

## ACKNOWLEDGEMENT

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# Demonstration Projects

## PREFACE

The Scientific and Technical Committee of IDNDR (STC) developed overall programs of the Decade in 1991. Promotion of a number of illustrative projects is an important component of the overall programmes.

The objective of these illustrative projects is to provide good examples to people who are involved in natural disaster management in disaster prone countries.

The STC has selected 35 projects out of more than 100 proposals as the illustrative projects. Afterwards the STC endorsed them as Demonstration Projects. These projects cover the following fields.

1. DROUGHTS
2. EARTHQUAKES and TSUNAMIS
3. FLOODS and STORMS
4. VOLCANOES
5. OTHER NATURAL HAZARDS
6. PUBLIC HEALTH
7. RESEARCH CENTER
8. TRAINING/ TECHNOLOGY TRANSFER
9. RISK-ASSESSMENT, PREVENTIVE-ACTIONS
10. INFORMATION
11. SOCIO-ECONOMIC IMPACT

This brochure provides information on these projects to participants of the World Conference, particularly to the gallery of the scientific and technical poster session in the Conference. This brochure in the last introduces some projects which are under review for endorsement as Demonstration projects.

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The brochure could also be displayed and distribute throughout the week 23-27 May 1994 in Room 305. For further information, contact the IDNDR Secretariat in Geneva at the following address.

IDNDR Secretariat, c/o Geneva Office of the United Nations, Palais des Nations, CH-1211, Geneva 10, Switzerland; Tel 41 22-798 5858; and Fax 41 22-733 86 95.

## 1. DROUGHTS

### 1.1. Drought Hazard Assessment, Famine Disasters and Vulnerable Food Systems

Promoter: International Commission of Scientific Unions (ICSU)/ International Geographical Union (IGU)

Objectives: The project is developed initially in relation to the needs of the African Continent, although it has potential for future application to parallel needs in Asia and in South America. Two planning conferences in 1991 and 1992 with excellent participation of well-qualified specialists from African continent have identified the following three pilot projects:

"People's Coping Strategies" in Cameroon and Mali where we have much to learn from well-developed strategies for coping with acute onsets of drought with some strong local participation. The objective is to learn from observed shorter-term patterns of response to droughts, and from longer-term adaptive behavior, in communities under threat;

"Famine Early Warning" in Sudan, where different problems for the identification of reliable early warning indicators, with strong local participation will be presented. The objective is to discriminate between types of indicators needed under a variety of ecological and economic conditions; and

"Related Development Policies" in Botswana and Zimbabwe, which are seen as having been effective in integrating policies for development. The policies include policies for control of drought-induced famine. The objective is to identify methods for harnessing development and external-intervention programmes to reduce levels of vulnerability to drought-induced famine. The following publications are available: "The Challenge of Famine: Recent Experience, Lessons Learned" edited by J.O. Field; "Coping with Vulnerability and Criticality" edited by Bohle et al, Breitenbach Verlag, 1993; and " Making Vulnerable Groups More Food-Secure" by IGU, GeoJournal, 1993.

## 2. EARTHQUAKE and TSUNAMI

### 2.1. The Global Seismic Hazard Assessment Program (GSHAP)

Promoter: ICSU / Inter-Union Commission on the Lithosphere (ICL)

Objectives: ICL has been undertaking the project that comprises (i) the World Stress Map, already published during 1992 in a special number of the Journal of Geophysical Research. It will be followed towards the end of 1995 by (ii) publication of the World Map of Major Active Faults. Much activity has meanwhile been continuing on (iii) the valuable paleoseismic technique that applied to appropriately dated strata, determines the occurrence times within those strata of major seismic events during the past 5000 years.

On the basis of the outcomes from the above project, GSHAP is aiming at providing, by a combination of different modern methods now available, the comprehensive global seismic-hazard mapping that is needed as a robust framework within which national agencies in a regionally coordinated fashion. This map could be utilized for the purpose of targeting high-priority areas for introduction of low-cost earthquake-resistant building design and construction.

This project is based upon the following nine regional centers in nine different seismo-tectonic regions: Mexico City; CERESIS; Potsdam, Rabat; Nairobi; Tehran; Moscow; Beijing; and Manila

For further information the following publication should be referred: Global Seismic hazard Assessment

## **2.2. Reconditioning of Existing Adobe Housing to Mitigate Earthquake Effects**

Project Category: International Demonstration Project

Promoter: Centro Regional de Seismologia para America del Sur (CERESIS)

Objectives: Considerable work has been done throughout the world to produce new technology for adequate construction with adobe. However, such efforts do not mitigate the impact of future large earthquakes on existing adobe housing, since these technologies are not applicable, in general, for reconditioning older houses. It is therefore urgent and very important to address the problem faced by millions of people who live in adobe housing just hoping they are lucky enough to be spared during their lifetimes the occurrence of a destructive earthquake. The problems with adobe construction when subjected to ground shaking are due to non-engineered construction, the inherent mechanical limitations of the material massive yet fragile and low-resistant walls, configuration defects that enhance the problem such as long walls without transversal bracing elements, excessive height from floor to ceiling, inadequate wall-to-wall and wall-to-roof joints, and foundations in soft soils. After each important earthquake a series of brochures and manuals are prepared and distributed, with an assortment of recommendations, many of them with contradictory appreciation and, generally without the benefit of laboratory or field tests to guarantee proper performance. The basic concept of the CERESIS project is to evaluate and establish simple, low-cost procedures for reconditioning existing adobe housing, taking into account the type of soil on which they are built, the size, shape and construction characteristics, so that they will resist seismic excitation at least to the extent that the occupants, when a severe earthquake occurs, will have enough time to get outside before the house collapses. The objective is to save lives. The project includes strategies to develop the proper methodology to motivate the population to carry out by themselves the recommended reconditioning, without the help of outside experts or external financial aid.

NOTE: The German Government has indeed formally committed DM 590,000 for this project. Administrative paper work is still being processed. Although so far much work has been done, the project officially has yet to begin.

## **2.3. Minimizing Earthquake Vulnerability**

Promoter: International Association of Seismology and Physics of the Earth's Interior (IASPEI)

Objectives: IASPEI is basing its Decade activities largely upon the existing organization of the Association. Immediately after the inception of the Decade, the Assembly of the IASPEI adopted the initiation of this project. The project comprises many activities, such as the program on World-Wide Map of Future Earthquake Losses, the program on the Practice of Earthquake Hazard Assessment, the program on Earthquake Hazard Management in Large Cities,

construction of a database, in addition to collaboration with the GSHAP project. Moreover, this project is putting strong emphasis in fostering experts through promotion of training courses such as the International Institute of the Seismology and Earthquake Engineering (IISEE) in Japan and the International Center for Theoretical Physics (ICTP) in Italy. As an outcome from the project, Spitak Database was created by both the Geophysical center of Russian Academy of Sciences and NOAA of USA. For further information, the "IDNDR Newsletter" that is published quarterly from IASPEI/IDNDR Secretariat in Beijing is available.

## **2.4. Cooperative Project for Seismic Risk Reduction in the Mediterranean Region (SEISMED)**

Promoter: Department of Humanitarian Affairs of the United Nations (DHA-Geneva)

The project was initiated in 1989 by UNDP. Sixteen Mediterranean nations participated in the Mediterranean Region with the following objectives: (i) To contribute to the overall effectiveness of earthquake disaster management among countries of the Mediterranean Region; (ii) To estimate expected losses of life and property in the countries; (iii) To provide disaster management scenarios; and (iv) To design and implement policies and measures to meet the requirements of such scenarios. In 1992 this project completed successfully with production of three proceedings of workshops and several others, by having mainly financial support from the Italian Government. Outcomes of the project are in practical application in earthquake-hazard mitigation in the Mediterranean region. In addition, the project concluded with a number of recommendations: (i) the effort for seismic risk reduction should be continued; (ii) a project should be developed for that; (iii) the new project should provide training; (iv) institutions are needed for the continuous effort; and (v) supporting science must be crucial. Following these recommendations, the second phase aiming at stimulation of national activities, assistance in risk management, and continuous monitoring the seismic activities has been proposed to several potential donors such as the Italian Government to fund.

The following publications are available for further information of this project: Proceedings of the Workshop in Genoa, 1991, 785 pages; Proceedings of the Workshop in Trieste, 1991, 804 pages; Proceedings of the Workshop in Rome, 1992, 396 pages; Preliminary Mediterranean Information Base on Seismic Risk, 1993, 276 pages; Feasibility Study for the Preparation of an Atlas on Seismic Risk in the Mediterranean, 1993, 35 pages.

## **2.5. WORLD SEISMIC SAFETY INITIATIVE (WSSI)**

### **(1) Objectives**

The WSSI is a project in support of the IDNDR promoted by the International Association for Earthquake Engineering (IAEE), a non-affiliated but definitive academic organization in the field of earthquake engineering. Its concept was endorsed by the IAEE in July 1992 in Madrid during the 10th World Conference

on Earthquake Engineering. After preliminary activities as WSSI Interim Organizing Committee for about a year, the WSSI was officially established in September 1993 with 11 Directors.

The WSSI has the three general goals: (i) Disseminate state-of-the-art earthquake engineering information throughout the world; (ii) Incorporate experience and research findings into recommended practices and codes in earthquake-prone countries; and (iii) Advance engineering knowledge through problem-focused research.

The WSSI will sponsor projects that will: (i) Transfer technology; (ii) Develop professional engineering practice; and (iii) Address crucial research questions that constitute gaps in our knowledge of how structures respond to earthquakes and how they can be built to withstand them.

The WSSI will provide an organizational framework capable of raising financial resources, undertaking projects that require multi-national effort, and providing encouragement to apply better engineering practices.

The logo of the WSSI and how various types of projects can be expected to show benefits are schematically shown below.

#### (2) Outcomes So Far Obtained and Expected in Future

The WSSI is not going to undertake gigantic projects but will try to achieve steady but visible goals in developing nations of the world, with its initial emphasis on the Asia Pacific region.

The WSSI is being built from regional bases to facilitate development of shared hazard information by best utilizing existing communication and resource networks. We will keep the WSSI organization lean and simple only to add additional layers of organizational structures if absolutely needed.

The WSSI has so far organized/coorganized four workshops/training courses, three high level meetings (HLM), and three lecture meetings: (i) Organized and provided funds for "Seismic Risk Management for the Countries of Asia Pacific Region", Feb. 8-11, 1993, in Bangkok, Thailand; (ii) Coorganized "Towards Natural Disaster Reduction", June 28-30, 1993, in Naha, Japan experts and representatives from Pacific-rim countries; (iii) Cosponsored and provided funds for "International Workshop on Seismotectonics and Seismic Hazard in South East Asia", Jan. 27-Feb. 4, 1994, Hanoi, Vietnam; (iv) Cosponsored and provided funds for "Training Course on Earthquake Resistant Non-Engineered Buildings", March 21-26, 1994, in Hyderabad, India; (v) Held an HLM in Kuala Lumpur, Nov. 8, 1993, attended by Deputy Minister levels; (vi) Held an HLM in Singapore, Nov. 9, 1993; (vii) Held an HLM in Kathmandu, Nov. 12, 1993, attended by Secretaries of Ministry levels; (viii) Held a Lecture Meeting with Professionals at Society of Consulting, Architectural and Engineering Firms, Nov. 11, 1993, Kathmandu, Nepal; (ix) Held WSSI Lectures at the General Membership Meeting of the Association of Structural Engineers of the Philippines, Inc., Feb. 7, 1994, Manila, the Philippines; and (x) Held WSSI Lectures to civil engineering students of the University of the Philippines, Feb. 8, 1994, Manila, the Philippines.

The WSSI has endorsed the following three projects which are deemed to meet its objectives: (i) The Quito Project submitted by Dr. Brian Tucker to perform a seismic vulnerability study for the City of Quito, Ecuador. (ii) "Seismic Protection of Cultural Properties" described by Dr. Charles Thiel, and potentially to be supported by the Getty Conservation Institute; (iii) A New Program of Seismic Hazard Assessment and Zoning for Indonesia submitted by Mr. Teddy Boen

Through past activities of the WSSI, the following miscellaneous outcomes have so far been achieved: (i) A project "Sumatran Earthquake Effects on Singapore Buildings" was funded to Schools of Civil and Structural Engineering, Nanyang University, by the National Science and Technology Board of Singapore (S\$373,000); (ii) A national network of seismographs is being planned to be implemented in Brunei; (iii) The Nepal Society for Earthquake Technology (NSET) was newly established; (iv) The Pakistan Society for Earthquake Engineering (PAKSEE) was newly established; and (v) A WSSI Student Charter was established in the University of the Philippines.

Future activities of the WSSI include: (i) To register the WSSI in Singapore as a professional nonprofit organization with Prof. T.C. Pan (Nanyang University) as the manager of the WSSI office in Singapore; (ii) To hold a workshop "Mitigation of Earthquake Risks - Needs and Resources of European Countries" on Sep. 1, 1994, in Vienna during the 10th European Conference on Earthquake Engineering; (iii) To join Emergency Management Australia (EMA) to hold a WSSI Workshop for Southwest Pacific in Fiji during the summer of 1994; (iv) To initiate negotiations with the International Institute of Earthquake Engineering and Seismology in Tehran, Iran, to organize a WSSI workshop for Middle and Central Asian Countries.

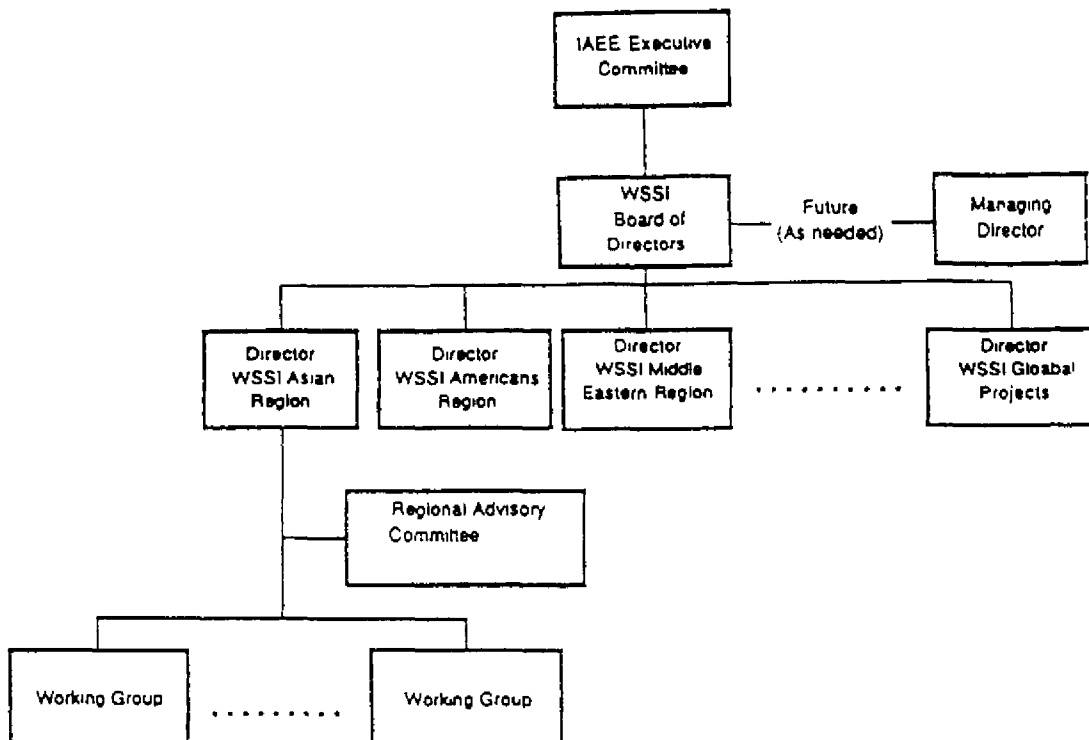
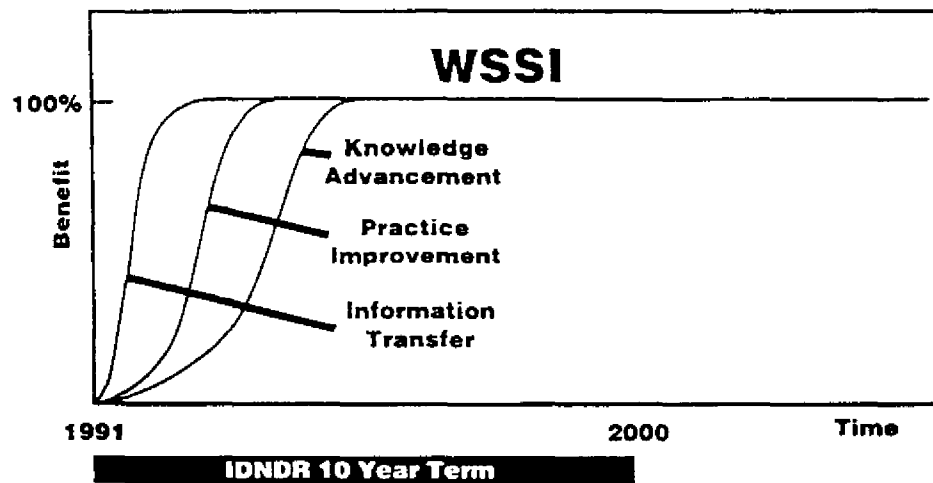
#### (3) Other Relevant Information

Since its official establishment, the WSSI Board of Directors Meetings were held twice, first in Tokyo on September 7, 1993 and the second in Manila on February 9, 1994. The third Board Meeting is planned to be held in Vienna on September 2, 1994. The following is the list of the present Directors of the WSSI: (i) One year ending August 31, 1994: Roman Kintanar; Roberto Meli; and Charles Thiel, Jr.; (ii) Two years ending August 31, 1995: Teddy Boen; Wilfred D. Iwan; Rudolfo Saragoni; and Kenzo Toki; (iii) Three years ending August 31, 1996: Hareesh C. Shah; Gunter Klein; Hiroyuki Aoyama; and (iv) No Specific Term - LAEE's Secretary General: Tsuneo Katayama

The geographical distribution of the present Directors is not ideal. Although the WSSI has so far received six donations amounting to approximately US\$70,000, financial conditions are extremely tight. Presently, Directors have to support themselves for developing programs as well as traveling to attend the Board Meetings. It is understood that the Directors were appointed as individuals, not as representatives of nations or national earthquake organizations.



## WORLD SEISMIC SAFETY INITIATIVE *An IAEA Undertaking*



## **2.6. Earthquake Risk Reduction in Ghana, West Africa**

Promoter: University of London and the Government of Ghana

The proposal of this project was made in 1991 by both the above promoters aiming at examination of the likely consequences of large earthquake located near Accra, the capital city of Ghana and to design and implement measures that will be effective and affordable within the context of an underdeveloped country. Despite its situation of being far from recognized global earthquake zones, Ghana has a well-documented history of damaging earthquakes around magnitude 6, most recently in 1862, 1906 and 1939. Since independence in 1957, Accra, capital city of Ghana, has grown and industrial wealth of Ghana is heavily concentrated within the city so that the vulnerability of the city to earthquakes has increased rapidly. The project is a pilot project to find solutions to reduce the vulnerability to earthquake hazards which most big cities in developing countries are facing. The promoter of the project has approached to the government of Ghana to fund the project. A Workshop is planned to meet to discuss overall programmes under this project in Accra.

Outcomes: An example of measures that will be effective and affordable within the context of an under-developed country.

## **3. FLOODS AND STORMS**

### **3.1. Tropical Cyclone Disasters**

Promoter: ICSU / World Meteorological Organization (WMO)

Objective:

A major improvement of predictions of tropical cyclones so that populations under threat may learn to rely on them and consequently follow measures recommended for their protection.

Background:

Tropical cyclones are among the most destructive natural phenomena on earth. Improving forecasting through new technology and methodology is an important approach to reducing disasters caused by tropical cyclones. The following are now particularly stressed: Fund raising is essential for substantial development of the Aerosonde and/or other types of an unmanned aerial vehicle (UAV) reconnaissance to find a cost-effective observing system.

Continuing efforts are required for further improvement of tropical cyclone prediction through exchanging scientists between advanced meteorological centres and tropical cyclone affected regions and organizing scientific gatherings with participation of both researchers and forecasters.

This International Demonstration Project of the IDNDR is being implemented jointly by the International Council of Scientific Unions (ICSU) and the World Meteorological Organization (WMO).

Outcomes:

An interdisciplinary symposium on tropical cyclone disasters was conducted by ICSU with WMO's cosponsorship in Beijing, China in October 1992. WMO distributed free copies of the proceedings, which contains papers by highly qualified experts, to libraries of tropical cyclone affected developing countries.

An international workshop, providing a forum for discussion between researchers and forecasters, was organized by WMO with ICSU's cosponsorship in Huatulco, Mexico in November/December 1993. A symposium on global climate change and tropical cyclones was held at ICSU's initiative during the workshop. A textbook on tropical cyclones was revised by the workshop and will be published by WMO. UAV reconnaissance system has been developed as a cost-effective means of obtaining the observations that are required for providing better initial data for the numerical prediction of tropical cyclones. Among various types of aerial vehicle, the focus is on the Aerosonde as one of the most promising.

### **3.2. Tropical Cyclone Warning System for the South-West Indian Ocean Region**

Promoter: WMO

Objective:

To upgrade substantially the tropical cyclone warning system in the South-West Indian Ocean region by strengthening the capabilities of the national Meteorological Services and through the application of meteorological satellite and microcomputer technology and the transfer of scientific knowledge.

Background:

In the South-West Indian Ocean, an average of about eight tropical cyclones form each year, threatening the region and causing disasters with sometimes disastrous results on the affected populations. Timely and reliable warnings are highly important requirements for the reduction of the loss of life and also the destruction of property they cause. The project is designed to: (i) enhance the meteorological observational network and communication system for the international exchange of meteorological data and processed products making use of the METEOSAT geostationary meteorological satellite operated by European countries; (ii) improve the data handling, data processing and tropical cyclone monitoring and forecasting by installing microcomputer based systems and training of meteorologists in using scientific knowledge, modern techniques and the available facilities and data.

The project will build on the progress already made through international co-ordination and co-operation promoted by WMO. It is closely inter-related and fully co-ordinated with the WMO's World Weather Watch Programme, the regional co-operation programme of the Regional Association I Tropical Cyclone Committee for the South-West Indian Ocean and the establishment of the Regional Specialized Meteorological Centre: La Reunion-Tropical Cyclone Centre. The modern facilities to be installed have been field-tested in the region.

The project is being funded by the Governments of member countries of the Indian Ocean Commission and the European Development Fund, with an allocation of 5 million ECU. The Government of Madagascar is th