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SPECIAL ECONOMIC AND DISASTER RELIEF ASSISTANCE

International Decade for Natural Disaster Reduction

Report of the Secretary-General

CONTENTS

	<u>Paragraphs</u>	<u>Page</u>
I. INTRODUCTION	1 - 3	2
II. BACKGROUND	4 - 8	2
III. POTENTIAL OF DISASTER-MITIGATION MEASURES FOR REDUCING HUMAN AND MATERIAL LOSSES	9 - 21	3
IV. PREPARATIONS FOR INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION	22 - 32	6
V. ROLE OF THE UNITED NATIONS SYSTEM	33 - 35	9

ANNEXES

I. Sudden natural disasters (1900-1987), tables A and B	10
II. Preliminary summary of disaster losses, January-September 1988	11
III. International <u>ad hoc</u> experts group for International Decade for Natural Disaster Reduction	13
IV. Non-governmental organizations, preliminary list	15
V. International Decade for Natural Disaster Reduction, budget estimate for preparatory stage, 1988-1989	18
VI. Decade activity matrix for the International Decade for Natural Disaster Reduction - United Nations agencies	19

I. INTRODUCTION

1. In its resolution 42/169 of 11 December 1987, the General Assembly decided to designate the 1990s as a decade in which the international community, under the auspices of the United Nations, would pay special attention to fostering international co-operation in the field of natural disaster reduction. The objective of this Decade would be to reduce, through concerted international actions, loss of life, property damage and social and economic disruption caused by natural disasters, especially in developing countries. The goals are:

- (a) To improve the capacity of each country to mitigate the effects of natural disasters expeditiously and effectively, paying special attention to assisting developing countries in the establishment, when needed, of early warning systems;
- (b) To devise appropriate guidelines and strategies for applying existing knowledge, taking into account the cultural and economic diversity among nations;
- (c) To foster scientific and engineering endeavours aimed at closing critical gaps in knowledge in order to reduce loss of life and property;
- (d) To disseminate existing and new information related to measures for the assessment, prediction, prevention and mitigation of natural disasters;
- (e) To develop measures for the assessment, prediction, prevention and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects and education and training, tailored to specific hazards and locations, and to evaluate the effectiveness of those programmes.

2. The Secretary-General was requested to develop, in co-operation with the appropriate organizations of the United Nations system and relevant scientific, technical, academic and other non-governmental organizations, an appropriate framework to attain these objective and goals, and to report thereon to the General Assembly at its forty-fourth session through the Economic and Social Council.

3. The Secretary-General was also requested to submit a progress report to the General Assembly at its forty-third session, with particular emphasis on defining the catalytic and facilitating role envisaged for the United Nations. The present report is submitted pursuant to that request.

II. BACKGROUND

4. It is not possible to estimate accurately the loss of human lives and the damage caused by natural disasters, especially since many go unreported. However, some indicative figures for the period from 1900 to 1987 are given in annex I, as well as a preliminary summary of disaster losses in January-September 1988 in annex II.

5. Major disaster events in 1988 alone have included the extensive floods in the Sudan and Bangladesh, hurricane Gilbert in Jamaica, Haiti and Mexico, a typhoon in China, a major earthquake along the border region of Nepal and India, a landslide in Venezuela, and locust infestations in northern Africa.

6. Reports on these and other scenes of devastation were being featured in the world's press at the time this report was being prepared. By the time it is presented to the General Assembly, news of these disasters may have faded; however, it is likely that reports of fresh events will be replacing them in the headlines. In fact, almost every day a natural disaster occurs somewhere in the world, bringing misery, death and destruction to people going about their daily lives.

7. While some areas are at more risk than others, natural disasters are a global phenomenon and occur in all parts of the world. The capacity of individual countries to respond, however, varies significantly. Of particular concern in this regard is the need to develop and enhance the capacity of many developing countries to undertake effective prevention and preparedness measures. Most developing countries are unable to make a timely assessment of potentially damaging events or to set in place management systems to provide useful warning and other related information to government authorities, civil defense and protection institutions, community organizations and the public in general. At the same time, the risk of natural disasters is increasing as a result of population growth, urbanization, alteration of the natural environment, substandard dwellings and public buildings, and inadequate infrastructure maintenance. Many of these factors reflect insufficient economic growth.

8. Despite the severity and magnitude of the problem, disaster prevention ranks relatively low on public agendas. The simple, relatively inexpensive steps that can be taken are, to a large extent, ignored, and development plans and strategies fail to include provision for disaster reduction mechanisms. In the long run, the immediate cost of disaster-mitigating activities would be more than offset by savings in potential damage and in human lives.

III. POTENTIAL OF DISASTER-MITIGATION MEASURES FOR REDUCING HUMAN AND MATERIAL LOSSES

9. In proposing the Decade, the General Assembly recognized that the scientific and technical understanding of the causes and impact of natural disasters and of ways to reduce both human and property losses has progressed to such an extent that a concerted effort to assemble, disseminate and apply this knowledge could have very positive effects, particularly for developing countries. The following examples are illustrative of the sort of actions that might be envisaged in this regard.

10. Warning and preparedness systems installed in those regions where most deaths occur can save many lives and substantially reduce property damage. More widespread use of risk analyses and appropriate engineering design and land use planning as well as the introduction of management, administrative and

co-ordination mechanisms together with special education, training, and information dissemination programmes can provide effective and long-lasting protection against the impact of natural disasters.

11. Experience in the United States and Japan, where advance flood and storm warning systems are installed, shows that the impact of natural phenomena, particularly tropical storms, can be greatly reduced. For example, in Japan, the advantages that research, satellites and good communications have brought to the warning system for typhoons has meant that the death toll has been significantly lowered since 1960. In the United States, the loss of life from hurricanes has decreased substantially since the advent of a warning service in the 1870s, and this decrease has become especially marked since improvements have been made to the warning system following the launching of meteorological satellites in the 1960s.

12. For flood plains of large rivers in countries with good hydrological forecasting systems, up to a third of potential flood damage can be avoided and most deaths prevented; normally the amount of damage reduction is 10 to 15 per cent. In India, the mean annual flood damage is approximately \$2,500 million. Even a 10 per cent reduction in this figure by means of an adequate warning and preparedness system amounts to \$250 million a year. In Bangladesh, the installation of a satellite-based warning system helped to limit the number of victims of the killer cyclone in 1985 to 10,000, as compared with a similar event in 1970 when over 300,000 people died.

13. There are other examples of the benefits of mitigation measures. In Argentina, on 1 January 1944, a 7.8 magnitude, IX intensity earthquake hit the prosperous province of San Juan, killing nearly 10,000 people and causing injury to an additional 12,000. Eighty per cent of housing collapsed; damage was estimated to have been over \$1 billion at 1944 value. A special commission was established for the reconstruction of the affected region; in a few years it became the National Institute for Seismic Prevention - INPRES - responsible for implementation of prevention and mitigation measures. On 23 November 1977 a similar earthquake, magnitude 7.4, IX intensity struck the very same region, causing 100 deaths, 200 injured and the collapse of some 250 adobe houses; however, none of the new housing, built since 1944 under INPRES regulations, suffered serious damage.

14. Earthquake-resistant design has reduced the casualties significantly. Moreover, such design, although it increases building costs by approximately 5-15 per cent on the average, prevents serious damage to or total loss of the buildings themselves. Old buildings, and new non-engineered structures in earthquake-prone developing countries, remain highly vulnerable; in thousands of villages and cities, the danger is even greater, because of narrow streets or because of their location on slopes. Migration from rural areas to cities with virtually no available housing has aggravated the problem. In the absence of a sufficiently reliable ability to predict earthquakes, emphasis should be given to making structures earthquake-resistant and preparing adequate plans for evacuation and other relief activities.

15. Warning systems for tsunamis are operational in the Pacific Ocean region for the benefit of island States and the countries around the Pacific Rim. If the source is distant (e.g. 500 km or more from a threatened coast) there may be time to put pre-planned evacuation measures into force, but the speed of travel of tsunamis means that by the time the source is near it will be impractical to initiate such an evacuation. Because coastal areas are being subjected to unprecedented population growth and economic development, making more people and property vulnerable to tsunamis (as well as hurricanes), mitigation is the most effective long-term protective measure. This implies control of land use and of the structural integrity of new buildings and infrastructure such as roads and communications, attention to the proper design and siting of essential services, the planning of and provision for evacuation routes, and comprehensive public education programmes.

16. With regard to volcanoes, timely warning is the basic means of saving human lives. Predicting volcanic eruptions is now becoming more promising and successful measures have been applied in several countries.

17. The problem of landslides is generally underestimated. They occur almost everywhere, usually as a function of a slope in the terrain and of the natural and human actions that reduce the capacity of a slope to support rock and soil. The main causes of landslides are heavy rains, melting snow or ice, earthquakes, volcanic eruptions and human activities. Humans have contributed to the severity of the landslide hazard by altering the natural environment through deforestation, grazing and development on steep slopes. The impact of landslides can be drastically reduced by legislation on land use, proper identification of high risk areas, application of sound engineering techniques, timely issue of warnings in certain cases, dissemination of information and additional basic research. Very successful high-benefit and low-cost programmes in Japan, Hong Kong and Los Angeles are examples of how losses by landslides can be dramatically reduced. After 1958, when the Japanese Government enacted strong legislation to prevent landslides, the number of victims dropped substantially, by two orders of magnitude.

18. Wildfires are uncontrolled conflagrations that spread freely after being initiated by human acts or by natural causes such as lightning, volcanoes and earthquakes. Wildfires have devastated thousands of square kilometers of forests, crop-land and cities (San Francisco 1906, Tokyo 1923, China 1987, United States 1988). They contribute to floods and landslides because of rapid run-off from burnt-over areas and erosion of exposed soil. As human populations continue to encroach on eroded areas, wildfires increasingly include significant human losses. Prevention is still the foremost measure to reduce losses. These include permanent watch during dry seasons, controlled burning, vegetation breaks, public education, improvement in firefighting techniques and equipment, and the design, composition and construction of structures to enhance probability of surviving.

19. Locust infestations causing severe agricultural losses have been recorded for millennia. The extensive damage caused by locusts has been particularly severe in Africa. Major locust outbreaks, with a periodicity of some 30 to 80 years, often start in inaccessible areas. Fortunately, good forecasting systems are now operational. Basic research is still needed to develop new, environmentally

friendly, sustainable, locally adaptable technologies for more rapid control of the swarms.

20. Drought and desertification remain a critical problem. In spite of the major efforts that have been initiated, there is need for additional research on and application of relatively low-cost programmes.

21. Typically, disaster mitigation is undertaken on the basis of individual hazards. Often an initial hazard triggers secondary effects; an earthquake may cause a tsunami, a landslide, soil liquefaction or fires or failure of industrial installations (dam, pipeline, chemical plant, factories, etc.); volcanic eruptions may induce severe mudflows; heavy rains will cause landslides and mudflows as well as floods. Essential communications systems can be destroyed or interrupted by almost any kind of disaster. Many of the worst disasters are the result of the combined action of two or more natural hazards. Thus, multiple disaster mitigation must be viewed as a logical and necessary development which requires more attention than it has received so far.

IV. PREPARATIONS FOR INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

A. Steering committee

22. In February 1988, the Secretary-General established a steering committee on the Decade to assist him in developing an appropriate framework to attain its objectives and goals. The Director-General for Development and International Economic Co-operation of the Secretariat was designated Chairman and the United Nations Disaster Relief Co-ordinator, Vice-Chairman. Members of the Committee are designated senior officials of the Department of Technical Co-operation for Development and the Centre for Science and Technology for Development of the Secretariat, UNDP, UNEP, UNCHS, WFP, FAO, UNESCO, WHO, World Bank, ITU, WMO and IAEA. Other entities of the United Nations system are associated with the work of the Committee when questions of direct interest to them are being considered. A working group of the steering committee has prepared several documents for approval by the Committee as inputs to the work of the experts group (see below).

B. Washington meeting

23. In March 1988, the United Nations, in co-operation with the United States National Academy of Sciences, convened an informal meeting of international scientists, engineers and representatives of the United Nations system to discuss the Decade. The meeting provided a useful opportunity to review the possible orientation of and preparatory arrangements for such an event.

C. International ad hoc group of experts on the Decade

24. To assist him in developing an appropriate framework for the Decade, the Secretary-General appointed a panel of 25 eminent scientists and experts (see annex III for list). The experts group, under the chairmanship of Dr. Frank Press (President of the United States National Academy of Sciences) has held two meetings, the first from 5 to 8 July 1988 at Geneva and the second from 3 to 6 October 1988 in New York. Two additional meetings have been tentatively scheduled for January and April 1989. It is anticipated that the report of the experts group will provide the basis for the report of the Secretary-General to be submitted to the forty-fourth session of the General Assembly through the Economic and Social Council.

25. A report on the first meeting of the experts group is available to delegations. It should be noted, however, that the group is engaged in an iterative process and thus the content and orientation of its final report has not been determined.

D. National committees

26. On 29 July 1988, the Director-General for Development and International Economic Co-operation of the Secretariat addressed a letter to Member States, in which, among other things, he drew to their attention the provisions of General Assembly resolution 42/169 relating to the establishment of national committees and included an annex on possible modes of organization at the national level. It was suggested that areas of activity for national committees might include:

- (a) Identification of hazard zones and hazard assessment;
- (b) Monitoring, prediction and warning;
- (c) Short-term protective measures and preparedness;
- (d) Long-term preventive measures;
- (e) Land use and risk management;
- (f) Public education and information.

27. Governments were asked to provide information on any action taken towards establishing a national committee or other official body for the Decade. Several Governments have already reported the establishment of such committees.

E. Co-operation with non-governmental organizations

28. General Assembly resolution 42/169 requests the Secretary-General to co-operate with the relevant scientific, technical, academic and other non-governmental organizations in developing an appropriate framework for the

Decade. Contact has been established with a number of scientific and engineering organizations that have been active in one or more fields covered by the Decade (see annex IV). Positive responses have been received from 15 organizations, and 12 have designated correspondents (liaison offices) for further contacts. To assist in maintaining liaison with and sensitizing the international scientific and technical community, the Secretary-General has appointed a senior scientific adviser (funded from extrabudgetary resources) who will also assist in the work of the experts group and provide guidance to the secretariat.

29. A large number of voluntary organizations, many of them members of the International Council of Voluntary Agencies, are involved in disaster management. They are mainly active in relief operations but some also work in pre-disaster planning. Contact has been established with this community of organizations. The League of Red Cross and Red Crescent Societies has offered its co-operation in the Decade's work, objectives and goals.

F. Co-operation with intergovernmental organizations

30. Contacts have been established with several intergovernmental organizations outside the United Nations system, namely, Association of South-East Asian Nations (ASEAN), Caribbean Community, Organization of African Unity (OAU), Organization of American States (OAS), International Civil Defense Organization, Council for Mutual Economic Assistance (CMEA), Council of Europe, Commission of the European Communities, Organisation for Economic Co-operation and Development (OECD), Pan-American Institute of Geography and History, and Acuerdo de Cartagena. Positive responses have been received from the Council of Europe, OAU, OAS, OECD, the International Civil Defense Organization and CMEA; the Council of Europe and the International Civil Defense Organization have designated focal points for further contacts.

G. Funding and secretariat support

31. General Assembly resolution 42/169 recommends that, if necessary, extrabudgetary resources be provided for the preparations for the Decade and considers that for this purpose, voluntary contributions from countries, international organizations and other organizations are highly desirable. An appeal has been made to potential donors for voluntary contributions based on a provisional budget (see annex V). The Government of Japan has offered to pay for the costs of meetings of the experts group, as well as to cover the costs associated with the Senior Scientific Adviser. The Government of Morocco has also offered to contribute to meeting the costs of the experts group. The Government of France has contributed to the Decade trust fund. The United States National Academy of Sciences has arranged for the services of a scientific adviser to be available to the secretariat. The Secretary-General is appreciative of this support.

32. Within the Secretariat, every effort has been made to utilize existing resources. The Office of the United Nations Disaster Relief Co-ordinator (UNDRO),

in particular, has provided much of the secretariat support for the preparatory process. However, given the continuing stringent resource situation of the Organization, additional resources are required, especially in the coming months when the work that has been set in motion comes to fruition and will have to be integrated in a final report. Accordingly, potential donors are urged once again to consider providing the voluntary contributions needed to ensure adequate preparations for the Decade.

V. ROLE OF THE UNITED NATIONS SYSTEM

33. The Decade is envisaged as an international undertaking that will require the active support and participation of local communities, national authorities, regional organizations, and the international community as a whole, both governmental and non-governmental. The United Nations system has a critical catalytic and facilitating role in inspiring and supporting these activities. In addition, the United Nations is called on to become an international centre for the exchange of information, the storing of documents and the co-ordination of international efforts.

34. Several United Nations entities have a long tradition in promoting the study of natural disaster phenomenon as well as the application of counter-disaster measures. Those most involved include UNDP, UNEP, UNCHS, UNDRO, FAO, UNESCO, WMO and IAEA. A preliminary summary overview of the relevant activities of the entities of the United Nations has been prepared and is available to delegations. The distribution of fields of competence is schematically represented by a matrix in annex VI.

35. Many of the past and current activities of United Nations entities lend themselves to achieving the objective and goals of the Decade. This experience and expertise is being mobilized in the preparations and should be fully utilized during the Decade itself. However, pending agreement on the appropriate framework, it is not possible to define in further detail the role of the United Nations system in the Decade.

ANNEX I

Sudden natural disasters (1900-1987)

Table A

Human and material losses by region

<u>Region</u>	<u>Damage \$US (millions)</u>	<u>Total number of deaths</u>
Africa	6 945	21 651
Latin America and the Caribbean	22 422	284 369
Europe (including the Soviet Union)	38 747	286 487
Asia and South-West Pacific	22 663	3 489 320
Totals	<u>90 777</u>	<u>4 081 027</u>

Table B

Human and material losses by type of hazard*

<u>Type of hazard</u>	<u>Damage \$US (millions)</u>	<u>Total number of deaths</u>
Earthquakes	45 245	2 076 164
Floods	29 250	1 213 299
Windstorms	14 100	686 849
Volcanoes	1 405	79 264
Landslides	720	21 904
Tsunamis	57	3 547
Totals	<u>90 777</u>	<u>4 081 027</u>

* These figures should be regarded as purely indicative and are partly based on the following source: "Disaster History to present-day values", Office for Foreign Disaster Assistance, US AID.

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ANNEX II

Preliminary summary of disaster losses*

January-September 1988

Disaster type	Number of events	Totals per disaster types	
		Persons affected	Damage (\$US)
Avalanche/ Landslides	12	600 dead 70 missing 100 affected 600 homeless	Damage estimate: \$7 million reported in only one event.
Drought/ Famine	2		Estimated damage: \$1 billion reported in Yugoslavia. 7.3 million ha. of crops reported affected in China.
Earthquakes	1	908 dead 2 312 injured	One event straddling Indo-Nepalese border. Nepal: 27 districts affected; 18 000 houses destroyed. India: 3 districts severely affected; 30,000 families affected.
Epidemics	8	4 280 dead over 670 000 affected	
Fires	7	137 dead 14 injured 27 500 affected	Damage estimate: \$9.3 million reported in one event and \$350 million in another (historical centre of Lisbon, Portugal).
Floods	41	5 512 dead 800 missing 1 057 injured 48.5 million affected	Damage estimate: \$240 million reported in 5 out of 41 events. No estimate yet for recent major floods in August and September in Africa, Asia and Latin America.

Disaster type	Number of events	Totals per disaster types	
		Persons affected	Damage (\$US)
Storms	14	over 1 000 dead 2 416 injured 17 million affected	Damage estimate: \$941 million reported in five events. (Preliminary damage estimate for Hurricane Gilbert in Jamaica alone: at least 400 million.)
Other disasters (heatwave, chemical spills, poisoning, etc.)	10	2 212 dead 1 850 affected	Damage estimate: \$3 million reported for one event.
Accidents (airplane, train, boat, road, explosion)	78	3 319 dead 9 171 injured 200 000 evacuated in one event	

* Source: UNDRO NEWS.

ANNEX III

International ad hoc experts group for International Decade
for Natural Disaster Reduction

Frank Press (United States)	President of the United States National Academy of Sciences;
Claude Allegre (France)	Directeur de l'Institut de physique du globe, Université de Paris;
Luis Novais de Almeida (Brazil)	Regional Co-ordinator, Latin America Watershed Management Network;
Anand Swarup Arya (India)	Former Director, International Association of Earthquake Engineering;
M. Benblidia (Algeria)	Directeur Général de l'Agence nationale pour l'aménagement du territoire;
Driss Bensari (Morocco)	Directeur, Centre national de coordination et de la planification de la recherche scientifique et technique;
Noel Phillip Cheney (Australia)	National Bushfire Research Centre;
J. C. I. Dooge (Ireland)	Former President, International Association of Hydrological Sciences;
Alberto Giesecke (Peru)	Director of the Regional Seismological Centre for South America;
Richard E. Hallgren (United States)	Executive Director, American Meteorological Society;
Vit Karnik (Czechoslovakia)	Senior Research Scientist, Geophysical Institute of the Czechoslovak Academy of Science;
Vladimir I. Keilis-Borok (Soviet Union)	President, International Union of Geodesy and Geophysics;
Roman L. Kintanar (Philippines)	Director-General of Philippines Atmospheric, Geophysical and Astronomical Services Administration;
Ram Krishna (Fiji)	Director of National Weather Service; Chairman, South Pacific Tropical Cyclone Committee;

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Michel Lechat (Belgium)	Professor of Epidemiology, University of Louvain;
Franklin MacDonald (Jamaica)	Director, Office of Disaster Preparedness and Emergency Relief Co-ordination;
Norbert Morganstern (Canada)	Department of Civil Engineering, University of Alberta;
Thomas Odhiambo (Kenya)	President of the African Academy of Sciences;
Keizo Okabe (Japan)	Professor, Department of Sociology, Tokyo University;
L. Oyebande (Nigeria)	Provost, College of Science and Technology, Abeskuta;
Carlos Pelanda (Italy)	Member, Committee on Disaster Research, International Institute of Sociology;
Gudjon Petersen (Iceland)	Director, Iceland Civil Defence Organization;
Jakim Petrovski (Yugoslavia)	Former Director, Institute of Earthquake Engineering and Engineering Seismology;
Emilio Rosenblueth (Mexico)	Founder and first Director of the Instituto de Ingeniería de México; and
Lili Xie (China)	Professor, Secretary-General of the China Association of Natural Hazard Reduction

ANNEX IV

Non-governmental organizations

Preliminary list

The following is a preliminary list of international non-governmental organizations that have ongoing activities relevant to the objective and goals of the Decade or have expressed interest in participating in the Decade.

1. The International Council of Scientific Unions (ICSU) and its member unions, scientific associates, scientific and special committees and inter-union commissions:
 - 1.1 The International Union of Geodesy and Geophysics (IUGG) and its member associations:
 - 1.1.1. The International Association of Geodesy (IAG);
 - 1.1.2. The International Association of Seismology and Physics of the Earth's Interior (IASPEI) and its Commission on Earthquake Hazard;
 - 1.1.3. The International Association of Volcanology (IAVCEI) and its Working Group on the Mitigation of Volcanic Disasters;
 - 1.1.4. The International Association of Meteorology and Atmospheric Physics (IAMAP);
 - 1.1.5. The International Association of Hydrological Sciences (IAHS);
 - 1.1.6. The International Association for the Physical Sciences of the Ocean (IAPSO);
 - 1.2 The International Union of Biological Sciences (IUBS) and its Commission on Limnology;
 - 1.3 The International Geographical Union and its Commission on Geographical Monitoring and Forecasting (IGU);
 - 1.4 The International Union of Geological Sciences (IUGS) and its affiliated organizations:
 - 1.4.1. The International Association of Hydrogeologists (IAH);
 - 1.4.2. The International Association of Engineering Geology (IAEG);
 - 1.4.3. The Association of Geoscientists for International Development (AGID);

- 1.5 The International Union of Psychological Science (IUPsyS) and its International Network of Research Centres in Behavioural Ecology/Environmental Psychology;
- 1.6 The International Union for Quaternary Research (INQUA);
- 1.7 The International Union of Forestry Research Organizations (IUFRO);
- 1.8 The International Society of Soil Science (ISSS), its Commission on Soil Technology and its Working Group on the Engineering Properties of Soils;
- 1.9 The Pacific Science Association (PSA) and its Committee on Solid Earth Sciences;
- 1.10 The Scientific Committee on Oceanic Research (SCOR);
- 1.11 The Scientific Committee on Problems of the Environment (SCOPE) and its Working Group on the Ecology of Biological Invasions;
- 1.12 The Federation of Astronomical and Geophysical Services (FAGS);
- 1.13 The Inter-Union Commission on the Lithosphere (ICL) and its Committee on Environmental Geology and Geophysics.
2. The Union of International Technical Associations (UATI) and its member associations, in particular:
 - 2.1 The International Association for Hydraulic Research (LAHR);
 - 2.2 The International Commission on Irrigation and Drainage (ICID);
 - 2.3 The International Commission on Large Dams (ICOLD);
 - 2.4 The International Union of Testing and Research Laboratories for Materials and Structures (RILEM);
 - 2.5 The International Union of Public Transport (UITP);
 - 2.6 The International Union of Producers and Distributors of Electrical Energy (UNIPED).
3. The World Federation of Engineering Organizations (UFEO) and its national member organizations.
4. Other technical associations
 - 4.1 The International Association for Earthquake Engineering (IAEE);
 - 4.2 The International Association for the Study of Insurance Economics;

- 4.3 The International Association for Wind Engineering (IAWE);
- 4.4 The International Council on Archives (ICA);
- 4.5 The International Council on Museums (ICOM);
- 4.6 The International Council on Monuments and Sites (ICOMOS);
- 4.7 The International Institute for Applied Systems Analysis (IIASA);
- 4.8 The International Sociological Association (ISA);
- 4.9 The International Seismological Centre (ISC);
- 4.10 The International Society for Soil Mechanics and Foundation Engineering (ISSMFE);
- 4.11 The International Science Writers Association (ISWA);
- 4.12 The World Association of Industrial and Technological Research Organizations (WAITRO);
- 4.13 The International Union of Architects (IUA);
- 4.14 The International Society for City and Regional Planning (ISOCARP).

5. Voluntary agencies

- 5.1 The International Council of Voluntary Agencies (ICVA);
- 5.2 The League of Red Cross and Red Crescent Societies (LORCS).

ANNEX V

International Decade for Natural Disaster Reduction

Budget estimate for preparatory stage, 1988-1989

Cost in \$US

International ad hoc group of experts

Travel and daily subsistence allowance for experts (four meetings)	381 000	
Conference services	254 400	
Travel of secretariat staff	40 000	
Miscellaneous	<u>15 000</u>	
Subtotal		690 400

Support for group of experts

Senior Scientific Advisor, L-VII (total of 6 months during 1988-89)	70 000	
Consultant, L-V (18 months)	125 000	
Travel	<u>100 000</u>	
Subtotal		<u>295 000</u>

Total for ad hoc group of experts 985 000

Decade secretariat

One D-1/P-5 and one P-4 (18 months each)	336 000	
Two GS (18 months each)	170 000	
Office facilities and supplies	25 000	
Communications	<u>25 000</u>	

Total for secretariat 556 000

Total preparatory stage costs 1 541 000

ANNEX VI

Decade activity matrix for the International Decade for
Natural Disaster Reduction - United Nations agencies

Type of hazard Type of action	Wind storms	Storm surges	River floods	Volcanic eruptions	Earthquakes	Tsunami	Landslides	Avalanches	Wildfires	Insect plagues
Action on the causative phenomenon	WMO	FAO WMO UNESCO					FAO DTCD		FAO	FAO
Hazard zoning and microzoning	WMO UNCHS IAEA	UNESCO WMO IAEA	WMO UNCHS IAEA DTCD	UNESCO	UNESCO UNCHS IAEA DTCD	UNESCO IAEA	UNESCO UNCHS DTCD	UNESCO WMO	FAO WMO	FAO WMO WHO
Prediction and warning	WMO	WMO UNESCO	WMO FAO UNESCO DTCD	UNESCO	UNESCO	UNESCO	WMO UNESCO	WMO UNESCO	WMO	FAO WMO
Preparedness planning and training and response to warnings	UNDRO WMO WHO UNCHS	UNDRO WMO WHO	UNDRO WMO WHO UNCHS DTCD	UNDRO WHO UNCHS	UNDRO WHO UNCHS	UNDRO WMO WHO	UNDRO WMO WHO UNCHS	UNDRO WMO WHO	UNDRO WMO WHO	UNDRO FAO WHO WMO
Disaster assessment and analysis	UNDRO UNCHS WMO	UNDRO UNCHS UNESCO	UNDRO FAO WMO UNCHS	UNDRO UNCHS UNESCO FAO	UNDRO UNCHS UNESCO FAO UNESCO	UNDRO UNCHS UNESCO	UNDRO UNCHS UNESCO	UNDRO UNCHS UNESCO WMO	UNDRO FAO	UNDRO FAO WMO
Long-term protection (building codes, site modification, etc.)	FAO WMO IAEA UNESCO	UNCHS WMO UNESCO IAEA	UNCHS UNESCO WMO IAEA DTCD	UNCHS FAO	UNESCO UNCHS IAEA	UNESCO FAO	UNCHS FAO	UNCHS		
Land-use planning		UNESCO DTCD	UNCHS FAO WMO UNESCO	UNCHS UNESCO	UNCHS UNESCO DTCD	UNESCO	UNCHS UNESCO DTCD	UNESCO	FAO	FAO WMO

Type of hazard Type of action	Wind storms	Storm surges	River floods	Volcanic eruptions	Earthquakes	Tsunami	Landslides	Avalanches	Wildfires	Insect plagues
Public information and education	WHO WMO UNCHS UNDRO	UNESCO WHO WMO UNDRO	WMO DTCD UNCHS UNESCO UNDRO	UNESCO UNCHS WHO WMO UNDRO	UNESCO UNCHS WHO DTCD UNDRO	UNESCO WHO UNDRO	UNESCO UNCHS WMO DTCD UNDRO	WHO WMO UNESCO UNDRO	WHO WMO UNDRO	FAO WMO WHO UNDRO
Prevention by action at the source					IASPEI ICSU		ICSU IAEG			IUBS ICSU
Hazard zoning and microzoning	ICA	IAH ICID/IAH ICA	IAH ICID/IAH ICA	ICL/ICA PSA IUGS IAVCEI	WDC/PSA IASPEI/FAGS ISC/ICL IUGS/INQUA	IAH	IGU IAH INQUA/ESG ISSS/ICA	IAHS FAGS ICA	IUFRO	ICA
Land-use planning					ISOCARP		ISOCARP			
Prediction and warning			IAHR IAHS	IAH IAVCEI PSA	IASPEI IAH	SCOR IAPSO	IAEG	FAGS		SCOPE
Response to warning preparedness planning and training	LORCS UNIPED	LORCS	LORCS	LORCS	LORCS UNIPED	LORCS	LORCS	LORCS	LORCS	
Long-term protection (building codes, site modification, etc.)	IAWE RILEM		ICID/ICOLD IAHR/ICOMOS ISSS IAEG	IACVEI	ICOM/ICOMOS IAEE/ISSMFE RILEM ISSS		IAEG ISSS ISSMFE		IUFRO	
Public information and education	ISA	IUPsys ISA	IUPsys ISA	IUPsys	IUPsys ISA		IUPsys ISA	ISA	ISA	
Loss sharing (insurance)										
Disaster assessment and analysis	IAWE				ISC IAEE				WFRO	

Note: Apart from its principal concern with disaster preparedness, assessment and public information, UNDRO has a co-ordinating and supporting role in all aspects of disaster mitigation.