed. Increased losses in flood protection zones for higher frequency floods will be prevented by land use plans.

2. Measures required for damage mitigation of floods caused by human action such as collapse or failure of storage reservoirs will be taken.

E - Public Education and Information

1. The public will be educated and informed about the precautions to be taken before and after floods through publications, TV, radio, and meetings.

2. Persons responsible in flood management organizations will be trained and exercises will be carried out.

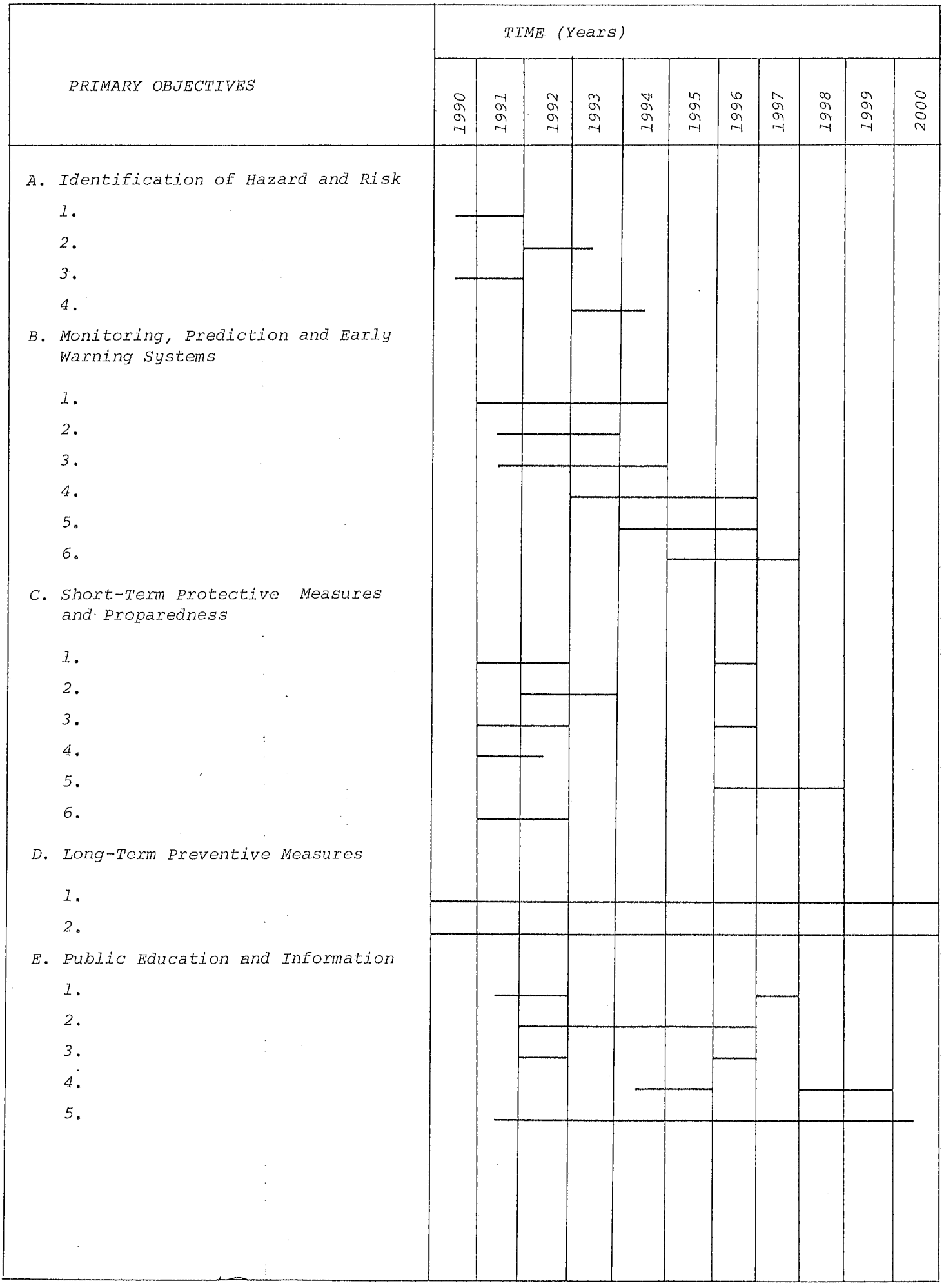
3. Local administrations dealing with flood management systems will be coordinated through instructions and regulations.

4. Two conferences, one national and the other international, will be organized in order to strengthen administrative and technical cooperation and provide direction for future work.

5. Researches at universities on flood hydrology and flood mitigation projects will be encouraged.

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON FLOODS



INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION
TURKISH NATIONAL WORKING GROUP ON FIRE

Background Information

Fire is the combustion of certain materials when accompanied by flames or glowing heat. In its many uses it serves mankind but when permitted to spread in an uncontrolled way fire can destroy the products of centuries within a short time. For this reason it is correctly considered to be a form of natural disaster.

In Turkey during the years 1982 - 87 a total of 86 304 fires broke out, causing damages totalling 100 billion TL. Within the same time frame 7030 forest fires have occurred, burning 58 700 hectares of forest land and inflicting damages equivalent to 27 billion TL. These figures underline the gravity of the fire disaster in terms of material losses it causes. The effects of fires must therefore be contained. The Working Group on Fires has determined that achieving this goal of minimizing life and property losses should be given renewed emphasis within the context of IDNDR. Public information and education are considered to be the most important tools for this goal.

Structure within IDNDR

The Turkish National Working Group on Fires has consisted of the following persons who have contributed towards this part of the National Report.

Yüksel Ayhan (Chairman): Assistant General Director of Civil Defense, Ministry of the Interior

Abdurrahman Kılıç: Associate Professor, Faculty of Mechanical Engineering, İstanbul Technical University

Özcan Esmer: Department of Urban Planning, Middle East Technical University, Ankara

Cevdet Dölarslan: Director of the Fire Brigade, Greater Municipality of Ankara

Metin Demir: Director of the Fire Brigade, Greater Municipality of İstanbul

Enver Yalçınkaya: Assistant General Director, Güven Insurance Inc.

Eşref Adalı: Associate Professor of Electrical Engineering, İstanbul Technical University

Ü. Savaş Baran: Captain, Turkish Navy

Hüseyin Çakır: Section Chief for Electronic Warning Systems, Turkish Standards Institute, Ankara

PRIMARY OBJECTIVES FOR THE REDUCTION OF THE FIRE DISASTER

A - Identification of Hazard and Risk

1. A critical review of the existing situation concerning fires, including legislation and insurance, will be provided.

2. Statistical studies in relation to fire data will be performed.

3. Information will be collected on the establishment of fire-fighting institutions.

4. State-of-the-art reviews will be provided for fire extinguishing equipment, gadgets aand materials.

5. Information will be collected on means of communications for combatting fire.

6. Information will be collected on causes and origins of forest fires.

7. Comparison studies will be undertaken between Turkey and other countries in ways of fire fighting.

B - Monitoring, Prediction, and Early Warning Systems

1. Fire alarm systems in major cities will be modernized.

2. In establishing modern means of communication between fire brigades, static and mobile communication possibilities will be strengthened, and a standard for management will be developed.

3. Monitoring and early warning systems will be set up in forested areas; where such already exist, improvements will be provided.

C - Short-Term Protective Measures and Preparedness

1. The existing legislation on fire safety will be reviewed, and new mitigation legislation will be introduced.

2. The status concerning the constitution, duties, training, and supervision principles of fire organizations will be reviewed and amended as required.

3. Improvements in the economic and social status of fire brigade personnel will be provided so that this profession becomes more attractive.

4. Areas of further training and supervision will be clarified.

5. Equipment, devices and materials currently in use in fire fighting will be identified and a standardization for them will be provided on a priority basis.

6. Plans will be provided for minimizing fire damages in provincial centers and smaller cities.

7. Municipal administrations and public or private enterprises lacking fire brigades will be required to organize them.

8. The most suitable fire extinguishing systems for Turkey will be identified, and these will be standardized on a priority basis. Inclusion of these systems in buildings and other facilities will be required from the design stage; services for their selection, maintenance and testing will be provided.

9. A positive information exchange between persons in the fire protection industry will be encouraged.

10. Cooperation will be established with foreign fire fighting establishments.

11. A "Fire Training Center" will be formed in order to provide advanced level training to fire brigade personnel.

12. General plans will be prepared as resources permit at regional or local scale for identification of the vulnerability of national forests against fire.

13. A unified management organization will be put up for air- or land-based preventive and protective operations against forest fires.

D - Long-Term Preventive Measures

1. The following specific requirements will be introduced into the existing building construction legislation so that the occurrence and spread of fires are prevented and damages are minimized.

a. Detailed and comprehensive regulations considering particular local climatic conditions will be prepared in planning, implementation, building materials and building technology for building safety.

b. Municipal governments will be asked to require fire prevention designs for construction and use stages in buildings.

c. The fire hazard will be introduced as an item for consideration during urban planning in its approval or design stage.

d. Local administrations will be assisted in implementing in a timely way all legislative revisions that are introduced.

e. Particular attention will be paid to ensuring that urban plans are abided with in relation to fire safety.

f. Rules for application and supervision in these areas will be identified.

2. Compulsory fire insurance on national scale will be introduced.

3. Fire Engineering will be supported as an independent subject at universities.

4. Combustion tests and structural safety precautions will be standardized from the point of view of fire endurance for building materials.

5. A Fire-Fighting fund will be established.

6. Beginning from the most vulnerable locations and considering transport means, a mobile guarding system will be set up in preventing and combatting forest fires.

7. An applied research project will be commissioned for the protection and fire safety of classical Turkish timber houses in Safranbolu, a town within the province of Zonguldak.

E - Land Use and Risk Management

1. More rational use of land in planned habitation centers and in investment planning will be achieved for protection from fire.

2. Risk of fire will be minimized in fire sensitive areas.

3. Roadways and tracks will be established in forested areas for use in fire prevention and fighting.

F - Public Education and Information

1. Exercises for fire safety and protection will be performed at schools.

2. Drills will be provided at hospitals for fire safety and rescue of patients.

3. Mass communication means will be utilized in making informative and easily comprehended printed material on fire safety available to all groups of society.

4. Efforts will be made to organize three scientific and technical symposiums (two national, one international) for increasing the public's awareness against fires and in orienting future work in this regard.

5. Statistical data on fires and related matters will be collected and periodically published.

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON FIRE

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Identification of Hazard and Risk											
1.											
2.											
3.											
4.											
5.											
6.											
7.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
2.											
3.											
C. Short-Term Protective Measures and Preparedness											
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13.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON FIRE

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
D. Long-Term Preventive Measures											
1.											
2.											
3.											
4.											
5.											
6.											
7.											
E. Land Use and Risk Management											
1.											
2.											
3.											
F. Public Education and Information											
1.											
2.											
3.											
4.											
5.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION
TURKISH WORKING GROUP ON "OTHER DISASTERS"

Background Information

Due to its geological and topographical features, Turkey ranks high among other countries facing natural disasters which cause a heavy toll of death, human sufferings and loss of properties.

It is possible to rank natural disasters occurring in our country, according to their importance as follows: Earthquakes, landslides, floods, rock falls, fires, avalanches, windstorms.

When the statistics of damages on houses caused by natural disasters were studied it was be seen that 1.30 percent of property damages were caused by avalanches, windstorms and other types of natural disasters. It was accepted that some studies be made in five basic groups during the first national meeting of the International Decade for Natural Hazard Reduction, held on 23 December 1988. Agreement was reached that one of the five working groups should be concerned with other Natural Disasters covering tsunamis, windstorms, volcanic eruptions and other events caused by underground water.

Organizational Structures within IDNDR

The Working Group on Other Disasters was set up under the general responsibility of the General Directorate for Disaster Affairs. Its administrative and scientific responsibilities were shared as follows:

Sayhan Bayoğlu (Chairman): General Director for Disaster Affairs, Ministry of Public Works and Settlement

Tuncay Ercan: Geologist, General Directorate of Minerals Research and Exploration

İstemi Ünsal: Professor of Civil Engineering, İstanbul Technical University

Ümit Ünlüata: Professor of Marine Sciences, Middle East Technical University, Erdemli

Sinan Gencoğlu: Geophysicist, Earthquake Research Division, General Directorate of Disaster Affairs

Faruk Tümer: Section Head, General Directorate of Disaster Affairs

Arif Gafur: Division Chief, General Directorate for Meteorology

Erdoğan Uzgider: Professor of Civil Engineering, İstanbul Technical University

Mustafa Çöleri: Division Chief, General Directorate for Meteorology

Ülker Yetkin: General Directorate of Ports and Airports, Ministry of Communications

Tahir Komaklioğlu: Electrical Surveys Administration

PRIMARY OBJECTIVES FOR THE REDUCTION OF "OTHER DISASTERS"

AVALANCHES

A - Identification of Hazard and Risk

1. All available information about avalanches, whether past or future, will be gathered by using the experiences on international basis, an avalanche hazard map will be prepared.

2. A model and simulation work will be done in order to determine the mechanics and the influence area of avalanche occurrences.

B - Monitoring,Prediction and Early Warning Systems

1. By keeping in contact with WMO (World Meteorological Organization) information will be collected about snow precipitation and snow storms and alert systems around highways and in areas having high avalanche danger will be established.

C - Short-Run Protective Measures and Early Preparedness

1. Studies about the avalanche hazard and risk will be made in winter tourism centers.

2. A cooperation will be undertaken with countries where experienced is available to rescue people buried under avalanches. Specially trained teams will be established in areas having high avalanche danger.

D - Long-Run Preventive Measures

1. International scientific gatherings and information exchange studies dealing with avalanche prevention will be attended.

E - Public Education and Information

1. Public training programs about preventive precautions against avalanches will be initiated.

WINDSTORMS

A - Identification of Hazard and Risk

1. Studies for the determination, according to the natural and topographical conditions of the country, of regions or zones in which the effect of windstorm is excessive will be started. Setting up and administrating the special obervation stations shall be provided.

2. Studies for gathering statistical information about re-

gional windstorms and their effects will be done for analyzing the duration and magnitude of windstorms by using the long hours, historical registers gathered for meteorological purposes.

3. The regions with excessive or less hazard and zones in which there is a potential storm risk in case of possible windstorm, will be determined. Physical planning studies of these data will be considered in case of application of construction.

B - Monitoring, Prediction and Early Warning Systems

1. The studies for gathering information about wind and wave at the same time will be started by setting up see observation stations in predetermined locations.

2. The early warning systems constructed by means of satellite communications systems and in cooperation with the World Meteorological Organization will be improved.

3. The hourly meteorological data recording stations of the existing network will be computerized and additional studies will be made to improve the existing measurement network technically.

C - Short-Term Protective Measures and Preparedness

1. The standards for the design of the buildings under the effect of wind loads will be examined and new regulations for other structures will be drawn up.

2. The application of the active and passive control methods for reducing the effects of wind load will be started.

D - Long-Term Preventive Measures

1. Mathematical models of dynamic wind loads on slender bridges, high energy lines, radio or TV antennas, stacks higher than (say) 100 m and multi story buildings will be improved. Improvement of experimental work for building models or real structures will be given priority.

2. Studies on suspension bridges, TV and radio antennas, tall chimneys and existing hotels and business centers with more than 20 storeys will be made. The actual strength of these buildings will be determined. Active and passive preventive precautions to be applied on these buildings will be determined.

E - Public Education and Information

1. The education and research work on wind and its dynamic effects which are put into operation, will be supported and encouraged.

VOLCANOES

A - Identification of Hazard and Risk

1. National and international information on volcanic eruptions, about which there is insufficient experience because we have not faced them in our country will be gathered and an archive will be started. Studies will be made on some selected volcanoes, such as Erciyes, Nemrut, Tendürek and Hasandağı, which erupted in ancient times and are still expelling hot water and gas. Studies will be made on their influence area.

2. Chemical analysis will be completed on gas and hot water specimens which are derived from sources around volcanoes.

B - Monitoring, Prediction and Early Warning Systems

1. Early alert and warning systems for volcanoes existing in the world will be examined and a model for an early alert system which can be set up in our country will be proposed.

C - Short-Term Protection Measures and Preparedness

1. After the completion of the studies made on the influence area of active volcanoes, the evacuation plan will be prepared for these locations in danger

D - Long-Term Preventive Measures

1. Warning the people living around the volcanoes which give of poisonous gases, the health personnel and tourism centers against the danger of volcanic eruptions will be done. Detailed training programs on precautions against gas poisoning will be started.

2. Research studies will be supported in order to improve the experience and knowledge which is not enough and a program will be made in order to examine the active volcanoes all over the world.

TSUNAMIS

A - Identification of Hazard and Risk

1. An archive will be constituted to collect and to examine the historical data related to the tsunami danger.

2. Mathematical model studies will be started by considering the morphological characteristics of the shores, the magnitude of the earthquakes that may happen near these shores, and the origin of the earthquakes in seas.

3. Mathematical models will be gathered for determination of tsunami risk and existing mathematical models will be improved.

B - Monitoring, Prediction and Early Warning Systems

1. Data related to tsunami "red alert" systems existing in the world will be collected and it will be searched whether or not the earthquake alert systems could be used for this purpose.

2. The conditions of the observation and measurement stations existing around national shores will be determined. It will be examined whether they can be used for warning and ways will be searched for the improvement of existing stations.

3. Setting up an early alert system on a regional scale among countries around the Agean Sea, Black Sea and the Mediterranean will be proposed, and coordination possibilities on an International research program will be investigated.

C - Short-Term Protective Measures and Preparedness

1. Tsunami surveys will be supported and encouraged in the area of nuclear plants, important ports and harbours. This will be forced by legal regulations.

2. Special evacuation programs will be prepared for regions having high tsunami risk.

D - Long-Term Preventive Measures

1. Research studies for examining the tsunami event in physical and mathematical point of view will be encouraged and supported.

2. Public information studies will be made in order to educate the people about how to use the devices and navigators of the ships in harbours on how to behave when a tsunami alert is given. These studies will be made under the light of international activities.

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON

OTHER DISASTERS (AVALANCHES)

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Identification of Hazard and Risk											
1.											
2.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
C. Short-Term Protective Measures and Preparedness											
1.											
2.											
D. Long-Term Preventive Measures											
1.											
E. Public Education and Information											
1.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON OTHER DISASTERS (WINDSTORMS)

PRIMARY OBJECTIVES	*TIME (Years)*										
	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
A. Identification of Hazard and Risk											
1.											
2.											
3.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
2.											
3.											
C. Short-Term Protective Measures and Preparedness											
1.											
2.											
D. Long-Term-Preventive Measures											
1.											
2.											
E. Public Education and Information											
1.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON OTHER DISASTERS (VOLCANOES)

PRIMARY OBJECTIVES	TIME (Years)										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Identification of Hazard and Risk											
1.											
2.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
C. Short-Term Protective Measures and Preparedness											
1.											
D. Long-Term Preventive Measures											
1.											
2.											

INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

TIME-TABLE FOR PLANNED ACTIVITIES OF WORKING GROUP ON OTHER DISASTERS

(TSUNAMIS)

PRIMARY OBJECTIVES	*TIME (Years)*										
	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
A. Identification of Hazard and Risk											
1.											
2.											
3.											
B. Monitoring, Prediction and Early Warning Systems											
1.											
2.											
3.											
C. Short-Term Protective Measures and Preparedness											
1.											
2.											
D. Long-Term Preventive Measures											
1.											
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