UNCRD

Disaster Management Planning Hyogo Office

Proceedings

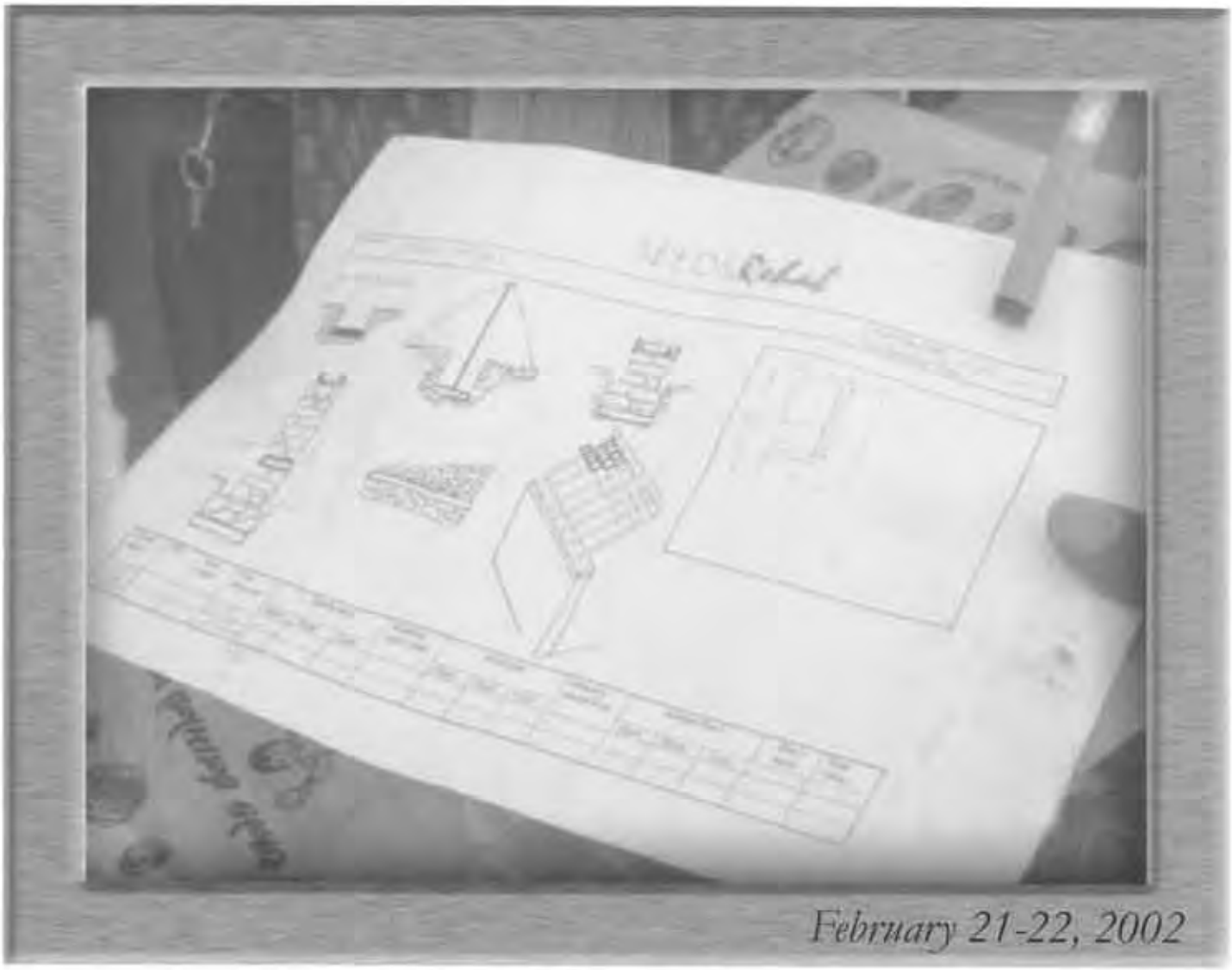
International Workshop on Earthquake Safer World in the 21st Century II

~Emphasis on Community and Culture~

International Workshop on

EARTHQUAKE SAFER WORLD IN THE 21st CENTURY II

- Emphasis on Community and Culture -



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Editors:

Kenji Okazaki
Rajib Shaw
Kazushi Maki
Yuko Nakagawa
Yuriko Tsunehiro

NOTE

Preface

United **N**ations **C**entre for **R**egional **D**evelopment (UNCRD) Disaster Management Planning Hyogo Office (Hyogo Office) was established in Kobe in 1999 after the Great Hanshin-Awaji Earthquake of 1995. While applying the lessons learned from the experience of the earthquake of 1995, the Hyogo office formulated integrated projects for 'Sustainable Development through Disaster Management'. The office had three basic research programs: 1) Design of community based projects for disaster management planning, 2) School earthquake safety project, and 3) Disaster management capacity building program to introduce best practices case studies on disaster management in developing countries.

During past three years, several projects were supported by the Hyogo Office. The projects emphasized specific issues of earthquake disaster mitigation with emphasis on three key elements: self-help, cooperation and education, which could and should be combined together in promoting mitigation culture among the communities. Among its activities, the Hyogo Office supported the United Nations IDNDR (**I**nternational **D**ecade for **N**atural **D**isaster **R**eduction, 1990-1999) RADIUS (**R**isk **A**ssessment Tools for **D**iagnosis of **U**rban **A**reas against **S**eismic Disasters) project; initiated the GESI (**G**lobal **E**arthquake **S**afety **I**nitiative) project; and conceptualized SESI (School Earthquake Safety Initiative) project. While focusing on the global initiative like mapping and databases of the active faults, the office also focused on the community empowerment and post disaster rehabilitation programs for better livelihood.

At the end of three years of operation of Hyogo Office, this was the time to revisit the major activities, and to evaluate the progress towards a safer and sustainable future. The current workshop had three major objectives: (1) To report the progress of the on-going projects and the achievements of the past initiatives; (2) To obtain an independent evaluation of its activities; and (3) To formulate the policies for future operations within the overall framework of Human Security.

UNCRD had three organizational mandates: training, research and advisory services. With the recent progress of information technology, the world became closer than ever, and the international organizations had more responsibilities to serve the needy people. While implementing the projects at the community level, it was therefore important to disseminate the best practices globally. Effective sharing of responsibilities, cooperation with other agencies and human networking were regarded as the key elements for successful organizational operation. In this connection, the workshop was able to reinforce the partnership with related stakeholders, to promote the multi disaster mitigation approach, and to establish the operational strategy by enlightening the future direction of the Hyogo Office. This document contains the presentations, and discussions resulted in the workshop, and can be regarded as the summary of the activities of Hyogo office in last three years.

Contents

UNCRD's Role 1

Workshop Program 3

Opening Session 5

Welcome Address 7

Opening Remarks 8

Guest Speech 8

Key-note Speech 9

Session 1 Global Earthquake Safety Initiative (GESI) 11

Session 2 Patan Navjivan Yojna (PNY) 21

Session 3 Community Project in Kathmandu 31

Active Fault Project 43

Session 4 School Earthquake Safety Initiative (SESI) 53

Hyogo Gujarat Friendship Fund (HGFF) 63

Kobe-Kathmandu Collaboration on School Earthquake Safety 71

Panel Discussion 1

Leadership of the Future Generation 79

Panel Discussion 2

Scheme of Cooperation for Disaster Reduction 89

Panel Discussion 3

Future Perspective of UNCRD DMP Hyogo Office 97

An Evaluation

Three Years of Operation of Hyogo Office 105

Appendix i

Newspaper Coverage iii

List of Participants vii

Contents of Enclosed CD-ROM xv

CD-ROM xvi

UNCRD's Role

UNCRD's Disaster Management Planning Programme was initiated in 1985. Progress in regional development has led to a better and safer living environment, but it has also made the environment more vulnerable to natural hazards. The programme's research and training projects aim to support local government, non-government, and academic institutions in creating partnership with communities in developing countries for disaster management planning. Our programme's goal is twofold: (1) improve the capacity of communities to develop and implement disaster management plans and (2) strengthen public awareness of natural hazards.

UNCRD has supported the activities of the United Nations International Decade for Natural Disaster Reduction (IDNDR 1990-2000). UNCRD's programmes have incorporated pre-disaster management methods such as preparedness, mitigation, and prevention. For example, the Mega-City Risk Assessment Project in China, the Integrated Approach to Cyclone Disaster Management in Bangladesh, and "Quake Busters" educational software for children have been important components of the decade.

In April 1999, UNCRD's Disaster Management Planning Programme moved from Nagoya to a new office in Hyogo Prefecture, where the Great Hanshin-Awaji Earthquake disaster occurred on January 17, 1995 and its residents are now attempting to redevelop their city. The new Hyogo Office will examine the reconstruction process in Hyogo and other disaster-damaged areas in developing countries as well as carry out the following programmes to fulfill the concept behind IDNDR of "establishing disaster prevention as an essential element of sustainable development."

(1) To provide advisory services to communities vulnerable to disasters in cooperation with governmental agencies, NGOs, and academic institutions alike;
(2) To improve safety of core community facilities such as schools and hospitals, and cultural heritage that may be damaged by disasters; and
(3) To identify and learn best practices in disaster management at the community level and disseminate them through workshops and information technology.

Workshop Program

Day 1: Thursday, February 21, 2002

Medium: English

Revisiting UNCRD DMPHO's Activities

9:30-10:30	**Opening Session** --Chair	UNCRD DMPHO Coordinator	K. Okazaki
9:30-9:40	Welcome Address	UNCRD Director	Y. Kimura
9:40-9:50	Opening Remarks	Hyogo Prefecture Chief of Emergency Management	K. Aoto
9:50-10:00	Guest Speech	OCHA NY Director	E. Tsui
10:00-10:30	Keynote Speech	ISDR Director	S. Briceno
11:00-12:00	**UNCRD DMPHO's Activities - I**		
11:00-11:10	Overview	Kyoto University	M. Kobayashi
11:10-11:50	GESI	UNCRD DMPHO	R. Shaw
	-- Commentator	GHI	L. Samant
		CICESE	L. Mendoza
		SEEDS	A. Sharma
12:00-13:00	Lunch		
13:00-15:00	**UNCRD DMPHO's Activities - II**		
	Presentation by R. Shaw, A. Sharma, R. Suzuki, R. Desai and H. Arai		
	-- Commentator	A. Arya	
15:30-17:30	**UNCRD DMPHO's Activities - III**		
15:30-16:00	Nepal Kathmandu Project	UNCRD DMPHO	B. Shrestha
	-- Commentator	Habitat Fukuoka	M. Mathema
16:00-17:30	Active Fault Project	UNCRD DMPHO	M. Sugai
	-- Commentator	S. Tyuganov, Y. Suzuki, H. Goto	

Day 2: Friday, February 22, 2002

Medium: English & Japanese

Future Prospective of UNCRD DMPHO

9:30-11:00	**School Earthquake Safety Initiative**		
	-- Chair	Kyoto University	M. Kobayashi
9:30-9:55	School Earthquake Safety Project	UNCRD DMPHO	R. Shaw
9.55-10:20	Hyogo-Gujarat Friendship Fund for School Earthquake Safety		A. Arya
10:20-11:00	Kobe-Kathmandu Collaboration on School Earthquake Safety		
		Kathmandu Balabikas Secondary School	R. H. Sharma
		Maiko High School	H. Nishinaka
	-- Commentator	NSET-Nepal	A. Dixit
		Hyogo Prefectural Board of Education	N. Nakano
11:15-12:00	**Panel Discussion I : Leadership of the Future Generation**		
	-- Moderator	Maiko High School	S. Suwa
	-- Panelist	Students of Maiko High School	
12:00-13:00	Lunch		
13:00-14:30	**Panel Discussion II : Scheme of Cooperation for Disaster Reduction**		
	-- Moderator	Jiji Press	K. Nakagawa
	-- Panelist	Hyogo Prefecture	K. Nakase
		ADRC	Y. Ogawa
		JICA	M. Watanabe
		UNCRD DMPHO	K. Okazaki
15:00-17:00	**Panel Discussion III : Future Perspective of UNCRD DMPHO**		
	-- Moderator	USA	T. Tobin
	-- Panelist	NIED, Japan	T. Katayama
		Kobe University	K. Niino
		ISDR	S. Briceno
		Cranfield University	I. Davis

Opening Session

Opening Session

Kenji Okazaki, the new coordinator of the UNCRD Hyogo Office, chaired the Opening Session, and introduced the workshop objectives briefly at the beginning of the workshop. He stated that the current workshop titled 'Earthquake Safer World in the 21st Century II' is the continuation of the similar type of workshop, which was held in Kobe last year, but with different objectives. In the current workshop, the main objectives are to understand and revisit the achievements of the Hyogo office in past three years, and to find the suitable direction for its future operations.

Welcome Address

Yo Kimura

Director of UNCRD

First of all, he welcomed all the participants to Kobe and introduced the establishment of UNCRD and its Hyogo Office briefly. Disaster Management unit of UNCRD moved to Kobe in 1999 with the financial support from the Hyogo Prefecture Government which experienced the Great Hanshin-Awaji Earthquake in 1995. He expressed deep appreciation to the government and the people of Hyogo Prefecture for supporting UNCRD Hyogo office for last three years.

He also praised the people of Hyogo Prefecture for their great efforts in the quick recovery from the devastated earthquake of 1995. It could not have been achieved without the efforts and cooperation among different stakeholders, including common people through their community activities, proper interventions of the local government, and contributions from volunteers. The dissemination of the experiences and the best practices learnt from different disasters are one of the missions of the United Nations Centre for Regional Development. In this regard, since its establishment, the Hyogo Office had conducted several projects at community level during past three years. This workshop was aimed at reviewing the activities of UNCRD Hyogo office during last three years. Thus, to have a useful evaluation, he requested all the participants to provide straightforward opinions, and suggestions for the future activities of the Hyogo Office. He emphasized that the workshop should be conducted in a true spirit of workshop, through intensive discussion and comments.

Opening Remarks

Kenichi Aoto

Chief of emergency management of Hyogo Prefectual Government

Since the Great Hanshin-Awaji Earthquake occurred in 1996, 7 years has already passed. The affected area was reconstructed and recovered incredibly fast as everyone can identify. This is the result of all the kind help from all over the world which were sent to Hyogo after the devastation. To requite the favors offered to Hyogo during the earthquake, donations have been gathered from the people of Hyogo Prefecture and sent to the disaster-stricken areas around the world, such as Turkey, Taiwan, and India. The donations gathered for the people of Gujarat, India, were sent with the consultancy of UNCRD Hyogo Office, and it was to be used for the reconstructions of schools damaged by the earthquake. For that, the concept of the School Earthquake Safety Initiative of UNCRD was applied. He also introduced the Disaster Reduction and Human Renovation Institution (so-called **Memorial Center**), which will be opened in this spring. Many disaster related organizations including UNCRD Hyogo Office will assemble in the center and cooperate for disaster mitigation through research, training and dissemination of information towards a disaster safer world. He concluded his address with the hope that, through future activities of the UNCRD Hyogo Office, efforts would be taken to mitigate disaster risk at community levels, and during this process, the experience of the Hyogo Prefecture would be useful to disseminate to other parts of the world.

Guest Speech

Ed Tsui

Director of OCHA, New York

At the beginning of his speech, he mentioned that Asia has had terrifying and destructive earthquakes, such as in Taiwan of 1999, in India of 2000, which caused huge life and economic losses, and emphasized the importance and urgency of developing a culture of prevention from the past and recent tragedies. He added that community participation was considered invaluable for the management of the disasters in recent years, so that more emphasis indeed must be placed on a community-based approach in disaster reduction and response. He highlighted the School Earthquake Safety Initiative of UNCRD as one of the best practices in this regard. It is of strategic importance to start promoting a culture of prevention with children in schools and communities, prone to disasters. Also he added that to promote a culture of prevention, it is needed to emphasize pre-disaster mitigation, but at the same time, it is also necessary to look after the disaster response. This is because not all disasters can be avoided or prevented. A right balance between prevention and effective response is required.

Key-note Speech

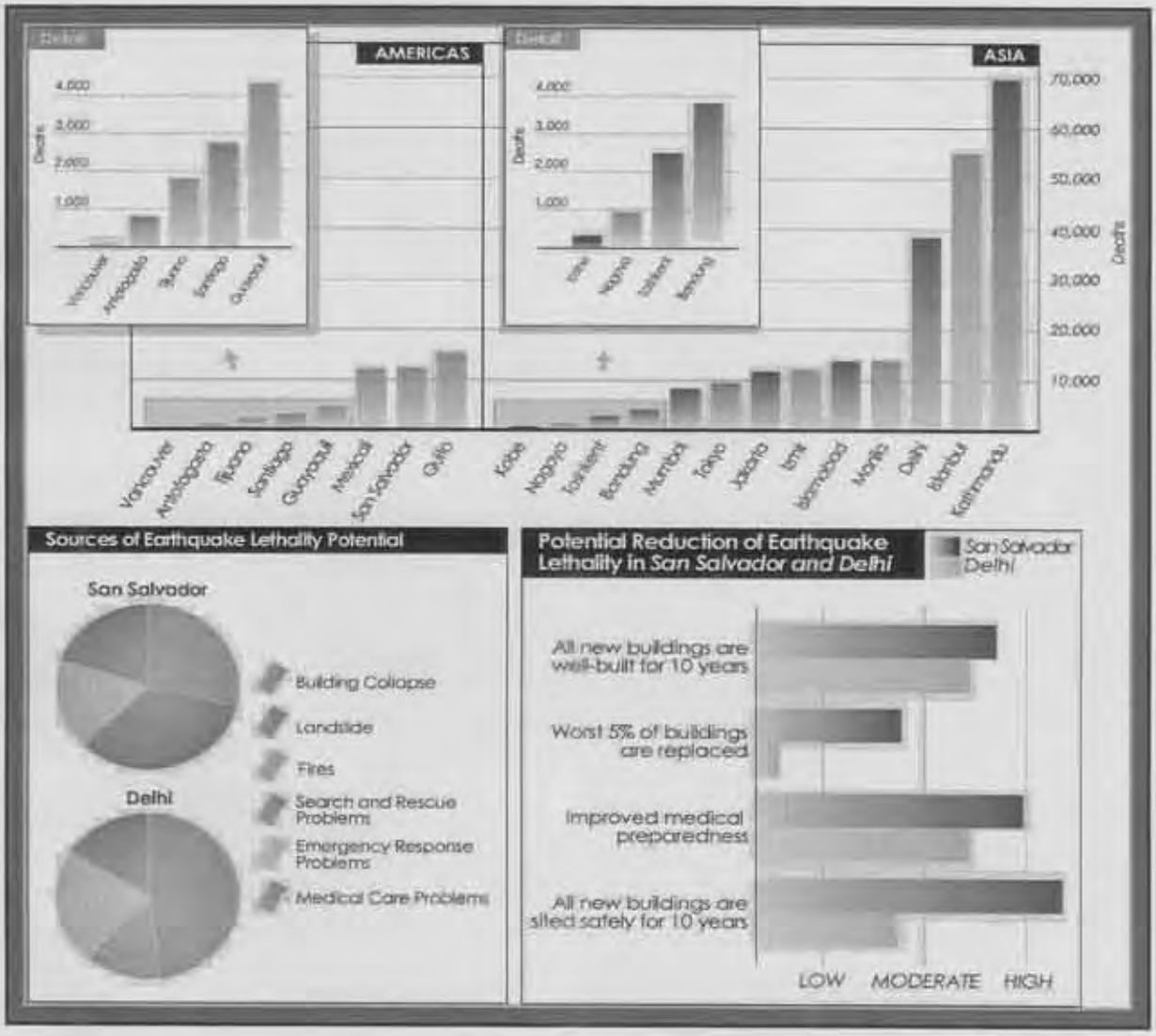
Salvano Briceno

Director of UN/ISDR

Fist of all, he introduced his organization, UN/ISDR and its mandate in his key-note speech. At the aftermath of the International Decade for Natural Disaster Reduction (IDNDR: 1990-1999), UN/ISDR was established aiming at building disaster resilient societies and communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development. The objective was to reduce human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters. UN/ISDR and UNCRD share common interest in the field of disaster reduction activities. Strong partnership was built during the IDNDR between the ISDR Secretariat and UNCRD through the RADIUS initiative. UNCRD supported the initiative actively by organizing workshops, and evaluating the case studies in Asia. The Global Earthquake Safety Initiative (GESI) was based on the RADIUS network, and UN/ISDR shared the similar activities to raise awareness in different communities. UNCRD is also planning to develop a methodology not only for earthquakes but also for flood risk management jointly with UN/ISDR, in collaboration with other partners. He closed his speech emphasizing on the continuation of the cooperation between UN/ISDR and UNCRD in order to expand and enhance the work at the global level. The bi-lateral cooperation should be strengthen in future, as well as it is needed to engage additional partners gradually.

Session 1:

Global Earthquake Safety Initiative (GESI)



Project Summary	Global Earthquake Safety Initiative (GESI)

Project Duration: January 2000 to March 2001

Project Partner: GeoHazards International (GHI) and City governments and non-government organizations in the participating cities

Project Site: 21 earthquake threatened cities in the world

Project Goal:

To motivate appropriate local risk mitigation action by: measuring trends in risk over time, evaluating effectiveness of mitigation options, comparing risk of similar cities

Project Objectives:

1) To develop methods to measure urban earthquake risk and effectiveness of mitigation options,
2) To apply the methodology to 21 cities, and
3) To evaluate potential to motivate risk mitigation actions.

Project Methodology:

The project adopts a simplified methodology to determine the life loss due to possible earthquake, as a function of building collapse, landslide, search and rescue, emergency response, fire and medical care problems. Data are collected through interviews of city specialists.

Project Outputs:

The outputs include:

1) Risk of casualty, per-capita risk of casualty, sources of risk in 21 cities,
2) Effectiveness of risk management options and
3) Risk of school children,
4) Trained city disaster managers, and aware communities.

Introduction[1]

Urban earthquake risk is greatest and most rapidly growing in developing countries. In 1950, slightly more than half the urban population at risk from earthquakes lived in developing countries; in the year 2000, that number increased to more than 85%. While developing nations bear a disproportionate burden of earthquake risk, very little of the world's spending on earthquake engineering research is aimed at their needs. Tucker *et al.* (1994) estimate that over the last 50 years the portion of the world's annual earthquake engineering research focused on the needs of developing countries has remained fixed at about 15%. It is clear that unless something is done quickly to significantly improve the urban earthquake risk of developing countries, earthquakes will cause increasingly greater human and economic losses in these countries, further delaying their development. Therefore the current project aimed to develop and test a methodology for assessing earthquake risk and lethality in 21 cities around the world, and to develop a tool for providing risk management solutions.

Background

The Global Earthquake Safety Initiative (GESI) Pilot Project applied the GHI method to twenty-one cities worldwide to evaluate its potential to improve earthquake risk management. Of particular interest were:

1) The defensibility, understandability and reasonableness of the method's results,
2) The feasibility of applying the method to a large number of cities, taking into account cost, time, data quality, access of local authorities, and receptivity of results,
3) The potential of the method to motivate earthquake risk mitigation action, and
4) Based on that potential, its future applications.

The GESI Pilot Project spanned eighteen months, from January 2000 to June 2001 and was conducted by the GESI Team, which was formed by staff from GeoHazards International, the Disaster Management Planning Office of UNCRD, and the University of British Columbia.

Methodology

Figure 1 illustrates how cities' earthquake lethality potential is calculated.

The horizontal bands in Figure 1 indicate how the components of risk are calculated. The basic structure of each calculation is the same: the most important indicators are shown in yellow on the left, and are combined to determine the potential for various types of damage, shown by the blue squares. The corresponding risk of

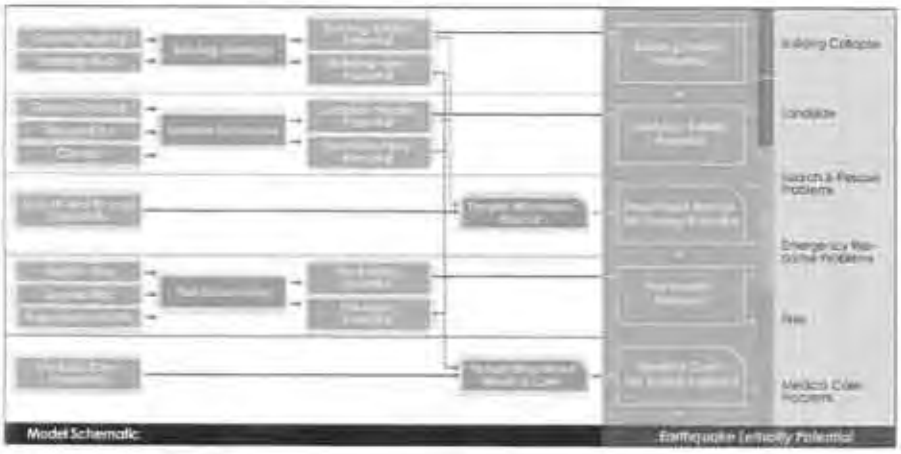


Figure 1. Methodological scheme of GESI project

[1] This summary is an excerpt from the GESI Pilot Project report, GHI, UNCRD, 2001

death and injuries is then estimated, as represented by the green squares. The injuries and fatalities are combined to produce the fatality and life saving potentials in blue-gray on the right.

The indicators used to calculate each component are discussed below. The term 'indicators' means the data needed by the algorithm to complete the calculation. In many cases, because the necessary information was unavailable, a proxy was used to represent the needed information.

1) **Building Fatality Potential.** Indicators measure the ground shaking on firm and soft soils; the building stock; the quality of building design, construction and materials; the weight of the buildings; and the building occupancy rates.

2) **Landslide Fatality Potential.** Indicators measure the ground shaking; the percentage of the city area likely to slide; the average annual rainfall; and the population density of the area that is affected by slides.

3) **Search and Rescue Life Saving Potential.** The indicator measures the number of people available to participate in organized search and rescue and their training and effectiveness.

4) **Fire Fatality Potential.** Indicators measure the ground shaking; the amount of infrastructure damage; the annual average wind speed; the prevalence of flammable buildings and materials; the density of structures; the sources of available water; the ease of access for fire trucks and other equipment; the capacity of the fire department; and the capacity of the city to respond to emergencies.

5) **Medical Care Life Saving Potential.** The indicator measures the capacity of the medical community to handle many casualties after a damaging earthquake (this takes into account the possibility that the medical capacity might be reduced).

The current method collects data through interviews and workshops conducted in the cities, in which specialists from a wide range of fields and institutions describe aspects of their city that contribute to risk and discuss risk management activities already in effect. A City Team Leader acts as the primary contact and is responsible for identifying the experts who supply the data. This approach improves the data quality over the approach of collecting data remotely. Eight questionnaires were developed to collect the needed information; each targets a particular field or specialty: Seismology, Soils and Landslides, City Planning, Building Inventory, School Buildings, Emergency Response, Medical Emergency Preparedness, Hospital Emergency Preparedness and Fire Preparedness.

City Selection

The participating cities were chosen for the importance of their earthquake threat, the presence of local contacts of GHI and UNCRD, and the interest of these contacts in participating. The cities were located in the Americas and Asia. To ensure a representative sample of cities, the selected cities were small and large (populations from several hundred thousands to almost fifteen million), located in developing and industrialized countries (per capita GNPs from several hundred USD to several tens of thousands USD), and threatened by seismic hazard ranging from moderate to great (expected peak ground accelerations over 475 years from 0.15 g to 0.45 g).

After an initial screening, twenty-two cities were invited to participate in the project without compensation. All accepted and, except San Jose, Costa Rica, all participated in the project for its duration. These cities were the following:

Antofagasta, Chile,	Bandung, Indonesia	Delhi, India,
Guayaquil, Ecuador	Islamabad/Rawalpindi, Pakistan	Istanbul, Turkey
Izmir, Turkey	Jakarta, Indonesia	Kathmandu, Nepal
Kobe, Japan	Manila, Philippines	Mexicali, Mexico
Mumbai, India	Nagoya, Japan	Quito, Ecuador
San Salvador,	El Salvador Santiago, Chile	Tashkent, Uzbekistan
Tijuana, Mexico	Tokyo, Japan	Vancouver, Canada

Data Collection

In all cases, the City Team Leaders reconciled data from different sources, revised the collected information and identified data that needed verification. Additionally, public workshops were held in the Latin American cities to present and discuss the collected information and, in this way, improve its accuracy. In one city, for example, presentations at the workshop showed that information on hospitals' emergency preparedness provided by the hospital authorities was different from the information provided by the nurses working at those same hospitals, even though the same questionnaire was used to collect information from both groups. In another city, the emergency response organizations found that not only the information they were providing but also their daily activities were based on three different, not clearly related City Emergency Plans. The workshops helped the participants reach consensus about the information that best reflected the local reality. Since these workshops included representatives of the various sectors of society and of the mass media, they provided the additional benefit of raising awareness in the community about the city's earthquake risk. The participants could discuss, in many cases for the first time, the causes and characteristics of the city's risk, what had or had not been done to reduce that risk, and the coordination (or lack of it) among the city organizations in charge of managing that risk.

Results and Outputs

Working with the City Team Leaders through the Internet, the GESI Team completed missing information, put the data in a common format, and compiled it into a computer database. The GESI Team applied the GHI method to calculate preliminary results for both the entire cities and their school systems. The calculated results included a comparison of total and per capita earthquake lethality potential among the participating cities, a breakdown of the sources of this earthquake lethality potential in each city, and an analysis of the effectiveness of risk mitigation options for each city. All of these results are preliminary.

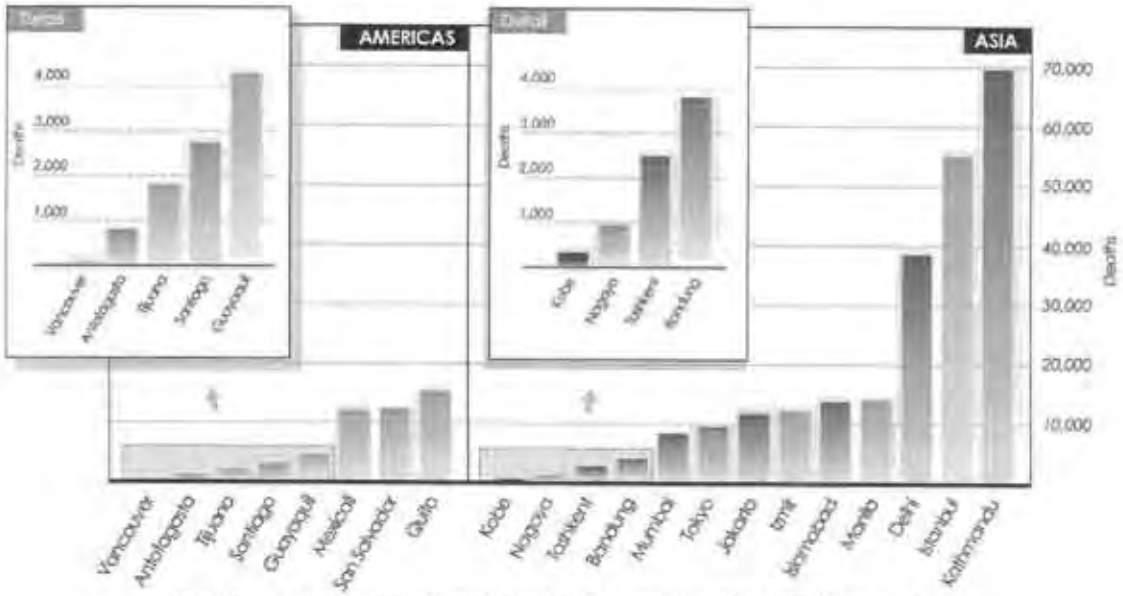


Fig. 2. The total earthquake lethality potential of the GESI pilot cities.

Figure 2 compares cities according to the likely lethality of earthquakes. These numbers represent composite losses, not the number of deaths expected for any specific earthquake. Although the value of each city's earthquake lethality potential in isolation has a complicated interpretation, the cities' relative scores indicate the different magnitudes of life loss they may experience, and therefore, they highlight where the risk is higher. Besides, there were other results like per-capita lethality potential, source of lethality potential, effectiveness of risk mitigation options, and lethality potential of school children.

Results Dissemination and Review

The preliminary results for both cities and schools were sent to the participating cities, in the form of City Risk Reports, for corrections and comments. The City Risk Reports presented the results in various forms. In addition to the results described previously, results in the City Risk Reports compared the cities in terms of Hazard, Building Vulnerability and Response Preparedness. Hazard was defined as the peak ground acceleration (PGA) with a 10% probability of being exceeded in 50 years averaged over the whole city, taking into account the amplification due to soft soils. Building vulnerability looked at the lethality of the building stock in each city, holding hazard constant. Response Preparedness was a combination of the Emergency Response Capacity and the Medical Emergency Response scores. The review of the preliminary results had the additional benefit of helping people in the participating cities

prepare for the evaluation phase of the GESI Pilot Project.

Project Evaluation

The GESI Pilot Project evaluated the method by conducting two workshops in early 2001. One (for representatives from the Asian cities) was held in Kobe, Japan on January 29-31, and another (for the American cities) in Quito, Ecuador on March 5-7. Local and international technical experts, city officials, and representatives from international agencies were invited to participate.

The evaluation workshops had three specific objectives:

1) To determine the usefulness of the results to cities and international development organizations,
2) To suggest improvements to the data collection and results dissemination processes, and
3) To recommend follow-up actions.

For each workshop, participants were divided into three working groups based on their involvement with the project and their technical background. The first group comprised city representatives who had worked with the GESI team to collect data, together with city officials who would be implementing the suggested mitigation actions. The second working group included representatives from international agencies. The third group consisted of technical experts, professors and scientists in the fields of engineering, seismology, and disaster management. The evaluation of the method was divided into three topics, *Results*, *Process* and *Future*. Each working group discussed each topic for an hour and a half, and then a reporter from each group summarized the group's findings in a plenary session, which led into an hour-long plenary discussion. At the end of each plenary discussion, a Moderator reviewed the major points and ideas generated. In the last session of the workshop, which was a plenary session, a summary of each session was presented for review, to ensure that the conclusions of each session accurately represented the consensus of the participants.

The two evaluation workshops came to many similar conclusions. Concerning the results, both groups thought that the GHI method produced reasonable results, that the data needed to be verified before results were used to determine public policy, and that the results needed to be targeted to different audiences, including the lay public, business leaders, and government officials. Concerning the implementation, the two groups thought that GESI should involve as many local institutions as possible in all of its aspects to increase local feelings of ownership of the results. They also believed that the separate analysis of schools was valuable. Regarding future activities, participants of the two workshops agreed that the method had the potential to motivate action, that it should continue to be applied around the world, and that separate studies of hospitals should be conducted.

Based on GESI's formal evaluations and the response it has received, we conclude that GESI should be applied to hundreds of the world's most earthquake-threatened communities. These should include cities and "catchment" areas, selected according to criteria including their earthquake hazard, population, and economic, cultural and political importance. GESI should

be applied to each of these communities periodically, perhaps once every four years. While local specialists in each community will play leading roles in collecting data, an international organization, such as GHI, should ensure a high and uniform standard of analysis so as to allow inter-city comparisons. The results should be released in each community by the local specialists who gathered the data, as well as internationally, for example, at a UN-sponsored conference. The release of GESI results should be accompanied by a report on each community's progress towards self-assigned mitigation goals, and by an announcement of each community's goals for the future. Such a report would encourage comparison, collaboration and competition among cities. This program should be started in a few regions and gradually spread globally.

Because earthquake disasters such as those that recently occurred in India and El Salvador are manmade, not natural, humans can reduce their effects. We hope that as people come to see earthquake disasters as their responsibility, they will seek means to manage them. GHI developed the method evaluated in the GESI Pilot Project in the hopes that it would be applied in earthquake-threatened cities around the world, so that their risks would be known, their most effective means of mitigation identified, and their inhabitants motivated to question the acceptability of living with such risk. Thanks to the generosity of the hundreds of people and organizations that made this project possible, GHI and UNCRD have demonstrated the promise of this method. We look forward to continuing to work with all the participants of this Pilot Project, and to joining new partners in the future, as GESI is used to improve earthquake risk management worldwide.

As an immediate start, it is proposed that GESI will be applied to Mexico and India.

Session 2:

Patan Navjivan Yojna (PNY)

(Patan New Life Plan on Gujarat Rehabilitation)

Project Summary	Patan Navjian Yojna (PNY)

Project Duration: April 2001 to March 2002

Project Partner: SEEDS, NCPDP, GSDMA, EdM, NGOs-Kobe and The people of Patanka

Project Site: Patanka village, Patan district, Gujarat, India

Project Goal:

To achieve safer and sustainable livelihood of the people in the post-disaster rehabilitation, which serves its own purpose, and acts as a model for others

Project Objectives:

1) To empower communities with safer technologies,
2) To enhance capacities and confidence in local know-how,
3) To train masons and engineers, and
4) To promote adoption of safer building practices.

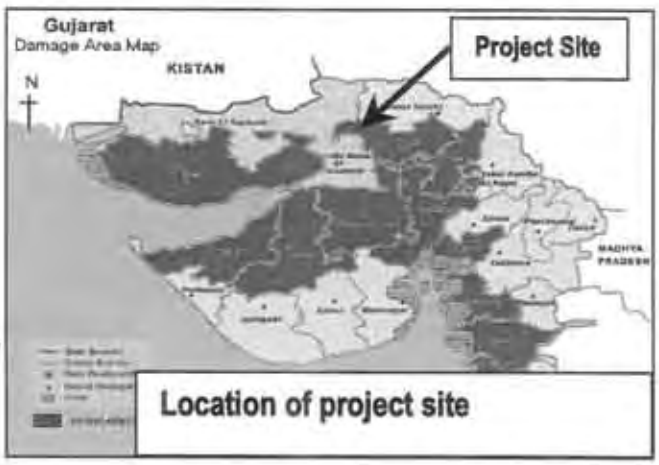
Project Methodology:

The methodology is a simplified owner-driven approach, where the community acts with its own needs, and priorities, and owns the problem and the solution by itself. A preliminary survey has been conducted, followed by initial training, shake table demonstration and civil works. In each step, the key focus was the involvement of the local community.

Project Outputs:

The outputs include:

1) A self-sustained, self-confident community,
2) Trained masons and engineers and
3) Improved livelihood and living condition, and
4) A model for community-driven post-disaster rehabilitation program.



Background

At the aftermath of the January 26 Earthquake of 2001, rehabilitation program is currently being undertaken by different agencies, including government, non-government and international organizations. PNY (Patan/ Patanka Navjivan Yojna) is the joint endeavor of different organizations in India and Japan for the rehabilitation of a model village called Patanka in district Patan (Figure 1) in Gujarat. The characteristic feature of the current initiative is to focus on the holistic approach of rehabilitation, where specific focus has been given on the improvement of the livelihood. The other aspect of the project is to establish a model of cooperation among different stakeholders from government, non-government, academics and international organizations. A 'model' rehabilitation project would thus provide:

- -Safer living condition: earthquake resistant houses
- -Continuous efforts: through awareness, confidence building and training
- -Sustainable Livelihoods for both men & women: Livelihood Alternatives, Appropriate Training & Opportunities
- -Improved quality of Life: Education, Health & Environment.
- -Care for the Vulnerable: Senior citizens, Disabled
- -Shared Living: Community Integration, Harmonious relation with agencies outside
- -Sustainable Future: Focusing on the future citizens, children

Patanka has been chosen as the model site for its location, dedication and motivation of local people, and interest of diverse stakeholders.

Mission, Goal and Objective

The experiences of recent earthquakes in India (Latur, 1993, Jabalpur, 1997, Chamoli, 1999) and abroad (Kobe, 1995, Turkey, 1999, and Taiwan, 1999) have shown that the immediate need after the earthquake is to improve livelihood. Past earthquakes in India pointed out that a program based on the need of the community has achieved a great success in the long-term sustainability[1]. Therefore, the following mission, goal and objectives have been identified for the current initiative:

Mission: To achieve safe and sustainable livelihood through self-help, cooperation and education

Goal: To build a standard model for disaster resistant community equipped with safer and sustainable livelihood, which well serves its own development needs and serves as a model for others.

Objectives: The rehabilitation initiative is being undertaken with the following objectives:

- To make vulnerable communities *safer* from the future disasters.
- To strive alongside the community in identifying *suitable means of livelihood* for making itself independent.
- To *empower communities* so that it is aware of its own needs and is actively able to strive to achieve them
- To *establish suitable standards* for disaster resistant communities by assisting the community demonstrate its achievements in the post earthquake scenario.
- To develop valuable information on *implementation technology*[2], and disseminate it globally.

[1] Shaw R. (2001): Safer Building Practices: problems and prospects, EdM workshop in Kobe

[2] Implementation technology is defied as the process of transferring knowledge into practice (Kameda, 2001).

Role Players: Diverse Stakeholders

The current project is a joint initiative of different stakeholders in India and abroad (Figure 1). SEEDS (Sustainable Environment and Ecological Development Society), a non-government organization based in New Delhi, with branch office in Ahmedabad is taking the lead responsibility for working in the field and overall coordination of the project. The participating Japanese counterpart is the NGO-Kobe, which intends to bring the experiences of the rehabilitation of the Kobe earthquake of 1995. Part of the work is sponsored by GAP Inc. and private citizens from around the world (India, Japan and USA). Besides, there are two other overseas NGOs working closely for the mason training program, which are the National Society for Earthquake Technology (NSET), Nepal and GeoHazards International (GHI), USA. Locally, technical support is provided by the NCPDP (National Center for People's-Action in Disaster Preparedness), Ahmedabad. The Earthquake Disaster Mitigation Research Center (EdM) of Japan and United Nations Centre for Regional Development (UNCRD), Kobe, Japan are promoting the project with technical help and overall coordination and training of masons. The project is implemented in close cooperation with the district administration in Patan with the moral support from the Gujarat State Disaster Management Authority (GSDMA), and technical advice from Professor Anand Arya, the seismic advisor of GSDMA.


Figure 1

Project Activities: self-help, cooperation and education

The project incorporates a people-driven initiative, where the community builds their own houses with the technical and material support from outside. At first, a model house (Figure 2) has been built to demonstrate the earthquake safer technology to the people. The house has been donated to the most needy person in the village upon consultation with the local community. Remarkable progress is noted in the construction process, where 100 houses have started its construction in first 100 days of the project. The most remarkable feature of the project is that the construction is not done by any building contractor, but by the friends and family members of the house owners. Thus, the actual building technology and the importance of the earthquake safer building practices are being deep rooted in the community, with the participation of the family members.

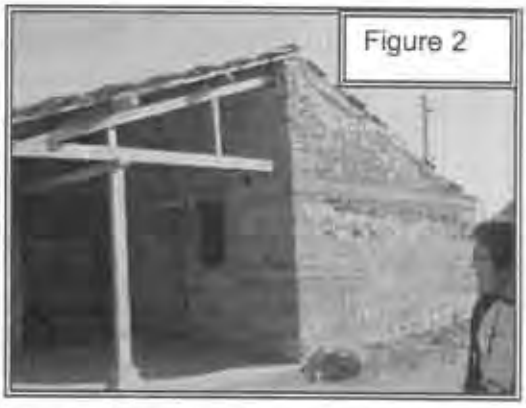


Figure 2

The other characteristic feature of the project is the incorporation of the community in the decision-making system through different community workshops, which are aimed to different groups of people, staring from masons, common people, and female members of the village. Several training programs have been organized for masons, for wood works, steel works and stone works. Thus, the construction process is being disseminated to the people as a holistic

approach, where people had a chance to grasp the idea of different parts of the construction, with specific focus areas.

A specific emphasis is given on upgrading the livelihood, where people will have access to better living condition. Water has been a problem in Patanka as well in the adjoining areas. A program is currently under consideration for building a rain water harvesting system in the village, where the community will work as a whole to restore the rain-water and its proper use for future purposes.

A mason-exchange program is currently conducted between the masons from Nepal and Patanka. Nepalese masons got trained by NSET-Nepal, during last several years as a part of the earthquake disaster mitigation program of Nepal. This program was found to be very useful in transferring the technology in non-technical terms, and also promoting international cooperation. This gave a big boost to the community of Patanka, which made it more unique as a model village.

Thus, the PNY project is one of the few on-going activities in Gujarat, which specifically focuses on the community involvement and participation as the core element of the project, with a clear-cut target to achieve safer and sustainable livelihood. The project can be defined as a community driven initiative, where different stakeholders are engaged. The other feature of the project is its attempt for making a model of international cooperation in the post-disaster scenario, which can be applied to any part of the world, for any type of disaster. We are looking forward to seeing a self-sustained Patanka, and to see its dissemination to other parts of the world.

Shake Table Demonstration and Training

As an integral part of the PNY project, a Shake Table Demonstration and Training program was conducted with the following specific objectives:

1. Build peoples' confidence in earthquake resistant building technologies including the retrofitting of existing houses,
2. To enhance the understanding of the performance of simple structures, with and without the earthquake resisting features under the impact of an earthquake,
3. To evolve a setup for future improvement and wider dissemination, and
4. To incorporate people into the process of transferring technology through participatory approach by training and capacity building.

The shake table demonstration testing is regarded as a tool for confidence building and education of the people and masons. The current program is intended to help in creating and

demonstrating the impact of such powerful tool.

Simple, Low-cost and Effective


Figure 3

In order to provide confidence in people for the seismic improvement of houses, it is necessary to show them the difference of the normal construction versus the improved construction. This is planned to do by using a simple shake table, and making two half-size models. The venue has been chosen in the Banshali Trust Complex in Radhanpur, Patan district. This total program is being designed in close partnership with the local engineers and masons and is be regarded as an important element of comprehensive training program. The shake table will consists of a platform, a shock generator and two models. The test consists of subjecting two structures simultaneously to a series of gradually increasing horizontal shocks and monitoring their comparative performance (Figure 3). Since the economic aspect defines the affordability and, hence the replicability of each option to be described in the testing, it has been studied carefully. There is a general feeling among the people that the earthquake safety is expensive and, hence, beyond the reach of the ordinary people. The economics of the test structures should try to change this attitude with appropriate supporting evidences. The cost benefit analysis of the retrofitting technology and the seismic elements are therefore carefully made. It is attempted to prove that the seismic retrofit is an accepted economic feasible alternative as compared to reconstruction. It is to be noted that the shake table will have a simple set-up, which will be affordable by the local people for future replication, but simultaneously it should be equipped with appropriate technical and engineering aspects. The set-up is consists of 6m x 3.6m RC platform mounted on two deep girders. Each girder was stiffened by fabricating a two bay truss at its underside with strut and ties. Each girder in turn was placed on two rollers. The long axis of the platform is the axis of the lateral movement. Four stoppers placed through the openings in the platform and embedded in the ground restricted the movement to a maximum of 150 mm in the direction parallel to the length of the platform. Rollers consisting of 50mm diameter machined M.S. rod were greased to minimize the friction and corrosion. The models are anchored to the platform with the help of bars. A tractor, alternating from the long axis end will impart shocks. Shocks are transmitted through a piece of wood projecting out in front of the tractor. Rubber padding are installed at the point of impact along the long axis of the platform, and also on the stoppers to minimize damage from the impact.

Test types: focus on local building practices

In the current project, it is planned that four testing will be performed using four different construction practices. The purpose of each testing is different, and is exemplified by the models and the construction materials. For Test 1, two models of un-coursed rubble masonry (UCRM) are used (Figure 4), using the mud mortar. One of the model is made using the traditional methods, and the other is retrofitted using improved methods, using the seismic elements, like RC Stitching Elements, gable guy anchors, and vertical corner reinforcement. The purpose of the test is to demonstrate the proper earthquake resistant constructions using stone with mud mortar, and to provide confidence in the traditional building materials.

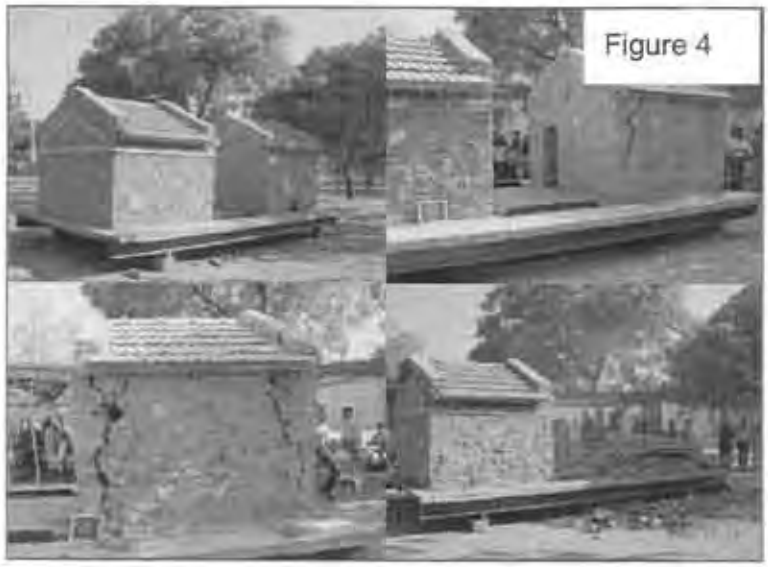


Figure 4

For Test 2, two models of un-coursed rubble masonry (UCRM) will be used, using the cement mortar. One of the models will be made using the traditional methods, and the other will be made using improved seismic elements like through-stones, RC Seismic Bands at different levels, RC lintel connection, and corner reinforcement. The purpose of the test is to demonstrate the proper earthquake resistant constructions using stone and cement mortar.

For Test 3, two models, one of burnt brick masonry and the other of concrete block masonry will be made using cement mortar. Both models will be made using seismic elements like lintel band, vertical corner reinforcement. The purpose of this test is to demonstrate the strength of the concrete block against the brick masonry, and to promote the concrete block masonry as a popular construction material.

For Test 4, two models of concrete blocks will be made using cement mortar. One of the models will use the conventional method, without frog, and the other will use the frog and seismic elements. The purpose of this test is to demonstrate the proper construction methods using concrete blocks.

For test 1 to 2, the size of the models will be 2m X 1.5m X 1.2 m, where the roof is a pitched roof, with clay tiles with timber understructures. For test 3 to 4, the models will be 2m X 1.5 m

X 1.375 m with RC slab as the roof.

Training, Impact Analysis, Monitor and Review

The testing is done through participatory training of the local masons, engineers and communities, and the impact of the training is closely monitored (Figure 5). The key point of the current project is the adoption of safer building practices, the application process to gain insight into the adoptability issue that can assist in transferring the experiences gained in this project in to other parts of India and abroad with similar socio-economic structure. Through the demonstration testing, it is needed to measure the impact in the community and to exemplify an effective means for confidence building among the community.

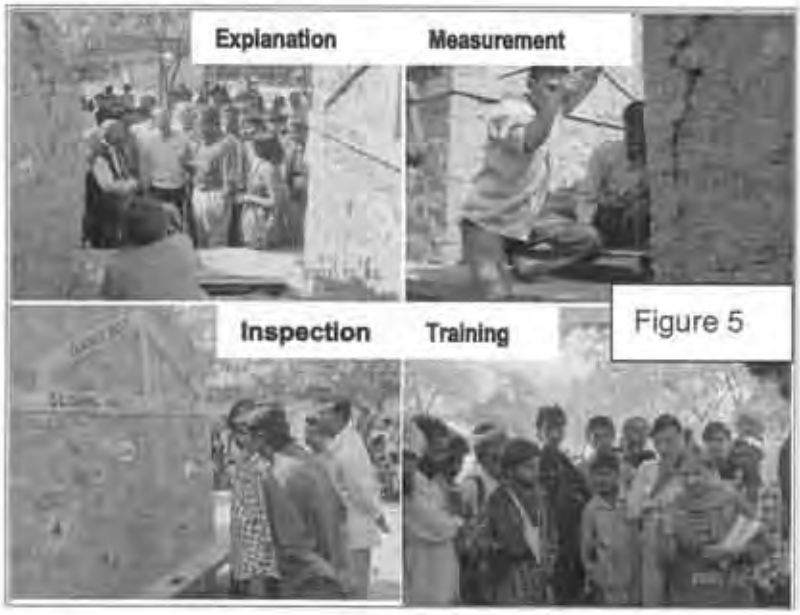


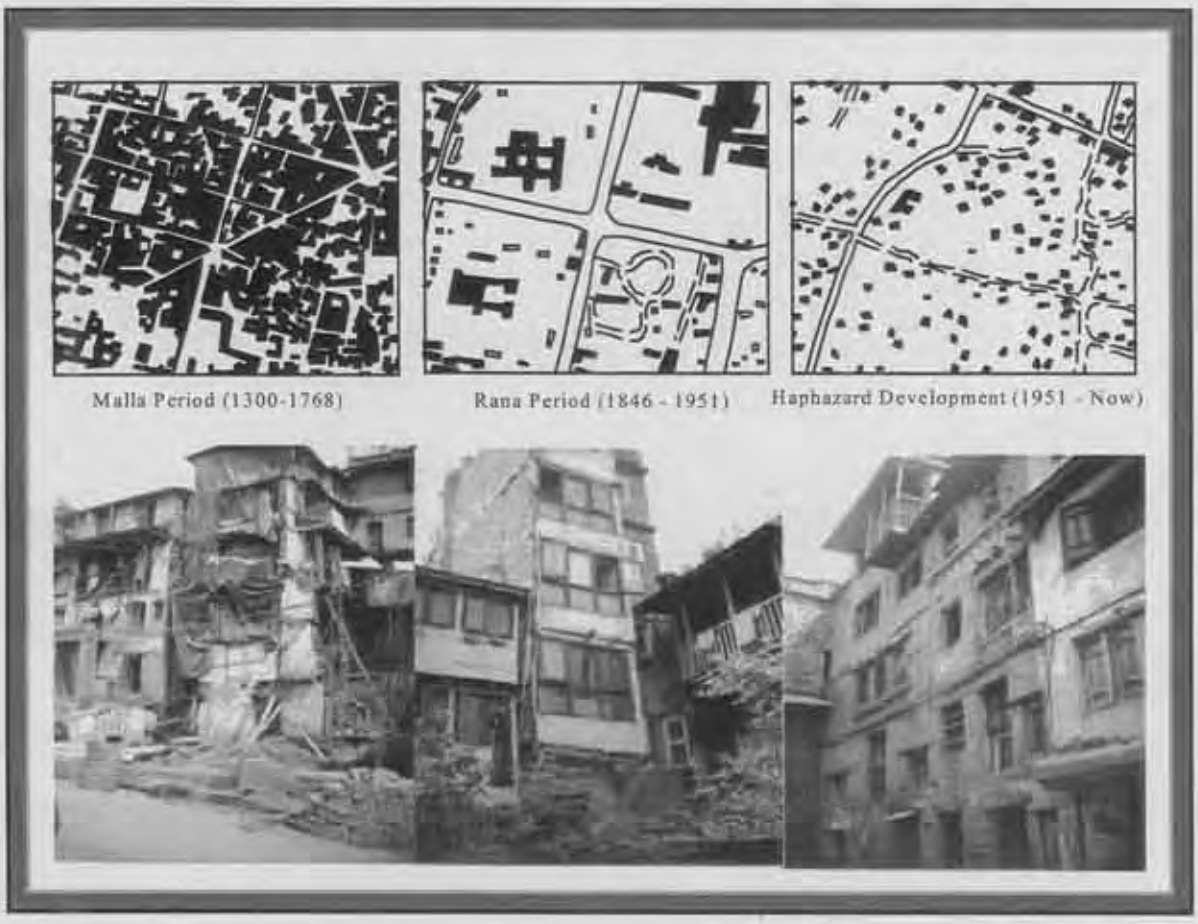
Figure 5

The current project has several target groups. The first one is at the local level, the community, the masons and local engineers. The first target is to train the local masons and engineers for earthquake safer non-engineered rural constructions. This will help the reconstruction and rehabilitation process after the earthquake, and will enhance the applicability of local knowledge, which in fact, will directly benefit the earthquake victims. The second target group is the policy makers and the decision makers in the central and local government. It is needed to add value to the strategic decision made by the policy makers for formulating effective risk reduction process. The process and product should be combined together to get the best output. The other target group of this project is the international community, including research organizations and the international donor agencies. A detail questionnaire survey is currently under progress, which is aimed to measure the impact of the shake table testing and its real implementation. A monitoring mechanism is formulated before and after the testing, through the questionnaire survey, interviews and on-site inspection of the construction process. This is currently being undertaken in Patanka village, as well as through the network of different non-government organizations.

Session 3:

Community Project in Kathmandu

Building disaster-resilient community



Project Summary — Community Project in Kathmandu

Project Duration: April 2000 to March 2001

Project Partner: Lalitpur Municipality, Kathmandu, Nepal

Project Site: Several wards in the municipality

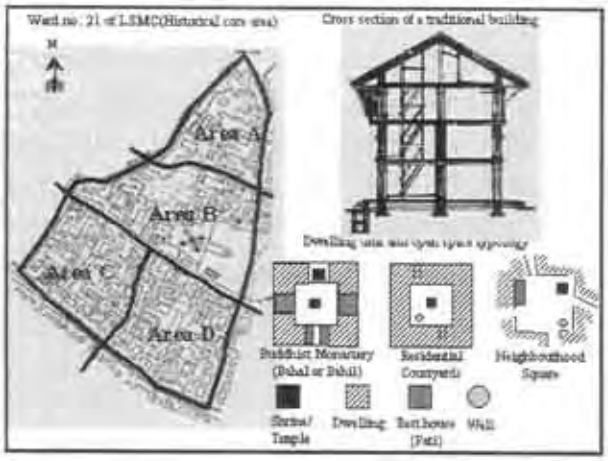
Project Goal:
To build a disaster resilient community in Kathamndu Valley, Nepal

Project Objectives:
1) Strengthen the capacity of local government,
2) Educate community (make them aware about vulnerability), and
3) Link the vulnerability to the institutional mechanism and legislation for sustainable disaster mitigation.

Project Methodology:
The project was done in basically five phases:
(i.) Hazard identification,
(ii.) Risk analysis,
(iii.) Vulnerability analysis,
(iv.) Impact analysis and
(v.) Risk management.

As each phase is related to other, they were analyzed both ways, once the new information (or data) were available.

Project Outputs:
The outputs include:
1) A disaster resilient community,
2) Basic information on risk and its causes,
3) A aware local government



Introduction

Natural factor such as location on the seismic belt, extreme variation of climate across the regions, high rainfall during monsoon, landslides and the glacial lake outburst flood in mountains coupled with human factor such as deforestation and environmental degradation have resulted increase in disaster events, decrease in agricultural production and huge rural-urban migration in Nepal. Rapid growth of population and concentration of their socioeconomic activities within limited city area combined with low economic growth and high illiteracy rate have led to a haphazard urban growth particularly in earthquake and fire prone capital city of Kathmandu and Lalitpur (Greater Kathmandu).

It is only after the great earthquake of 1988 and during the United Nations International Decade for Natural Disaster Reduction (IDNDR: 1990-2000), significant disaster related programs were initiated in the Kathmandu Valley to focus on disaster mitigation and preparedness and to bring public awareness. However, despite such effort and our advance understanding on geophysical, engineering and social science, losses (human and economic) due to natural disasters are on the rise; people are no safer they were in a decade ago and local and national economies are proving too vulnerable to disruption.

Nature provides equal opportunity for all but it is the process of urban (and city) development that is responsible for unequal access to opportunities and uneven exposure to risk. Social and economic systems place people at different levels of risk from nature's hazards. Disaster mitigation is cost effective from economical aspect and is essential from social and political points of view. It helps disaster response more effectively and relief operation more efficiently. Building a disaster resistant community is a broad concept aiming to build strong communities that can not only identify the community risk but also prepare the mitigation solutions to lessen the societal vulnerability and natural hazard, by integrating disaster management into local planning and development process through a participatory approach. This project for Lalitpur Submetropolitan City (LSMC) should be taken as a first important step towards that broad goal. The paper is divided into two parts – background study of Greater Kathmandu and ongoing LSMC project. Its objective is four folds. First, it reviews the urbanisation and socioeconomic development of Greater Kathmandu from disaster management perspective, linking the urban development process to the institutional capacity and legal framework. Second, based on the finding of the background study, it proposes an action-oriented, pilot project for LSMC. Third, it modifies the existing model for local government and community to integrate disaster management into local decision making process and to link the vulnerability to institutional capability and legislation for sustainable disaster mitigation. Finally, some findings with recommendations are presented (the project is in its first phase only).

Major Hazard in Greater Kathmandu – Earthquake and Fire

Nepal lies in an active earthquake belt between Tibetan and Indian plates that are constantly pushing each other resulting stress in main central active fault, Mahabharat thrust and Main boundary active faults. Longitudinal and transverse faults system along Arun and Dhudhkosi valleys, along Kali Gandaki in Thakkhola, and west of Kathmandu in NE-SW direction are extensive transgressing into Tibet and the Gangetic plain. This region of Nepal Himalayas had been hit by many major in the last two centuries causing extensive damages on lives and socioeconomy (table 1). Recent study on the movement of tectonic plates and analysis of the past history of Himalayan earthquakes revealed that a major earthquake is due on western part of Nepal, which is at present the biggest natural threat.

Table 1. Damages due to Great Earthquake in Nepal

Earthquakes	Richter scale	Lives loss	Houses destroyed	Prt. damage
1161	7.7	-	-	-
1255	-	One third of the Valley's population	-	-
1833	8.0	120	18,000	-
1866	-	8,519	-	-
1934	8.4	16,775	318,000	-
1966	6.0	24	6,544	-
1980	6.6	103 (dead) 391 (injured)	25,086 (collapsed) 11,670 (cracks developed)	NRs. 212.7 Million
1988	6.4	721 (dead) 12,444 (injured)	21,243 (collapsed) 40,374 (cracks developed)	NRs. 5,000 Million

Source: Disaster Relief Section, Ministry of Home Affairs, Kathmandu, Nepal

The Kathmandu Valley has a 'soft clay deposit' floor of prehistoric lake, whose geological development took place around one million years ago in three phases - (i) 200m thick sediment on the rock bed during the five hundred thousand year (ii) about 200m to 300m thick special type of clay deposit during the next five hundred thousand year and (iii) about 20m thick mixture of clay and sand deposit during the fifty thousand year (Pandey 1999). The old city centres and their extensions have taken place in the areas, which have 'unconsolidated sediments' with low to moderate bearing capacity, and are susceptible to liquefaction in case of earthquake.

Traditional building stocks in the city centres built by wooden structure and brick are fire prone. Fire hazard is also due to haphazard storage of kerosene and oils, extensive use of gas cylinder for daily cooking and more dependence on electrical appliances in daily. Major fire in the past that destroyed many 'Rana Palaces' (such as Singha durbar, Seto durbar, Lal durbar, Phora durbar, etc.) and recent series of fire broke in the garment factories further confirms the fire risk in the city.

Built Environment of Greater Kathmandu

The urban typology in the 'Malla Period (1300-1768)' characterised by building blocks of closely built three to four story houses clustered around the courtyards (figure 1), Buddhist Monasteries (Bahal and Bahil) and narrow non-axial streets forming neighbourhood squares at various junctions forms a system of socio-religious hierarchy. People were classified based on their professional (Jatta) and accordingly their housing were zoned - high officials, traders and craftsmen (upper cast Newars) surrounding the palace complex and the family of low cast (butcher, sweeper, etc.) and unskilled workers providing cheap services for the core's business entrepreneurs, on the periphery of the historical core area (e.g., pode tole). Courtyards and street squares comprising water conduit (or well) are still used for multiple activities in daily life and for safe gathering place in the event of earthquake.

Figure 1. Built Form of Greater Kathmandu in different period

Malla Period (1300-1768) Rana Period (1846 - 1951) Haphazard Development (1951 - Now)

Despite simplicity and symmetry in plan and elevation and having similar material, detailing and hence the architectural style, traditional buildings are weak against seismic force due to shallow foundation, poor bonding of mud mortar between the facing brickwork and inner brickwork, of different size and lack of tie at corner walls (Wolfgang 1998). Rain and weather has further deteriorated them. The 1988 earthquake destroyed some of such old structures in Bhaktapur district.

The new segments of the city on the periphery of the 'historical core' area, (re)built during 'Rana Period (1846-1951)' particularly after the great earthquake of 1934 were different from the earlier settlement pattern (figure 1) not only in terms of urban fabric but also significant from disaster mitigation perspective. Wide straight roads (Sukra/Dharma Path) were laid down and palace complexes with extensive landscaping, covering the whole street block were designed by trained engineers and constructed by best masons (and carpenters) using high quality materials. Introduction of fire fighting office (Judya Barun Yantrashala), upgradation of 'Sanitary Unit' to 'Municipality Office' in 1932, development of riverside complexes (dharmashala) and provision of social infrastructures (schools and colleges) have further strengthened the city's preparedness against earthquake and fire hazard. However, Ranas widely misused public lands and exploited low caste people for labour work and in their farming.

After the end of Rana autocracy in 1951, His Majesty's Government of Nepal (HMGN) has initiated land reform and planned development of housing and infrastructures. Accordingly, since mid seventies, the HMGN has been launching many programs - Site and Service program (Dallu and Kulewsore and Galfutar), Guided Line Development (GLD) program and Land Pooling projects on various parts of Greater Kathmandu to regulate haphazard growth and to minimise the public infrastructure cost.

In the seventh development plan (1985-1990), the issue of urbanisation and housing policy got focused within the framework of social welfare through the introduction of basic needs program with provision of six basic need elements – food, shelter, clothing, health and security. The eight plan (1992-1997) emphasised on infrastructure improvement and environment management on sectoral basis. However, absence of any regional development strategy at national level with little consideration to the regional implication of urbanisation yielded minimum result.

Only in the Ninth Development Plan (1998-2002) the need to strengthen the disaster management capability was envisioned. A national action plan under the guidance of IDNDR National Committee was prepared calling for various activities on disaster reduction under the co-operation among government, non-government sectors and international communities. Two significant earthquake projects 'The Kathmandu Valley Earthquake Risk Management Project' and the 'JICA project on Kathmandu Valley Earthquake,' both projected huge loss of lives and property damage in future great earthquake. A new building code was completed in 1994 and the government declared 'January 16' as the Earthquake Safety Day to raise awareness among citizens.

Urban Transformation and Vulnerable Situation

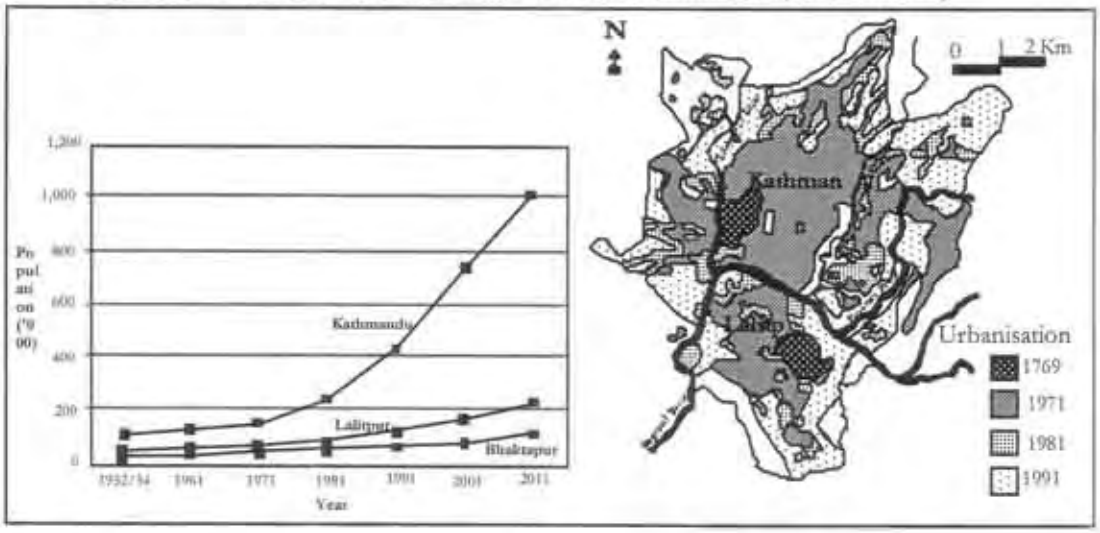
Though planned development was initiated in 1951/'52, interregional disparity in socio-economic development, centralised policy adoption, concentration of development projects in the valley all have encouraged huge migration into Greater Kathmandu, adversely affecting built fabric and socioeconomy both at local (neighbourhood) and city levels. Annual urban population growth rate is 6.0% in Kathmandu and 3.79% in Lalitpur (figure 2).

Within the last 20-30 years, many agricultural land in the fringe area have been quickly converted into haphazard housing settlement (such as Baneswore, Battisputali, Chabhil, Tahachal and Kalimati) without planning, zoning and other land development regulations (PADCO 1986). A study on building permit issued in Kathmandu in 1991 showed that out of 4150 permits, about 30-35% of houses constructed outside the core do not have vehicular access to the building and lack public utilities (MPE 1999).

There is a tremendous pressure on the old aged infrastructures, in most cases unable to meet the new demand in the core area and delay in providing physical and social infrastructures in the urban sprawl of periphery area. As a result, physical infrastructures become more vulnerable and the urban services become costly, ineffective and unreliable. Average vehicular speed has reduced to 20 km/hr. in the inner core and 40km/hr. in the ring road (JICA 1992) and

urban population served by drinking water has lowered from 80% (of total urban population) in 1980 to 75% in 1996 (MPE 1997).

Fig. 2 Population growth & Urbanisation of Greater Kathmandu (1952/54-2011)



Open space essential for relief and rescue works (immediate relief and temporary shelter for victims) is gradually decreasing in the valley (table 2), from 64.0% in 1984 to 42.2% in 2000 (Hriday 1999). During the period between 1971 and 1981, the open space and recreational area in Greater Kathmandu reduced from 255 hac (4.1%) to 245 hac (3.9%) and further to 143 hac (2.2%) in 1991 (Halcrow Fox 1991).

Table 2. Urban and Agricultural Land Use in the Kathmandu Valley

Year	1984	1991	1998	2000	2020
Urban Area (% of Total Valley Area)	4.8	11.0	17.6	26.0	34.3
Agricultural Area (% of Total Valley Area)	64.0	56.0	43.7	42.2	14.5

Source: (Hriday 1999)

Brick and cement factories located within the valley, unregulated carpet industry in the residential zone, erection of huge shopping complex, departmental stores and even hotels in already dense area, garment factory, private schools and nursing homes operating in normal residential buildings without safety measures all have not only increased the health hazard but also put many lives in danger.

Shift in economy from agro-based to service oriented has resulted many socioeconomic changes, which has a wide implication on community vulnerability. Disparity on income level is very high in Kathmandu as the bottom 60% earned only 5.8% compare to 85.4% by the top 20% (CBS 1997). Households need to spend higher percentage of their income on housing (28%) and clothing (10%) with little money left for medicine and personal care (4%) and education (4%) (NRB 1988). Significant number of urban poor (mainly rural migrants including children and women), who are working in industrial and manufacturing establishments are

living in slum area and squatter settlements. Similarly, many children working as a domestic servant and in restaurants are frequently unpaid (or less paid), exploited and abused. These children, women and low income people working on daily wage basis, who live in the most polluted areas are the most vulnerable group of the city.

Social system of transferring parental assets equally to children, sentimental value on ancestor's property, transition from joint family to nucleus family system and low income level have encouraged particularly in the historical core vertical division of old buildings into many parts. Haphazard opening on the load bearing façade wall for new door and window reduces the wall's strength and disturbs the load transferring system. Conversion of ground floor to a shop (or a habitable room) by removing significant part of load bearing wall leads to discontinuity in lateral stiffness and strength resulting formation of 'soft stories,' which is one of the most common causes of failure in earthquake disaster. Addition of new floor on the top of the existing old building, often with different material, construction technique and different floor height further erodes the strength and stiffness thus increasing torsional effect. Vertical irregularity occurs as buildings of different mass and material, floor height and construction system are located together along the street and around the courtyard. Finally, the present trend of new building construction - generally five and half storey height with water tank on the top, soft storey on ground and three feet project from second floor onwards – is often characterised by 'weak column and strong beam,' with formation of 'short column' and is highly vulnerable.

A study carried out in Kathmandu and Lalitpur indicates that as high as 72% of housing units were structurally unsafe, 55% were damp, without sunlight and congested, and only 43% house were connected to the water supply (DHBPP 1976). The streets and courtyards are poor, congested and lack street lamps and traffic signage (Engar and Joshi 1997). The narrow pedestrian lane, street squares and building itself acts as a 'death trap'. This situation further worsens as many water conduits ceased to supply continuous water and numerous rest house attached to 'Viharas' and street squares have been encroached, disappeared or demolished. Various sociocultural activities could not continue due to demise of 'guthi system.' This is a threat not only to the people occupying in the building itself, but also to the community living and visiting the neighbourhoods.

In nutshell, the city form has been transformed - vertically as 'high rise high density' (urban density exceeds 40,000-45,000 persons per sq. km.) in the historical cores by reconstruction and destruction of traditional homogenous building stocks without considering fire and seismic risks and horizontally on the peripheral agricultural land by haphazard settlement, irrespective of natural hazard and without basic amenities thus converting the whole city into a hazard prone zone.

Government Capacity, Institutional Framework and Legislation

Though various ministries and their regional or district offices are responsible for disaster mitigation activities within their jurisdiction, none of them has a disaster management unit within their organisation and hence no fund is allocated for mitigation and preparedness. It is

only the Special Disaster Unit (SDU) within Home Ministry, which under the 'Natural Calamity (Relief) Act 1982' can form the Central Disaster Relief Committee (CDRC) and District Disaster Relief Committee (DDRC) and allocate the fund to carry out rescue and relief works as well as to provide nominal financial assistance to disaster victims. Local governments get fund in case of natural calamities either from District disaster relief committee or from district development committee. Minimum information on disaster management available among many agencies could not use effectively due to lack of a co-ordinating agency at the centre level. To implement national action plan prepared by IDNDR national committee, the government is yet to formulate the legal framework and institutional mechanism.

The 'local self-governance act 1999' has empowered local municipality to prepare, implement and monitor its own development plans. However, low priority on disaster mitigation in Municipality Act 2048 and District Development Act 2048 (1991-'92), technical and financial constrains coupled with confrontation between the District Development Committee (DDC) and Municipality, controlled by two different political parties have led local government unable to take many responsibilities. Both Kathmandu and Lalitpur Cities are ineffective to regulate urban housing through issuing building permit and controlling construction work under the revised byelaws due to legal constraints, duplicate of responsibility among government agencies and negligence of public.

More than 90% of building construction in Greater Kathmandu are non-engineered and unmonitored. Illegal home construction is as high as 27% (CBS 1997). Even after the establishment of disaster management unit within Kathmandu city, it failed to take account of natural hazard in its various infrastructure projects. In such context, implementation of recently prepared building code and its effectiveness is doubt.

Emergency Services

The city preparedness level in terms of emergency facilities is far less than satisfactory. There is only five fire fighters (3 in Kathmandu, 1 in Lalitpur and 1 in Bhaktapur) providing services for abut 200 fire cases in the valley per year. It's ineffectiveness - due to congested narrow road network, absence of fire hydrants and shortage of water, untrained and understaffed fire office with poor budget - has already been proved in the recent fires in the city. They are kept under control of Ministry of Home Affairs. Similarly, no independent ambulance service is available except those administered and funded by parent organisations such as Nepal Red Cross Society, Nepal Paropakar Sansthan, Nepal Police and major government and semi-government hospitals including some social organisations, providing limited service in urban areas. Both government and private nursing homes have neither emergency response plan nor can they provide any effective services during natural calamity. The number of beds, medical staffs and the medicine stocks are far less than minimum to treat mass casualties or injuries.

The average telephone available per 1000 inhabitants in the valley comes about just 83 (Bhoop 1999). No public telephone boot is available in the streets thus making communication during emergency difficult particularly at night.

Findings of the Study

Various programs – study projects and public awareness activities – lunched during the IDNDR decade are successful to bring public awareness on earthquake risk of the valley in general and to initiate disaster mitigation and preparedness works and hence should be taken as a bold beginning towards the right direction. However, on the other hand, HMGN is still trying to solve the various socioeconomic and urban problems resulted from rapid urbanisation and haphazard urban growth. Not only in the past projects on housing and land development but also on recent works, disaster management gets little attention. Both central and local governments missed the opportunity to build safer community by including mitigation aspect in master layout plan, regulating building construction and infrastructures development for earthquake and fire resistant and providing social and emergency services in its implemented land, housing and infrastructure projects. Poor capacity of government coupled with absence of effective legislation and institutional mechanism has further delayed the implementation of some important mitigation task such as enforcement of national building code.

Local communities are not clearly aware how and why they are vulnerable to the seismic and fire hazards. While a top-down policy is needed, it is indeed the local level bottom-up policy that provides the impetus for the implementation of mitigation solutions. Lack of implementation of mitigation task at local level tends community to take public awareness programs in the context of celebration rather than the issue of life and death.

Session 3:

Active Fault Project

Technology Transfer for Earthquake Disaster Mitigation Focused on Active Fault Assessments

Project Summary — Active Fault Project

Project Duration: April 2000 to March 2001

Project Partner: Members of the Research Group of Active Faults in Japan, Asian Disaster Reduction Center (ADRC), United States Geological Survey and counterpart institutes in each participating country.

Project Site: Iran, Kazakhstan, Republic of Korea, Mongolia, Myanmar, Nepal, Russia, and Uzbekistan

Project Goal:

To make a database on the active faults for the above mentioned countries.

Project Objectives:

1) Data base formation of active fault
2) Training of professionals in utilizing the database

Project Methodology:

The project was implemented through following steps:

1) Preliminary Investigation, 2) Training & Practical Investigation,
3) Digitalization, 4) Supplemental Training & Investigation,
5) Dispatching of the Maps of the Information, 6) Data Processing,
7) G.I.S. Adjustment and Maintenance, 8) Text Translation, and
9) Conference and Meeting activities

Project Outputs:

The outputs include:

1) Digital maps, 2) Related Database, 3) Trained professionals

Background

As recently seen in the city of Kobe Japan, in Neftegorsk Sakhalin, Russia, in Izmit, Turkey, in Taiwan, in El Salvador and in Gujarat, India, earthquakes bring about major disasters to communities in a most unpredictable and uncontrollable fashion. Properly designed modern superstructures might withstand the impact of earthquakes, but poorly constructed dwellings of low-income people are always hit hardest, and combined with the lack of a proper social safety net. These devastated communities are often left in a state of deprivation for a very long time. Although plenty of projects were proposed and performed to prevent earthquake disasters in the developing countries after the International Decade of Natural Disaster Reduction program started in 1990, no earthquake occurred at the projects target areas. Any appropriate project has not been proposed or sufficiently performed yet to specify the high-risk areas. Namely, there is still possibility not to be ignored: Newly proposed projects will also be underway where no earthquake occur before the effect of projects lapse into null.

There are however ways to identify high-risk areas in advance and minimize the damage through better planning, education, preparedness, and organization-building. Even the predictability of earthquakes can be improved significantly by applying simple technology to the readily available information. According to recent scientific research[1)], major earthquakes are known to occur in limited areas around pre-existing active fault lines. The above great earthquakes are also good example occurred from active fault systems. Therefore, investigation into the distribution of active faults would be critical in assessing the earthquake vulnerability of a given region, both in terms of urban infrastructure development and disaster preparedness. Even in the highly dense active fault area of Japan, the potential area of great earthquake disasters around the active faults is less than several percent of the all country area. The nature and extent of active fault systems are critical elements of seismic hazard analysis.

In the West, the International Lithosphere Program (ILP) is successfully underway but, until now, no highly functional maps of active fault distribution or relate databases have been completed for Asia. A notable exception to this is Japan, a severely earthquake-prone country, where new technology to interpret aerial photos for production of maps and relate databases has been developed. A highly accurate set of maps entitled, "Active Faults in Japan: Sheet Maps and Inventories" has already been published.

Project Objectives and Implementation

The proposed project's main objective is to transfer newly-developed techniques for making active-fault maps and relate databases from Japan to other earthquake-prone countries. The technology will be transferred principally through in-country training courses. The technology is suitable for transfer to, and utilization in, developing countries. The new techniques do not

require any special equipment other than ordinary tools for geographical/geological investigations in addition to aerial photos and the basic knowledge of local geotopography. In the training courses, trainees can utilize their own stationery and simple drafting tools such as compasses and stereoscopes where necessary. The aerial photos to be used in the training are standard materials normally used to make basic geotopographical maps in each locality and are for general use. Only such material as is available for general application will be used during training. There is no possibility that material considered confidential by local or national authorities will be required in any training curriculum and, throughout the project, only normal discretionary considerations will be applied.

Usually there is a specialized institution (at national or regional levels) in each country that stocks and maintains the photographs and data relating to the geotopography. Aerial photos from the locality in which the training is conducted will be used for training purposes because the trainees are familiar with local geography and are thus able to learn and apply the technology more easily, and facilitate the production of active-fault maps and relate material for database building.

The technology will be directly transferred from the Japanese experts who originally developed it to local geographers/geologists who have a basic knowledge of local conditions. A comprehensive textbook has been published in Japanese and the contents may already be familiar to geographers/geologists internationally. It is intended that the training courses be conducted in each participating country and each target region. The trainees will be nominated from national (or equivalent level) institutes for geographical or geological survey (see Table 1). These institutes can easily access aerial photos and geotopographical maps of the individual localities. The trainees will conduct *in situ* investigations during which they will be trained to understand the new technology by utilizing their own knowledge and tools. The training courses on field investigation technology in developing countries cost far less than their equivalents in developed countries. So the project intends to send all trainers to respective countries instead of bringing trainees to Japan. In addition to transferring techniques for interpreting aerial photos and identifying active faults, related technologies for field investigation will be transferred to the extent of Japanese specialists' availability.

Target countries have been rigorously selected according to recent earthquake activities and information availability (e.g., the date provided in "The Chronological Scientific Table" and proceedings of related international conference such as the "Active Faults Research for the New Millennium," 1999). The participating countries will be Iran, Kazakhstan, the Republic of Korea, Mongolia, Myanmar, Nepal, Russia, and Uzbekistan. In addition to these countries, the project team also expects to participate in collaborative activities and dissemination meetings in Armenia, China, and Turkey.

Project Utility

Active-fault maps constitute critical input for disaster mitigation as a whole. The active-fault maps and the relate databases will be indispensably utilized for all-embracing earthquake countermeasures such as land use planing, urban planning, traffic network planing,

determination of urban areas to reconstruct dwellings, hospitals, schools etc., and optimum designs of great infrastructures. (See sample active fault maps shown in Figures 1 and 2) The maps and the databases of active faults will be designed for use by policymakers, administrators, urban planners, civil engineers, local community members, and others who may be concerned with regional development. Regional developments and the corresponding countermeasures against earthquake disasters will not effectively or efficiently be materialized until the maps and the databases are ready for use. The active fault maps and the databases are such key elements for comprehensive earthquake countermeasures, and are essential in terms of regional development. Thus the project is suitable to be attempted and accomplished by UNCRD as the center for Regional Development.

International cooperation or assistance will also be effective and efficient after the maps and the databases are build up and ready to be utilized. Namely, this project is suitable to be led by UNCRD as a UN organization. The active-fault maps and the relate databases will be designed also for use by international institutes or agencies such as United Nations Development Planning in each country, the World Bank, the Asian Development Bank, the Japan International Cooperation Agency and others that may be concerned with international cooperation and assistance in terms of earthquake disaster mitigation.

The potential impacts of the project are already evident in the use of outputs (active-fault maps) of similar exercises in large-scale regional development projects. One example is a project in Myanmar to build several dams along the Sittang River for hydro-electric power generation. By using active fault maps developed during the UNCRD project to date to site the

Table 1 List of Counterparts and Collaborating Institutes

Region	Representative	Institute	City (Institute)
Iran	M. Ghoraishi	Geological Survey of Iran	Tehran
Kazakhstan	Aitmukhamed Abdulin	Academy of Sciences of the Republic of Kazakhstan	Almaty
Rep. of Korea	Kyung Jai-Bok	Department of Earth Science	Chungbuk
Mongolia	Batnasan Nyamsuren	Mongolian Academy of Sciences	Ulaanbataar
Myanmar	Win Kyaw	Hydroelectric Department Myanmar	Yangon
Nepal	Bishal N. Upreti	Department of Geology, Katmandu	Kathmandu
Russia	Nikolai P. Romanovsky	Russian Academy of Sciences	Sakhalin
Russia	Alexi Ivshchenko	Russian Academy of Sciences	Khabarovsk
Uzbekistan	Sergey Tyagunov	Academy of Sciences Uzbekistan	Tashkent
Armenia	Sergey Balassanian	National Survey of Seismic Protection	Yerevan
China	Min Wei or Xu Xiwei,	China Seismological Bureau Institute of Geology	Beijing
Turkey	Ismail Kuscu	MTA Geological Research Dept.	Ankara
Pakistan*	Shahid Hasan Khan	Geological Survey of Pakistan	Quetta,
Philippine*	Punongbayan	Philippine Institute of Volcanology and Seismology	Quezon
Australia**	M C Ervin	GeoEng 2000	Melbourne
Japan**	Takashi Nakata	The Research Group For Active Faults of Japan	Hiroshima
Japan**	Shigeru Ito	Asian Disaster Reduction Center	Kobe
New Zealand**	Kelvin Berryman	Institute of Geological & Nuclear Science LTD	Lower Hutt
U.S.A.**	Michael N. Machette	U.S. Geological Survey (ILP II)	Denver

* Counterparts in the Future

** Collaborating Institutes

dams, risk avoidance and commensurate budgetary savings far outstripping the cost of the mapping project have been realized. Similarly, active-fault maps of Sakhalin in Russia are greatly assisting the construction of a natural-gas plant and pipeline etc.

So it should be noted here that, even during the procedures of making the active fault maps and of the databases, information of each active fault can be utilized to safely design significant infrastructures such as nuclear electric power generators in addition to new dwellings, hospitals, schools and others.

The technology will be efficiently and effectively transferred due to UNCRD's experienced skill. The first mandate of UNCRD is providing training courses for regional development to

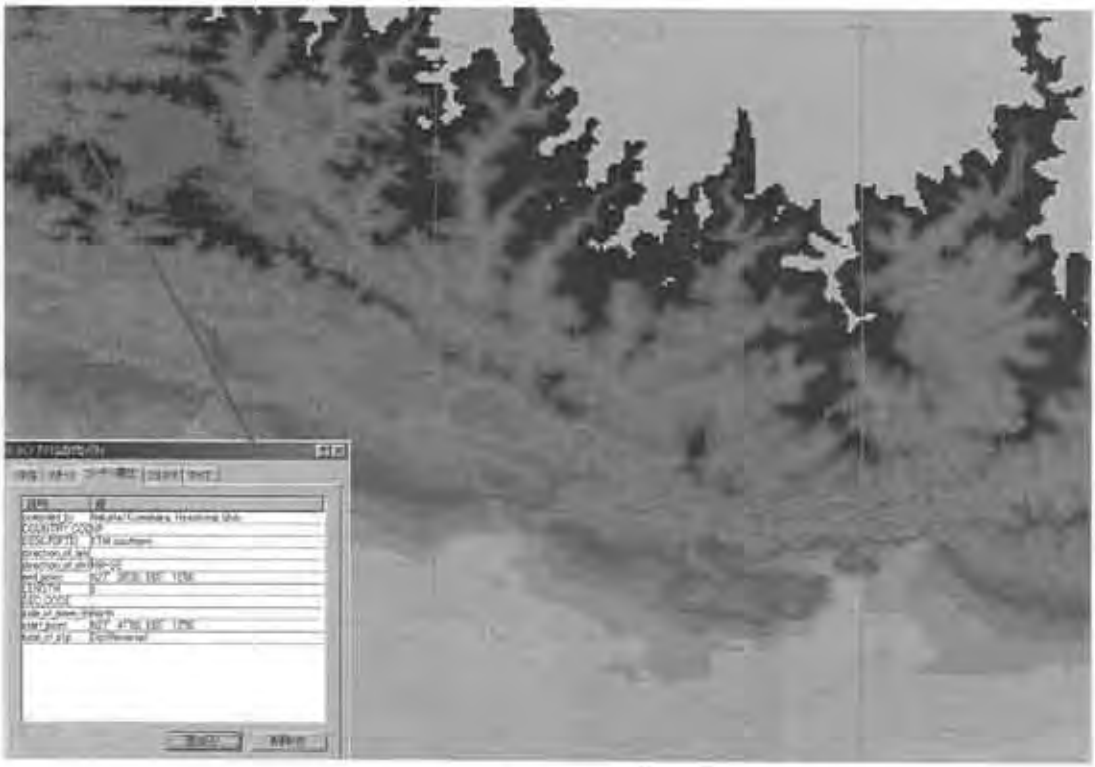


Figure 1. An Example of Active Fault Maps in East Nepal
(Superimposed on Elevation Data)

Information in the map enables us the region to build the optimal design for earthquake-proved dwellings and infrastructures.

developing countries. UNCRD has acquired advanced qualification to perform the most efficient and effective technology transfer through its experiences of training course organizations.

Project Scope and Activities

The project will largely be of a pilot nature in this first project duration from January 2002 to June 2003, and will comprise the following sequence of activities

(a) Preliminary investigations to identify areas which are ready and able to collaborate with UNCRD (in terms of capacity of local counterparts to undergo training);
(b) Training of local counterparts to interpret information from aerial photographs, and carry out *in situ* investigations (14-day courses);
(c) Supplementary training on the use of the Internet equipped with Geographic Information System (GIS) technology, and testing each region's suitability in terms of its use; and
(d) Dissemination of the technology via training courses, conducted by local trainers.

A one-day seminar will be conducted with the aim of conveying the general concept of the project prior to each training course. The seminar can be attended by policymakers, administrators, practitioners, civil engineers, local community members, and others concerned with regional development, depending upon their needs. Japanese experts and UNCRD staff members will be the lecturers in these seminars.

The main training courses, concerning the production of active-fault maps, will be conducted for specialists in the field of geography or geology at the related institutes listed in Table 1. The number of trainees participating in these courses will be a minimum of five up to a maximum of twenty per country, depending on the requests. Most trainers will be selected from among members of the "Research Group For Active Faults of Japan" – the group, which published "Active Faults in Japan: Sheet Maps and Inventories". The number of trainers (Japanese experts) will be either one or two for each course. UNCRD staff members will supervise and monitor the training courses, provide lectures, and extend essential support to the external trainers. A one-on-one technology transfer will be the basic method of training. The resource persons of the trainees are listed in Table 2.

Supplementary training, such as on the use of the Internet and GIS, will be provided to other relevant personnel at the institutes as and when required. Japanese experts and/or UNCRD staff members will be the trainers.

UNCRD staff members' duties during the training courses are:
(a) To supervise and monitor each training course;
(b) To give lectures at the seminar;
(c) To provide essential support to external trainers during the main training course;
(d) To assist the trainers for *in situ* investigation of active fault systems; and
(e) To evaluate the output of the Project (quality of active fault maps and standard of relate databases).

The trainers' duties during the training courses are:
(a) To give lectures at the initial one-day seminar;

(b) To give lectures during the main training course;
(c) To teach *in situ* investigation methods for active-fault systems identification;
(d) To evaluate the trainees and to provide suggestions to UNCRD for future project activities in the form of a detailed mission report; and
(e) To evaluate the project output (quality of active fault maps produced and standard and relevance of relate databases) and to provide further suggestions to UNCRD.

As the project's counterpart organizations will be government-level geographical, geological or seismological institutes, they will be quite capable of organizing such training courses and seminars based on their own experiences. In addition, one or two Japanese experts and one or two UNCRD staff members (depending upon the number of trainees) will jointly organize each training course in the countries listed in Table 1. As a first step, one training course per year will be provided specifically designed for each country. Other training courses to disseminate field investigation technology will be organized separately according to the counterparts' requests. After the first

Table 1 Resource Persons of the Trainees

Members of The Research Group For Active Faults of Japan		
Takashi Nakata	Professor	Hiroshima University
Atsumasa Okada	Professor	Kyoto University
Koji Okumura	Associate Professor	Hiroshima University
Hideaki Maekoku	Associate Professor	Hiroshima University
Mitsuhisa Watanabe	Associate Professor	Toyo University
Yasuhiro Suzuki	Associate Professor	Aichi Prefectural University
Hiroyuki Tsutsumi	Assistant Professor	Kyoto University
Hideaki Goto	Associate Professor	Fukushima University

training course, the counterparts are expected to begin their own investigations into active faults in their respective localities and to draw up basic active-fault maps. They will be expected to have learned the skills necessary to identify at least visible active fault lines in their own localities during the first training course. Additional skills, such as those needed to read indistinct active fault lines, will be transferred after the counterparts have gained the necessary experience to use the new Japanese technology. However, even basic maps of visible active fault lines will be very effective for disaster mitigation planning because clear active fault lines will indicate the potential for earthquakes of corresponding magnitude. For increased effectiveness, an international workshop will be organized in Japan after one year in order to share the counterparts' experience and to disseminate the lessons learned.

Collaborative Activities with Other Organizations

The maps and relate databases produced during the training courses will be digitized by the Asian Disaster Reduction Center (ADRC) upon request of the counterparts. The resulting

digitized information can be utilized in computers equipped with GIS technology. The importance of GIS technology in this regard is being increasingly recognized, in particular because of its utility and ease of application. ADRC has already developed a computerized information dissemination system called VENTEN[2], which is now available on the Internet. The system includes important geographic information essential for disaster mitigation planning and emergency rescue efforts. Such information includes, distribution of urban agglomerations and their populations, transportation networks, location of terminals and airports, and water supply and sewerage networks. The digitized active fault information will be superimposed on the ADRC system for quick and easy use. UNCRD will help counterparts to utilize the ADRC system, and provide supplementary training on the use of GIS according to their needs. Selected texts and training materials will be provided by ADRC. According to UNCRD and ADRC's experience, most countries participating in this project will utilize the VENTEN system.

The project will be supported by the International Lithosphere Program (ILP) of the US, which is an essential element in the UN-designated International Decade for Natural Disaster Reduction (IDNDR). The center of ILP is now located at United State Geological Survey in Denver, USA, where the program has been successfully underway, and highly functional maps of active fault distribution or relate databases have been completed for USA and her neighboring countries. This support will allow a rapid exchange and sharing of digital information across continents and between the Northern and Southern Hemispheres, thereby fostering further international collaboration. UNCRD, assisted by ILP, will endeavor to disseminate disaster mitigation activities among the countries and regions participating in the project.

Footnotes:

1) See Nobuki Kame and Teruo Yamashita, "Why are there more small-scale earthquakes than large-scale earthquakes?" Science Journal KAGAKU 68 (September 1998).
2) Available at http://venten.adrc.or.jp/; accessed 2001.
3) See National Astronomical Observatory, "The Chronological Scientific Table," (Rika-Nenpyou) (Tokyo: Maruzen , 1998).
4) See Hokudan International Symposium and School on Active Faulting Committee, "The Active Faults Research for the New Millennium – Proceedings of the Hokudan International Symposium and School on Active Faulting" (1999).

Session 4:

School Earthquake Safety Initiative (SESI)

Project Summary	School Earthquake Safety Initiative (SESI)

Project Duration: Two years (Initial preparation phase: 2000-2001)

Project Partner: Local governments, NGOs in project cities, and local communities

Project Site: 5 cities in 4 countries:
Chamoli (India), Bandung and Bengkulu (Indonesia), Kathmandu (Nepal) and Tashkent (Uzbekistan)

Project Goal:
To achieve safer and sustainable livelihood of the people through pre-disaster mitigation and preparedness initiative, with specific focus on disaster education.

Project Objectives:

1) To evaluate the vulnerability of schools, to suggest affordable means to retrofit schools,
2) To retrofit one or two model schools,
3) To train masons for earthquake safer construction,
4) To prepare disaster education materials for students, and
5) To promote cultural exchange.

Project Methodology:
The methodology is to use school as the center of the community activities in pre-disaster mitigation and preparedness initiative, and to raise awareness of different stakeholders through school retrofit programs.

Project Outputs:
The outputs include:

1) Trained, well-aware masons, and communities,
2) Trained students,
3) Retrofitted schools and
4) Disaster education materials.

Introduction

Earthquakes are considered as one of the most destructive natural disasters and can produce many types of losses, including physical, socio-economic and cultural losses. Although physical losses such as lives, buildings and social infrastructures will most directly affect the victims, other types of losses might trigger the social unrest and aggravate poverty level. It has severe impact on the development stages of the country and in many cases it has been observed that one single event does affect significant percent of the national Growth Domestic Product (GDP). To live in a safer environment is a basic human need. To make the development process sustainable, it is important to emphasize on the prevention and pre-disaster mitigation aspects. The most significant issue in this regard is to have a proper education training and perspective regarding the earthquake risk and its consequences.

The School Earthquake Safety Initiative (henceforth termed as 'SESI') is aimed to promote self-help and education for disaster mitigation by building safe and sustainable community. The participatory approach in the community development and capacity building among the local people are the key focus areas of the initiative. Schools have been found as the key element for the community involvement in Japan and other countries worldwide. School not only provides education to the children, a strong school also helps in emergency shelters immediately after the earthquake. Through this school-strengthening program, a community based training program is formulated to spread the knowledge of earthquake resistant traditional technologies rooted in culture and heritage. In this paper, a brief outline of the SESI is presented, and the activities in different countries are described briefly.

Why Focusing on Schools?

In the next decade, there will be a dramatic change in the socio-economic structure of developing countries as many of them transform themselves from predominantly agrarian economies into industrial based urban societies. Rapid urbanization in these countries is due to the policy of the developing countries that has emphasized industrial and urban growth and this urban biased policy has encouraged migrants to flock into cities to take advantages of the relatively better economic conditions. However, cities have weakened the potential of urban regions to absorb the growing urban population and provide them with necessary employment opportunity and service. As a result in most of the cities of developing countries, informal settlements are developing in the urban periphery. This population pressure combining with many other factors, compels improper construction, and many important buildings like schools are built rapidly without proper seismic design that drastically increase population's vulnerability from earthquake disaster. The United Nations International Decade for Natural Disaster Reduction (IDNDR: 1990-1999) has been able to

make a significant progress in raising awareness among diverse communities regarding risks and effects of natural disasters. A strong shift has been observed from post-disaster rehabilitation and reconstruction to pre-disaster mitigation and preparedness policy. As a part of the preparedness process, strengthening the school buildings and disaster education has been emphasized.

Earthquake-threatened communities need earthquake-resistant schools to protect their children and teachers. Moreover, earthquake-resistant schools can be used as relief and rehabilitation shelters during earthquakes. Also, a strong leadership of teachers has been proven very useful in dealing with emergency situations. Thus, schools can play an important role in community training, and building partnership among various community groups. This is important not only during emergency situations, but also before and after the disasters. The school safety issues have several dimensions. The physical one is strengthening the schools and transferring earthquake-safer construction technology to the communities. The second aspect is education, for students, teachers and communities. The third aspect is socialization of the effort, by creating awareness and capacity building among the communities. These issues are very much inter-related and have been addressed in an integrated manner in SESI.

Goal and Objectives of the School Earthquake Safety Initiative

Under the overall framework of 'Human Security', the goal of the initiative is to attain safer and sustainable livelihood for the people in the developing countries. Disaster affects both the safety and sustainability, in terms of lives and livelihood. To achieve the goal stated above, the initiative will focus on community development and empowerment activities in some of the selected cities and towns of developing countries. The overall objectives of this project are:

(a) To empower the community with know-how and technology for earthquake safer construction, and

(b) To make a disaster resilient, self-reliant community.

To do this, a specific focus has been given to the school systems, where the vulnerability of the school buildings will be evaluated and technically tested, affordable retrofitting techniques will be provided. Raising the education and awareness level related to earthquake disaster will be another focus area of the project initiative.

There are five direct objectives of the project:

(a) Evaluate the vulnerability of selected school buildings in each of the selected project city,

(b) Recommend designs and affordable means of strengthening vulnerable schools,

(c) Retrofit one or two model demonstration school(s) using appropriate or improved traditional and local technology,

(d) Provide training to workers from local construction industry who build schools and residential dwellings; and

(e) Prepare disaster education materials for school children, teachers and communities and use them for training and education purposes.

It is observed from the past experiences that the basic problems related to disaster mitigation and préparedness in the developing countries are attributed to lack of training, awareness, education, and self-reliance within the communities. An appropriately educated and self-trained community is much more capable to cope successfully with natural disasters, and to reduce its impacts. In other words, disaster management and related efforts are very much part of a sustainable development process in developing countries. The current initiative aims to promote the mitigation culture through community participation and empowerment process tailored to residents with specific needs. There are several completed and/or ongoing-projects in the selected cities/town. Some of these efforts are initiated by the government organizations, some of them are by non-government organizations, and many of them are from the international organizations. The current initiative will complement, enlarge and sustain the on-going efforts. The direct beneficiaries of this initiative will be school children, their families, teachers, school authorities, local engineers, masons, and homeowners. The indirect beneficiaries are the government organizations and the community as a whole.

Activities and Expected Outputs of the Initiatives

The initiative has been formulated based on the initial studies and surveys conducted by the Disaster Management Planning Hyogo Office of the UNCRD; and is designed as per the need and priority at the local level. There has been a wide range of stakeholders, identified as the counterparts. It varies from country to country, and includes the local governments, municipalities, academic institutions and non-government organizations. The initiative has two major phases: Preparation Phase and Implementation Phase.

Preparation Phase: The activities in this phase include detail survey of the schools, retrofit design, and design of the education materials. This Phase has two components, one regarding the school buildings, and the other regarding the education materials. For school buildings, following specific activities will be executed:

(a) Reconnaissance survey and selection of schools;
(b) Detailed survey of schools;
(c) Detailed retrofit design with special emphasis on applying appropriate or improved traditional technology at affordable costs;
(d) Recommendations based on cost performance analysis.

The selection of schools will have following criteria:

(1) Usage as per the number of students,
(2) Location as per the vulnerability of structures and spatial setting,
(3) Types of construction, to cover common construction practices,
(4) Priority of the local government and/or local counterparts

For education materials, following activities will be done:

(a) Preliminary survey of existing disaster related education materials;
(b) Preparation of preliminary booklets for schools;
(c) Testing preliminary education materials in schools and getting feedback from children and teachers and;
(d) Final design of educational materials.

Thus, during this phase, a proto-type of the education materials will be prepared, and its receptiveness will be tested. The initial results will be disseminated through arranging interactive workshops at local levels at different time period of the preparation phase.

Implementation Phase: The purpose of this phase is to prepare demonstration model in a participatory approach. Major activities in this phase will include retrofitting of school buildings, training of masons, and use of the education materials to raise awareness among the school children. This phase will execute following actions:

(a) Retrofit one or two model school(s) per agreed design and budget; and;
(b) Disseminate education materials through special classes in schools with emphasis on disaster education in curriculums. Training at the local level will be performed during this phase. Earthquake drills will also be planned and conducted in selected schools.

Actual retrofitting of school buildings will involve the local masons, teachers and parents in different form. A final workshop will be carried out in each project city/town to disseminate the results to a wider audience, and to ensure sustainability of efforts among the local stakeholders.

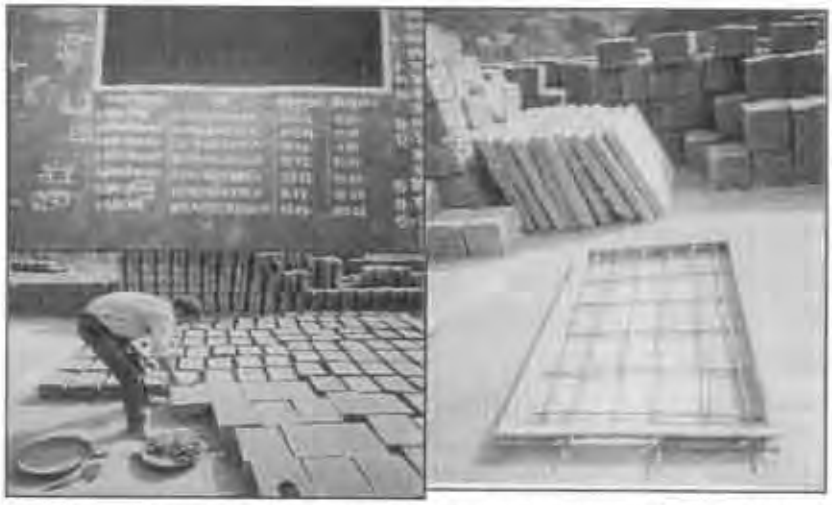
The expected outputs have two aspects: one physical, i.e., retrofitting school buildings, and the other social, which is to convert local communities into earthquake resilient communities. The retrofitted school buildings and associated training program will serve as a model for the disaster-prepared community for other parts of the country. On the other hand, educating the school children and the educational materials will serve as the tool for spreading the disaster prevention culture, and to make it sustainable at the community level through educating children, teachers and community members. It is expected that the current initiative will be able to raise the awareness at different levels. As a long-term initiative, it can be perceived that a comprehensive model of community training and capacity building for disaster preparedness will emerge out of this initiative.

Project Cities

Five cities have been selected for this project. These are Bandung and Bengkulu (Indonesia), Chamoli (India), Kathmandu (Nepal) and Tashkent (Uzbekistan). Although these cities vary in size and population, most of them have paid a serious toll on human resources, and physical infrastructure due to earthquakes. In spite of damages due to earthquake and apparent lack of preparedness at different level, the institutions at local, county and national levels have shown keen interest in the mitigation activities, and consequently several programs are currently on-going in these cities with different focus areas. Three out of five cities, Bandung, Tashkent and Kathmandu participated in the RADIUS project of the UN IDNDR.

Bengkulu was hit by a powerful earthquake in June 2000, with 7.9 Richter scale magnitudes. The area is located in an active seismic zone and future earthquakes at larger magnitudes can be expected in this region. Although more than one year has passed since the earthquake, the rehabilitation and reconstruction have not been completed. The proposed initiative in the city will be a pilot demonstration project where school-building rehabilitation and earthquake risk mitigation techniques will be carried out in an integrated manner.

Bandung has been a case study site for the United Nations IDNDR RADIUS project, which aims to raise awareness and build capacity in the local government. Here, the major focus of the project will be an education campaign. Through the UNESCO project and the Indonesian Urban Disaster Mitigation Project (IUDMP), the vulnerability of some of the school buildings has already been assessed and a preliminary education campaign has been started. This has been done in close cooperation with the Bandung municipality, and UNCRD played an advisory role in both the projects. By accumulating achievements of the above activities, the main goal of the current initiative in Bandung is to integrate these achievements into a comprehensive training program for school children and local communities.



Chamoli is located in northern India in the foothill of the Himalayas. This region is often hit by strong earthquakes, as evidenced by several past devastating earthquakes, the recent one being in early 1999. The most common residential and school buildings here are stone masonries, with relatively heavy slate roofs. Besides, there is an up-coming trend of non-reinforced brick masonry buildings. Under the initiative, several schools will be selected from two different construction types. Through this initiative, time-tested traditional technology and upcoming appropriate and affordable modern technology will be disseminated through a training program for retrofitting the existing school buildings.

Nepal has a long history of destructive earthquakes. In the twentieth century alone over 11,000 people have lost their lives in four major earthquakes. School children are especially vulnerable to earthquake hazards in the Kathmandu Valley. A recent study conducted by

Kathmandu Valley Earthquake Risk Mitigation Program (KVERMP) revealed that the majority of the 644 public school buildings require retrofitting to meet safety standards. The current practice of school construction does not incorporate earthquake resistant elements. In addition, none of the public schools have any emergency response plans. The current initiative will focus on the training of local masons for the earthquake resistant non-engineered construction and preparing the risk management plans for the schools.

The city of Tashkent is located in one of the most intensive seismic zones of Uzbekistan, and experienced several earthquakes. A preliminary analysis of the seismic risk for Tashkent shows that more than 25% of school buildings might be completely destroyed and 30% might be heavily damaged in case of a forthcoming earthquake of magnitude 6.5. The situation is aggravated by the absence of simple and efficient methods of increasing seismic safety of existing school buildings. Training of school administration for proper use of school buildings in earthquake regions and educational materials describing how to behave before, during and after an earthquake will help increase awareness and understanding of children, teachers and local communities.

As observed from the above description, each city has its own perspective and need at the local level. Therefore, the activities in each city are formulated based on the local priorities and problems. In some cities, school retrofit is a key focus area, where in some other cities, more emphasis is given on the training and capacity building among the masons and disaster education for children, teachers and their parents. The levels of interventions are also different from city to city.

Dissemination of the Concept of the School Earthquake Safety Initiative

The concept of the SESI is non-scale, non-regional and therefore can be applied to anywhere and for any type of disaster. After the recent earthquake of Gujarat, India (January 26, 2001), the Hyogo Prefecture of Japan had made a fund raising campaign from the citizen of Hyogo, and has been able to raise an amount of 1.7 million USD. Hyogo prefecture had experienced devastating earthquake in 1995, and during the disaster, many schools were used as temporary shelter for the citizens. Schools play a very important role in the Japanese scenario of the disaster management, and therefore the Hyogo prefecture has been very keen to support the concept of SESI in India, for the victims of the Gujarat Earthquake.

The overall objective of the proposed project is to conduct the comprehensive earthquake disaster mitigation training cum capacity building program for community development and long-term sustainability with special focus on the school system and the non-engineered construction procedures in Gujarat and other parts of India. The scope of work will include the following:

1. Construction of new schools
2. Retrofitting of damaged schools
3. Training, Dissemination
4. Preparation of education materials for the school children and

5. Monitor and Evaluation of the activities

In the process, 10 schools will be either newly constructed, reconstructed and/or retrofitted. An educational document will be prepared for the school children. The direct beneficiaries of the school retrofit and training program will be school children, their families, teachers, school authorities, local engineers and masons. The indirect beneficiaries are the government, non-governmental organizations and the community as a whole.

Conclusion

School Earthquake Safety Initiative uses the basic tools of disaster mitigation: self-help, cooperation and education, and is aimed to the sustainable future of the people through community involvement at an appropriate level. Retrofitting of schools, training of masons, awareness raising among different sectors, and disaster education are different elements of this initiative. It is recognized that this initiative is irrespective of region, hazard and scale of application, and therefore can be applied to wide range of disasters. It is hoped that the SESI can be global model for the successful disaster mitigation at the community level.

Session 4:

Hyogo Gujarat Friendship Fund (HGFF)

Project Summary — Hyogo Gujarat Friendship Fund (HGFF)

Project Duration: Three years (January 2002 to December 2004)

Project Partner: GSDMA, Social Welfare Department of Gujarat Government, and Hyogo Prefecture Government

Project Site: 5 cities in the earthquake affected area in Gujarat
Anjar, Bachcau, Bhuj, Mundra, Rapar

Project Goal:

To achieve safer and sustainable livelihood of the people through disaster mitigation and preparedness initiative, with specific focus on disaster education at the aftermath of the devastating earthquake of Gujarat.

Project Objectives:

1) To make new construction of schools with earthquake safe features,
2) To retrofit one or two model schools,
3) To train masons for earthquake safer construction,
4) To prepare disaster education materials for students.

Project Methodology:

The methodology is to use school as the center of the community activities in pre-disaster mitigation and preparedness initiative, and to raise awareness of different stakeholders through school retrofit programs.

Project Outputs:

The outputs include:

1) Trained, well-aware masons, students, teachers and communities,
2) Newly constructed schools and retrofitted schools,
3) Disaster education materials.

Background: January 26 Earthquake

The earthquake of January 26th, 2001 (magnitude 7.9, USGS) devastated the entire state of Gujarat causing extensive loss of life and property. The effect was particularly severe in the Kuchchh District, where more than 400 villages were affected. The number of life loss may vary from 30,000 to 50,000 while the number of affected people will be several millions. Gujarat being one of the most industrialized state of the country, a long-term economic effect of this earthquake is expected. Over 200,000 buildings have suffered severe to complete damage. This was a tragic blow to the region that was suffering from a draught conditions and the aftermath of two cyclones in last 3 years. The devastation has affected the area socially, economically and physically, and the measures adopted for its recovery should address issues along these aspects. Out of the damaged buildings, it has been found that major human loss came from the damages of the non-engineered buildings, mainly in the rural areas.

Need: To establish an earthquake resilient community

Immediately after the earthquake, the Governments of India and Gujarat had undertaken a massive relief operation in cooperation with the non-governmental organizations and international agencies. After the initial search and rescue operation, the main emphasis has been given to the shelter and reconstruction issues. Although the national and provincial government are doing their best to cope up with the present condition, the scale of devastation would require cooperation from different organizations in the recovery process. Basic facilities like health and education sectors have suffered severe damages both in the urban and rural areas.

A preliminary survey in the affected areas show that the severe damage was caused by:

1) The devastating nature of the earthquake (extreme magnitude),
2) Improper construction practices, which is often attributed to the lack of awareness and proper transfer of knowledge,
3) Lack of skilled masons, engineers and builders

Therefore, an attempt should be made to rectify these practices and raise awareness and build capacity among the local communities. Although the urgent need of the hour is to build people's houses and restore livelihood, keeping in mind the long-term sustainability of the efforts, it is important to emphasize on the basic elements, i.e., the proper awareness, education, confidence and training. Gujarat, having this severe experience of devastating earthquake, should take a leading role in the country for the disaster management and preparedness. It is very much needed to disseminate the experiences and expertise to other parts of India to avoid similar situation in future. Therefore, the need can be categorized in two ways:

- To build an earthquake resilient community in Gujarat, and

- To disseminate the Gujarat experience to the other parts of the country.

Project Concept: self-help, cooperation and education

The basic concept of the project is to establish a safer and sustainable community through self-help, cooperation and education. The idea is to transfer the culture of mitigation and preparedness using appropriate educational tool. It has been observed that school plays a very important role in the community. It provides education, teaches civics and makes future citizens. Earthquake threatened communities need earthquake-resistant schools. Students bring back a very strong message to their homes. Through the schools and its students, we can reach the parents and a wider part of the community. Therefore, schools can play a central role in the development of the community, both before and after the disaster.

To prevent a 'Next Gujarat', it is therefore needed to aware the community about the need and the possible solutions. Gujarat Earthquake provided this opportunity to use this tool during the recovery process in the state, and also to the other parts of the country. The recovery process in Gujarat, should therefore be based on:

1) Self-reliance and participation of the community,
2) Strengthening the local economy and Dissemination knowledge and
3) Promoting local ownership and leadership.

In this process, local values, cultures, and socio-economic conditions should be of utter importance. The process can be initiated by focusing the school and education sectors, which will act as the center of information and knowledge (both for earthquake resistant non-engineered construction, and also for the disaster education), and also will act as the bond among the communities. Initially, a training center will be made, which will be the center of the information gathering and dissemination for the non-engineered construction practices, specifically for the rural areas. New schools will be built, which will act as school for the children for the day-time, and act as the community training and adult education purpose in the night or on the holidays.

In the first phase (which will last for 2 years), the emphasis will be given to the reconstruction of school systems by building some model schools at selected locations. In the next phase (in the next 1 year), the experiences of Gujarat can be disseminated to a wider region in India, with special focus on the Zone 5 area, in the northern state of Uttaranchal. Since the state of Uttaranchal has been hit by several earthquakes, and both area have a significant amount of stone masonry construction, the experience of Gujarat will be specifically effective.

Objectives: build earthquake safer schools

The overall objective of the proposed project is to conduct the comprehensive earthquake disaster mitigation training cum capacity building program for community development and long-term sustainability with special focus on the school system and the non-engineered construction procedures in Gujarat and other parts of India. In the long-term recovery process, this will be the first step to prepare a disaster resilient community.

The specific objectives of the project are:

(1) Evaluate the vulnerability of some selected school buildings in Gujarat,
(2) Recommend appropriate designs and affordable means of strengthening vulnerable schools,
(3) Retrofit/ Reconstruct demonstration model school(s) using appropriate or improved traditional and local technology
(4) Set up a center for information dissemination and training with special focus on non-engineered construction practices in the rural area,
(5) Provide training to local masons who build schools and residential dwellings.
(6) Disseminate the experiences of Gujarat to a wider region in India.

Scope of Work: plan, design, implement, disseminate

The Scope of work includes the following:

1. Construction of one training cum dissemination centers in Gujarat
2. Retrofitting of schools
3. Construction of new school cum community centers
4. Training, Dissemination and
5. Monitor and Evaluation

This will be done in the following phases:

Planning Phase: This phase seems to be the most important one, since the success of the project depends much on this phase. During this phase, a detail plan will be made for the total program, and the sites for retrofit/reconstruct the schools will be chosen. The local counterparts (both government and non-government organizations) will be chosen.

Design Phase: This phase will start from the preliminary and detail survey of the selected school buildings, and appropriate designing for the construction and retrofitting. Also, educational materials will be designed during this stage targeting different age groups.

Implementation Phase: In this phase, actual implementation will be done, which will include the construction of new school, retrofit of existing school, training, and education.

A few small local workshops will be held during each phase, and the output will be presented in a larger workshop at the end of each phase. Besides, there will be a final workshop in India, followed by another one in Japan, to disseminate the project results to a wider community. For the long-term sustainability, a monitor and evaluation phase will be provided, where emphasis will be given to the information exchange and the training program. This can be done by exchange of personnel, trainer and trainee between Japan and India, more specifically between Hyogo prefecture and Gujarat state.

Schedule: time framed and objective oriented

The total project duration will be for three years, which is regarded as the standard time duration for the rehabilitation process. However, the key activities will be done in the first two years of the project. The next year will be spent for dissemination, monitor and review of the activities and impact analysis. Significant emphasis will be given on the planning phase, and identifying the local partners. The first three to six months will be allocated to the planning stage. In concurrence with the planning, establishing contacts and identifying schools, the design of retrofit will be made, after appropriate survey of the school buildings and selection of new school building sites. The actual retrofit and construction work should start after that. There will be several workshops as pointed out in the schedule. These workshops are aimed at the local level, targeting the dissemination and training of the community.

Output and Beneficiaries: community and its knowledge

The expected output can be divided in to two parts:

1. Physical Output:
   - Training centers,
   - Retrofitted Schools,
   - New School cum community learning centers
2. Social Output:
   - Educated, trained community, student and teachers
   - Educated and trained masons

By combining these two, a universal model of cooperation, self-help and community involvement will be established.

The direct beneficiaries of the school retrofit and training program will be school children, their families, teachers, school authorities, local engineers and masons. The indirect beneficiaries are the government, non-governmental organizations and the community as a whole.

Organization: partnership of government and other stakeholders

The Hyogo prefecture has made direct contact with the Gujarat government in consultation with the UNCRD Disaster Management Planning (DMP) Hyogo Office. A fund named Hyogo-Gujarat Friendship Fund is established. At the state level, a committee will be made including Professor Arya, the representative of GSDMA (Gujarat State Disaster Management Authority), state government representative, representative of the Hyogo Prefecture and UNCRD Hyogo Office. Professor Arya will be the head of this committee. They will form the policy and guideline for the project. The actual implementation will be done by the secretariat formed for this fund.

Process: Ensure Partnership and Sustainability

This is improtant to note that the funding is the collected money from the common people in Kobe and other parts of the Hyogo Prefecture. A total amount of approximately 1.5 million USD is available for the current project. During the Great Hanshin-Awaji Earthquake, the people in Hyogo have received help and cooperation from different parts of the worlld. This urged them to respons to the bigger earthquake around the world, and to help the local people and community to get back to the normal life as early as possible. This concept of brotherhood and international cooepration is the key point of this project. Therefore, this is the responsibilities of all the project partners to ensure that the money is spent in the right direction, in the right way, so that it reaches the victims and the communities, who need it the most. The Hyogo prefecture, from the urge of the local community, is determined to ensure this process. Therefore, this initial stage of communication and establishing a godo partnership is an important aspect of this project, which will ensure a long-term relationship between the communities in Gujarat and Hyogo.

Session 4:

Kobe-Kathmandu Collaboration on School Earthquake Safety

Project Summary

Kobe-Kathmandu Collaboration on School Earthquake Safety

Project Duration: Two years to start the initiative (2001-2002)

Project Partner: Maiko High School, Kobe, Bal Vikas Secondary School, Kathmandu, National Society for Earthquake Technology, Nepal.

Project Site: Kobe and Kathmandu

Project Goal:

To promote cultural exchange and disaster education among future generation.

Project Objectives:

1. To promote the disaster mitigation culture among the future generation
2. To learn from each other's experiences on the disaster mitigation and management
3. To disseminate the experiences of the Great Hanshin-Awaji Earthquake of 1995

Project Methodology:

The methodology is to use school as the center of cultural exchange and promote disaster education through the students.

Project Outputs:

The outputs include:

1) Trained, well-aware students and teacher,
2) Disaster education materials.

Background

Maiko High School, in Kobe has been doing pioneering work in introducing disaster education curriculum in the high school. Kobe, having the experience of damaging earthquake of 1995, the students still bear the memories of the event. In contrast, Kathmandu in Nepal, with high risk of earthquake, but not having any experiences in the recent past lacks the direct experience. While Maiko High School is introducing the school educational curriculum, Bal Vikas High School is trying to raise the awareness for disaster education through school retrofit programs. Therefore, it was thought to link up the two activities, so that the experiences of Kobe can benefit Kathmandu, and vice versa. Students should be the ambassador for this exchange program through cultural exchange, disaster educational curriculum exchange, and finally taking the lessons to future.

Retrofitting of School Building and Earthquake Safety Awareness in Nepal

In 1999 NSET-Nepal organized a seminar on Earthquake Risk of School Buildings in Kathmandu Valley for the school headmasters and we participated in that seminar. From the seminar we came to know about the earthquakes, vulnerability of school buildings and feasibility of retrofitting vulnerable school buildings. NSET-Nepal selected suitable school building for seismic retrofitting. The selection was basically conducted in three stages. At the first stage, we the headmasters were given a questionnaire to fill in, the schools were then screened out according to results and were selected finally after the field verification of local community commitment and participation and local resource mobilization. Very fortunately, our school was selected. The retrofitting work started in August 2000. The basic features of the retrofitting can be outlined as below:

Component of retrofitting work

- Structural Intervention for earthquake - resistant structure
- Training of Masons
- Development of Emergency Response Plan including training of teachers, parents, students and the community

Strategies taken

Prior to execution, the following strategies were set forth to run the project:

- No changes in overall building form unless that does not satisfy the seismic requirement.
- No destruction (dismantling) of building components as far as possible without compromising strengthening measures.
- Use of manual methods in construction rather than mechanization.
- Due consideration to serviceability (functional requirements) of building.

- Use of locally available construction materials.
- Use of local manpower with significant discount in labor charge.
- Regular and continuous instruction and monitoring of works from NSET-Nepal.
- Regular appraisal of resource management and works from community people.
- Technical instruction to craftsmen (local people) in form of advice with full understanding of reason behind it.
- Involvement of trained masons as instructor (one NSET-Nepal trained mason).
- Regular interaction program between engineers of NSET-Nepal and local villagers on the subject matter of earthquake phenomenon, vulnerability, consequences and mitigation techniques.
- Mason training program to upgrade local craftsmen's skill in quality construction and develop skillful working manpower in earthquake resistant construction.

At the beginning the retrofitting work was criticized by the community, but later they fully supported it. The appropriate construction method, the training provided to masons, the transparency of the whole construction process convinced the community that the works done by NSET-Nepal was beneficial to them. Through the retrofitting work, the community learnt about defects in prevailing building construction practice and corrective measures, earthquake-resistant construction and the management of local participation in projects.

Important features found in retrofitting program

1. *Awareness*

Raised awareness about earthquake hazards and preparedness of common people, school family and others through project is prime achievement of it in social sector. Being a public school, a concern of mass people as well as government, it drew attention of and was able to incorporate large part of society. Those who were touched through whatever means to this project are supposed to have more or less knowledge about earthquake.

The project itself and awareness activities under it make direct impact on school students, the future of society. To their context, it is not only source of awareness but also a molding tool to shape their life style incorporating earthquake safety measure. It is observed from their reaction to this effect that they think over difference between safe school building and their vulnerable house. School students carryout the message what they learned in school to their parents and give pressure to narrow down the difference.

2. *Employment*

In school retrofitting only local craftsmen and labor were employed. This module gave them opportunity to utilize their skill in development of own village. They were proud of being useful for society. The employment make positive economic impact in their life not only during retrofitting of school for short duration but also in long run as they now have upgraded skill equipped with earthquake technology. It certainly has widened their scope. The enhanced skill of masons of limited number may bring some misbalance in labor market as they may seek higher rate than that of previous. Also it may hinder in common people's effort to make their house earthquake resistant. On other side, firstly, the masons themselves will to be in process of earthquake safety awareness raising in order to selling their skill and secondly, other masons also would intend to acquire seismic resistant construction technique. One mason from alapot is already in Gujrat transferring the knowledge to his counterpart there.

3. *Technology Transferability*

IN Alapot Village, the house owners have been replicating the construction methods employed in school building to construct their private houses. There was no intervention from NSET-Nepal in this connection. Except some minor features, newly constructed houses adopt all basic earthquake resistant construction technology like bands, wall stitching, vertical tensile reds etc. It shows higher level of perception on what they are trained. Obviously, it can be said the process of replication would multiply in future to set a new technological culture in construction. In this aspect, the retrofitting project of school has much higher social value compared to other risk reduction programs that hardly are able to translate technology in real ground in root level.

4. *Social and academic environment*

Public meeting were attended by people of almost households of village, which gain opportunity to them to exchange their views and identify a common point. It created a public solidarity in community. Working together in retrofitting of school building, contributing labor and/or fund for new project as social responsibility consolidated social environment.

Being seismic strengthened out of 643 public schools of valley, intervened schools, get publicized. Now the school environment and activities are being watched from all around. The schools are now being upgraded after education officers visited it during retrofitting. Finished floor & wall surface, dust free environment in classroom and attractive aesthetic appearance had made school environment clean and healthy. It would increase children's willingness to be in school and promote academic environment. All these are effects of school retrofitting indirectly.

5. *Community participation and partnership development*

Community participation in this project is highest ever among government or NGO run community-based programs in Nepal. Villagers provided all bamboo required for scaffolding. All members of school management committee gave their full time in retrofitting of school during project execution. The management committee was able to handle all managerial and financial tasks of the project. This participating approach has made community people feel that the project is their own.

Activities related to the Cultural Exchange Program

1. ***Exchange of Culture Box:***
   It has been observed that the disaster mitigation and management is often a cultural issue. To promote international cooperation, it is very important to understand each other's cultural background, and then suggest the locally applicable measures. Thus, the cooperation between the students of two countries was started through exchange of CULTURE BOX. The Culture Box was made by the students of each school to introduce the basic culture to each to each other. The Culture Box has been a great success in awareness raising and interest generation among the students of each school.

2. ***Retrofitting of Schools:***
   Through the Fund-raising campaign of the Maiko High School students, some money has been collected, and sent to Nepal for retrofitting of schools. This will help NSET's school retrofit program.

Future Activities

1. ***Disaster Education Program:***
   It is proposed that the curriculum for disaster education should be exchanged between the two schools. For this purpose, during the workshop, one teacher from Kathmandu will visit Maiko High School for information exchange on disaster education.

2. ***Retrofitting of Schools:***
   The retrofitting will be continued through the involvement of the children from each school.

3. ***Exchange Program:***
   A student exchange program can be thought to continue and sustain the activities.

Panel Discussion 1:

Leadership of the Future Generation

The objective of the panel discussion was to promote the leadership of the future generation, by providing a platform of interaction among the school students. The panel was moderated by Seiji Suwa, a teacher from the Maiko High School, who was in-charge of the disaster education in the high school. Maiko High School was one of the leading schools in Kobe, which was actively involved in promoting disaster education as a school curriculum. The school was starting a new disaster education curriculum from April 2002. With the coordination of UNCRD, Maiko High School had been promoting the disaster education through cultural exchange program with Bal Vikas High School in Nepal. The panelists consisted of five high school students from the same school: Junko Nakashima, Takanori Fukushima, Tomoko Nakagawa, Maiko Kitamura, and Takayuki Tanaka. The major topics of discussion were the effectiveness of disaster education on promoting mitigation culture. The students were expected to focus on their initiatives on disaster education, and issues and concerns, for future.

The structure of the panel discussion was as follow:

Introduction by moderator:	5 minutes
Comments by panelists:	30 minutes
Discussion and questions from the floor:	5 minutes
Summary and closing (moderator):	5 minutes
Total:	45 minutes

The major topics of discussion were:

1. The experiences of the students during the Great Hanshin-Awaji Earthquake
2. What did they learn from the earthquake?
3. What do they think about the earthquake disaster mitigation?
4. What are the current disaster related initiatives in their school?
5. What are the future needs and what can they do in the taking a leadership role in promoting mitigation culture in Japan and abroad?

Mr. Suwa started with the self-introduction and pointed out that it was a great pleasure to have high school students in an international workshop. He explained the structure of the panel, and introduced the panelists to the audience. He stated that on the morning of January 17, 1995, he and his students experienced the earthquake. Mr. Fukushima was in the 3rd grade in elementary school, and all others were in the 4th grade. He wanted to hear their experiences of the earthquake.

Ms. Nakajima told that when the earthquake occurred, it was very early in the morning, so she was still in bed. She used to sleep until someone wakes her up, but on that day she got up with the shaking. Her mother rushed to her room, and told her to go underneath the table, so together with her sister, they were quietly sitting under the table. She did not remember about her father, but her mother told her that he was looking around inside the house, finding out what the damage was. Her father was also looking around outside the house trying to find out

the damages. Her mother was very impressed with the active role of her father. Thus, she realized that when unexpected things happened, children looked up and depended on their parents, and parent's preparedness influenced much the preparedness of the children. The whole family used to act as a single entity in the time of emergency.

Mr. Fukushima told that when he felt the shake, he was very surprised, since that was his first experience ever about the shaking. Earthquake did not come up to his mind, so he thought that an airplane hit his house. When he learned it was an earthquake, he had a very weird feeling, which he never experienced before. Fortunately his family members were all well, and damage was not that great. But all the lifelines were cut off, so they were in a situation where they had to line up for food and water. He remembered that he was able to see the black smoke coming up from urban Kobe City area every day, and it was approaching to their house everyday. So it was not the TV or newspapers that he had seen that black smoke coming and coming toward him, it was a real experience. Mr. Suwa explained that the black smoke came from Nagata Ward of Kobe City, where many houses were burnt down after the earthquake. Mr. Fukushima added that the electricity came back quite quickly but the water supply were cut off for a long time so he had to go out of the house to collect water from portable tanks.

Ms. Kitamura told that she would never forget the shake, she experienced at that time. It shook vertically and then horizontally, and it lasted for only a couple of minutes, but it felt longer that it was told. She remembered that her father tried to help her by holding a big shelf, which was about to come down upon her, and her father looked so cool that day. Her mother instructed to evacuate from the house, she tried hard to bring her a jacket and shoes to make sure that she would not step on any broken glass spread all over the floor. She had carried her to the entrance of the house. Her brother also helped her along, trying to hold her hand. She remembered that all her family members tried to help her a great deal. Mr. Suwa added that it showed the importance of family as a unit during the disaster, and the experience should be shared with other family members. Ms. Kitamura told that every year on January 17, when they look at earthquake memorial programs on TV, that time they talk about the earthquake with her family members, especially how energetic and bold her father was during the time of the earthquake. They also discuss how they should store emergency water in their house all the time.

Mr. Tanaka told that he used to live in the Kita Ward of Kobe City, which was not hit hard or in other words, the damage was relatively low compared to the rest of the Kobe city, but he was at the top floor of the apartment complex, so the shake was great. There were noises coming

from everywhere, the glasses were broken down, and they were all in panic. Because all the things that occurred to him were something that never happened, his family members were also very surprised. His photograph frame was broken down, which was a big treasure of him. The scary feeling stared by seeing the broken photo frame, and he cried loudly. Though he was in 3rd grade, he strongly felt the importance of the family, who were around him. He thought that he could make use of the experience, though of course the sacrifice was great. He became high school student; it had been 7 years, but not just as a student, as a person who experienced the earthquake, and as a person with experience he would like to convey the message to the people of the society. He added that there was a doll was on the photograph frame, and he remembered that his father tried to save the Kappa doll, that really impressed him. Mr. Suwa explained that he had 3 children, 12 years, 9 years, 6 years of age, and they did not remember the earthquake. He took them to Nagata Ward and trying to let them remember the earthquake, but they did not remember what happened. It pointed out that it was important to remember the event, and learn lessons from the experience.

Ms. Nakagawa told that she was ten years old when the earthquake occurred. It was early in the morning and she was sleeping, and awake with the first shaking. She tried to fall sleep again, but suddenly the window shook, and the shake was something she never experienced before. And it took a while for her to understand that this was an earthquake. Her mother, who was sleeping next to her, got up and tried to save us by being inside the bed, protecting them from all the things dropping upon them. After the shake stopped, she found that the TV the PC were fallen. They tried to go outside, and she could not believe the things she saw there. The electric poles were broken down, and the houses that were supposed to be in front of them were in a shape that was parallel to the ground. And the top of a building was in a hand's reach. They tried to evacuate themselves to a nearby school, and also took their dog with them. She was wearing pajamas, and took a jacket with her, thinking that she would come back soon, but actually the jacket and pajamas were the only things she could bring from my house, because soon after the evacuation, the fire hit her house. After spending some time at the evacuation place, they went to the house of relatives, came back to their town after spending some time at the temporary shelter in the west part of Kobe City. They are now living in the municipal apartment house. Looking at the town which was reconstructed, it was great that people have worked so hard, but at the same time she feel rather sad looking at a town which is completely different from the original, because old towns, which was so familiar with her, had been lost completely. Of course, she knew that the reconstruction and rehabilitation would never advance if they stick to

the past, and she knew that the town would be even more beautiful.

Mr. Suwa sympathized with the tragic experience of Ms. Nakagawa, and pointed out that through this tragic experience, she realized the importance of disaster preparedness. Listening to these 5 students, Ms. Nakagawa was the only one who lost her house, the other four had actually retained the house, but there were cracks, the roof came off, and nearly hurt themselves because of the broken glasses. But despite these hardships, they were fortunately blessed with no casualty of their family members. Many others lost their house, family members may have died, some may have injured, there are some degrees of mishaps of the amount of the experience people may have had. And despite these differences, these 5 panelists experienced the earthquake as a really tragic experience, but they have tried their best to accept the reality as it was. And in doing so, they came to value the importance of the family members, and they began to find out that the father was really a dependable person. And these were the learning experience. After they joined Maiko High School, they came to understand the course of environmental disaster analysis. They did not join the Maiko High School because of that course, but they just coincidently found out that the course was available at Maiko High School. He asked Mr. Tanaka to illustrate the points, he learned in the course.

Mr. Tanaka informed that the course of environmental disaster analysis would be made available, starting April 2002, and for the past two years Maiko High School had been prepared, and this course was actually done as research studies in the first two years, and they spend about two days per week learning this. It was a comprehensive work, the teacher explained about the theme and after that they were pretty much on their own to use about 40 PCs and through these computers we were able to get the information they wanted. They also went to the library. One group was composed of 5 or 6 students, and they brought in their pre-investigations, followed by discussions, and each group was to make a presentation, and they carried out their respective evaluation among the students. They also made several bulletin board, following several major earthquakes, like Turkey, Taiwan, Tottori. By making a comparative study, they were able to enlighten the perspective from Kobe to Japan, and then from Japan to the rest of the world. Other than that, during the summer and the winter break, they made a report and they actually experienced a debate, a discussion in addition to the presentations. In this year, the freshmen were studying town building as a major theme, and then this past summer vacation, they actually participated in the fire drill of the Kobe City, they acted as passengers who were locked up in the subway trains. In the classroom, there were plenty of for the routine

drill, and evacuation. Also on January 19 of 2002, there was an event not to forget Hanshin Awaji Earthquake. Former Governor of Hyogo Prefecture Mr. Kaihara came and he made a commemorative lecture and there were 23 different workshops. They were able to listen to different people in different disciplines; volunteers, lifeline, police, the administration people, the handicapped, and then medical professionals. They gained a lot of understanding about the nature of the disasters, and at the same time they were able to formulate self-thinking capabilities. This was something that was not given by computer or mathematics, no definite answer was set, but they were able to achieve something, and they would be able to make a contribution, hopefully, when they got graduated from the high school.

Mr. Fukushima informed that in the first year, they investigated on the disasters including Hanshin Awaji Earthquake, three people consisting each group. Each group decided on the theme to work on, and they investigated and then made a presentation. They used the internet for the presentation, they had many discussions, made presentation in the cultural festival, and displayed the results of the discussion. In the second semester, they shifted the theme to what they could do for their town to make the towns more disaster resilient. The methods they used were close to what they used in the first semester, using the internet, and group discussions. During the second semester, they used the PC for presentation. Many groups in the class were connected to other schools by attending a conference. There was a large conference called Disaster Prevention in Kobe by the City of Kobe, and they also made a presentation on town planning. They learned architecture and construction business and the importance of inner aspects or themselves, of what is called soft aspects including care of heart and mind.

Mr. Suwa pointed out that the talk of Mr. Fukushima explained the importance of both hard and soft aspects of disaster management. PTSD seemed to rise in the minds of the general public, after this earthquake, and the very first year of the volunteer activities was started in 1995.

Ms. Nakagawa told that the bulletin of the wall was made by the first grade people. Mr. Tanaka talked about the comparative study on four earthquakes. They investigated the number of casualties, and number of the damaged houses of these four events. They became to understand that natural disaster was really dreadful but four of these natural disasters alone led to the loss of tens of thousands of people's lives, and earthquakes happened here and there in the different parts of the world, it really had taken away hundreds and thousands of people's lives. She told that people could not prevent the disaster itself from happening, but people can certainly do better in terms of mitigation. She emphasized the need to think and

implement the countermeasures so that the damages can be minimized. For that purpose people across the national boundaries have to work together. This experience had taught them about the importance of thinking about the disaster mitigation, on the global scale.

Mr. Suwa praised the panelists for sharing their direct experiences of the earthquake as well as the work they did for the disaster education. Two major points came out of the discussion: the importance of the soft aspects of disaster mitigation, and need for global cooperation on learning process from the earthquake. He thought that the presentation were instrumental in trying to explain to the audience what they had been doing, and this activity had led to for formal, very first of its kind in Japan, the establishment of environment and disaster analysis course in the high school. He also announced that one of the panelists, Ms. Nakashima would like to be an expert, a specialist, of disaster prevention.

Ms. Nakajima reaffirmed the comments of Mr. Suwa that she would like to continue this line of specialty in the university as well. Actually at the very first of the first grade, she was privileged to make a presentation on behalf of their schoolmates. At the HAT building, during the memorial ceremony of the disaster, on the January 17 of 2001, she had an opportunity to explain what she did and what they were doing in the school, to the visitors as well as to the imperial families. During the international conference last year conducted by UNCRD Hyogo Office, she came to know Dr. Rajib Shaw, and it was her first experience to meet someone who was in line with this kind of activities. She also enjoyed being busy with all these activities, and with the exchange program with their Nepal counterparts. She was privileged with the meeting with Dr. Shaw a couple of times, and she became to think that she would like to take this as a profession. She pointed pout that people often talk about disasters not fading away with time, but this was something that she would like to convey with her own words. She would like to improve her knowledge, and she would like to study a lot more at the university. Through her experiences of exchanging their thoughts with the Nepalese friends, she would like to be an international minded person.

This was followed by a question answer session. Major point of discussion was how to disseminate the information and experiences to a wider community. Everybody recognized that it needed a long-term initiative, so that people got aware about the problem and the solution. Education has its own value to influence people. So, disaster education is a medium to raise awareness. This was followed by a final message from the students towards a safer world in the 21st century.

Ms. Kitamura told that they experienced the earthquake and received the education of disaster mitigation. They would like to send out this message that the experience should never be forgotten. They would like to let people know about the experience as much as possible. It was not just an experience of a dreadfulness or fearfulness, but it was a lesson learned from

that. They learned that it was needed to have emergency food, stabilize the furniture inside the house, different sorts of counter measure should be done, and protect one's own family members. It was needed to help each other in the family. Once family members were all well, and people could help others. All these helping hands were everywhere in their experience, and that kind of experience should be shared. People did never know when they would be hit by a natural disaster, and therefore, people should be prepared in advance. People should not be depending only on the experts regarding the preparedness issues. It was needed to prepare oneself by sharing people's own experiences. And as a person who actually experienced the earthquake, it was important to spread the lessons from Kobe to Japan, from Japan to the world, and from our generation to the next generation. She concluded her remarks by saying that the students of Maiko High School would be very happy to see the flow of information and sharing of the information.

Panel Discussion 2:

Scheme of Cooperation for Disaster Reduction

- Photo Credit: Disaster Reduction and Human Renovation Institution -

The objective of the panel discussion was to focus on the effective scheme of cooperation for disaster reduction, with specific focus on the Japanese experiences. It was observed in the recent days that the successful ways of disaster reduction was attributed to effective cooperation among different stakeholders: government, non-government, academics and international organizations. Exemplifying the experiences of the Great Hanshin-Awaji Earthquake of 1995 (and any other relevant earthquake experiences), the panelists were expected to show the best practices of cooperation with reference to the disaster cycle, and thereby recommending a scheme of cooperation.

The panel was moderated by Mr. Nakagawa of Jiji Press, who belonging to the media, had a direct opportunity to cooperate with different stakeholders at different disaster situation. He was also deeply involved in post-disaster rehabilitation activities, following the Great Hanshin-Awaji Earthquake. Among the panelist, there were representatives of Hyogo prefecture, the director general of the Disaster management department Mr. Nakase, senior advisor and former executive director of the Asian Disaster Reduction Center (ADRC), and senior advisor to the Japan International Cooperation Agency (JICA) Mr. Watanabe, and the former director of building disaster prevention office in the Ministry of Land, Infrastructure and Transport (MLIT), and the present coordinator of UNCRD Hyogo Office Mr. Okazaki. Altogether, there will be five panelists.

The structure of the panel discussion was:

Introduction by moderator, and objective of the panel: 10 minutes
Comments by panelists: 50 minutes (4 panelist)
Discussion among panelists and questions from the floor: 20 minutes
Summary and closing (moderator): 10 minutes
Total: 90 minutes

The major topics of discussion were:

1. What was the perspective of cooperation?
2. What were the essential elements of cooperation?
3. How the cooperation could be effective before, during and after disaster?
4. Describe individual experiences of the success stories with respect to the Hanshin-Awaji Earthquake and/or other major earthquake in Japan or abroad.
5. In the scheme of cooperation, how their organization could contribute?

Mr. Nakagawa started with his introductory comments that before the Great Awaji Hanshin Earthquake seven years ago, the reduction of the disaster damages were considered to the responsibilities of the specialists and government sectors. However because of the devastating earthquake seven years ago, the need of multi-sector cooperation was badly felt, and it was thought indispensable that the people and community play an important role in the disaster reduction activities, both before, during and after the event. After the earthquake, several new organizations have been established in Kobe, the UNCRD Hyogo office, ADRC, EDM, JICA Hyogo Center, Hyogo Memorial Center etc. And also triggered by the disaster, citizen's group activities were facilitated and now they are active as NGOs and NPOs. It is not only important for each organization to achieve their goal and objectives under the prescribed mandate, but also to have some organic cooperative and supportive system among each other. To make the link, it is needed to know the strength and weakness of each other, so that a coordinated activity can be initiated.

He also introduced a mailing list and the activities report which was initiated by UNCRD after the earthquake in Turkey in 1999. This is one of the very important model case that demonstrate the cooperation among the specialist agencies, academic agencies, citizens, and NGOs. Through this mailing list, there was an opportunity to exchange information regarding the earthquake, and during first three months, as many as 800,000 letters were exchanged with volumes of information. This can be regarded as one of the models to share the information and communication.

Following the moderator, Mr. Okazaki presented his views on cooperation. He had prior experiences in working in different set-up from central to provincial and city governments in Japan, and in different international organizations outside Japan. First, he provided a general overview of disaster prevention scenes in Japan. There are different types of disasters in Japan, from earthquake, volcano, tsunami, flood, typhoon etc. Although Japan was regarded as one of the pioneering countries in earthquake engineering research, more than 6,000 people were killed in the Great Hanshin Awaji Earthquake of 1995, and more than 80% of the casualty was caused due to building collapse. Thus, building collapse is one of major cause of casualty, and it can be only prevented if there is cooperation among different stakeholders. Statistics show that a total of $20 billion US dollars were actually spent for debris removal and new construction after the disaster, which comes to 200,000 US$ per house, which is the cost of new buildings. Cost of retrofitting should be less than 10% of this cost. MLIT used to provide subsidy to retrofit the

buildings, but right decision and its implementation has to be taken by the local government and the communities.

Japanese government tried to disseminate its experience and expertise in the related field to outside world through the development projects and expert dispatch programs of JICA, which were conducted in Peru, Mexico, Turkey, Kazakhstan, Rumania, Iran, Colombia, Nepal and Philippines, among many other countries. JICA also extends assistance after the disaster: the overseas emergency rescue teams, reconnaissance survey teams, supply temporary houses, and also supports disaster damaged assessment of buildings. The problem of this type of international cooperation is that it is very much orientated toward the government approach, and the bureaucratic sectionalism in some politicians leading such a overseas effort had been somewhat problematic. While there are lots of efforts on the post disaster programs, not much effort was seen for prevention. Also, experts sent from Japan have little knowledge of the reality of the developing countries. The RADIUS project of the UN IDNDR was very effective in the field of international cooperation. This was the first time that the UN was working directly with the local governments, involving scientists, life line agencies, and communities, on a multi-disciplinary basis.

Once again, it was emphasized that the post disaster emergency response was very critical but it was not possible to recover the lives, which were already lost. Thus, there should be more emphasis on the prevention issues. He emphasized the importance from a laboratory to field, to understand the real scenario, and give affordable solutions

Mr. Ogawa of ADRC started with the note that the 1990s was regarded as the decade for the disaster mitigation by United Nations., followed by ISDR in 2000 onward. However, in the Asian region, there needed to be done more, a continuous effort to make the disaster reduction initiative sustainable. For that, ADRC was established in 1998 with the involvement of 23 member states. The goal was to initiate the cooperation among national, regional and local levels. There are different kinds of cooperation, bilateral, through governments to governments, multi-lateral, through UN and international organizations, and through NGOs at the community level.

ADRC opt to provide information database on different countries in a systematic way, through its homepage. ADRC also receive visiting researchers every year to give them trainings on the Japanese experiences. Besides, in cooperation with JICA, there is a regular training program to develop human resources in the field of disaster management. Technical development is another aspect of cooperation, where information is again a key factor. Cooperation with other similar organizations like ADPC, SOPAC, EMA was another important aspect for exchange of information and experiences. Cooperation of NGOs is another point to be emphasized, and he informed that ADRC was organizing a three-day international NGO conference to enhance understand the role of NGOs in disaster, with special focus on response and recovery. To

promote effective cooperation, it is needed to establish trustful relationships among different organizations and how to nurture those trustful relations.

Mr. Watanabe of JICA started with the understanding of reality of developing countries. Citing the examples of Nepal for 1993 flood, he pointed out the need to consider the importance of development with education, poverty and job opportunities. He strongly emphasized that in case of developing countries, it is a common phenomenon that people were waiting for death, i.e., they lived in dangerous places, and these people should be termed as refugee. The key point here is the education and awareness, and the root causes for risk and vulnerability should be emphasized. People cut trees, which lead to soil erosion, and make a negative impact on the ecological balance, causing large flood and water- induced disasters.

Poverty, and socio- political discrimination made people to live in the high-hazard places, risking their lives. Usually, in the developing countries, a few number of the people are occupying 80 percent of the rich and affluent field. Therefore, the poor people had to go into the dangerous areas, prone to flood, earthquake, landslide, to find a place to live. The value of people's life is gradually becoming less. Although in Japan, there is a count of the number of death due to disasters, in developing countries, in most of the time, the number is an approximation. Disaster, in an ideal way should be considered as a cyclic event, however it is never occurred in such a way in the developing country. Social unrest, political instability are some of the unpredictable issues which causes damages to life and property more, leading to a unstable society. Civilization and culture are often destroyed in this regard. Citing the example of the Hyogo prefecture, he stressed that the work of the prefecture in the context of cooperation was very effective, and it very successfully managed the disaster cycle. This experience should be very useful for other parts of the world.

Mr. Nakase started with the international evaluation committee, headed by Professor Nino, which was aimed at finding the success and failure of the reconstruction work after the earthquake. Twenty different themes were chosen, and thirty-the 10th year of the earthquake, the prefecture plans to host an international forum on this event. Although it is easy to talk about own success but the more important features are the failures, and to learn from the failure. The sharing of experiences is an essential feature of cooperation, and it has been done in different recent earthquakes in Japan, the recent one being the Tottori earthquake of 2000. Also, the experiences of the Kobe

earthquake was helpful to provide relief operation after the Tottori earthquake.
Secondly, it is needed to be noted that there are many people with different background, different cultural, social, political differences. So, the important thing is to understand the needs based upon the local conditions or situations. In this regard, after every major overseas earthquake, Hyogo prefecture collected donations from the people in the prefecture. For Gujarat earthquake of India, this donation was utilized to run the School Project, formulated by the UNCRD Hyogo office. This is a great benefit to have different international organizations and networks in our prefecture. These organizations and networks are effective means to foster cooperation.
Hyogo prefecture also introduced disaster issues in the school curriculum, in the Maiko High School. Education is seen as the major part of cooperation, and it is believed that thought he culture box exchange program, cooperation could be strengthened. As everybody mentioned, human resource development is another aspect, which needs significant attention. In April, 2002, a new center will be created, to enhance the human resource development.

Mr. Murai of the NGOs Kobe was a scheduled member of this panel, but could not attend due to some unfortunate and unexpected incidence. Mr. Nakagawa conveyed his remarks on his behalf. There are many volunteers working after the Awaji Hanshin Earthquake and here in the Kobe area. After major disasters several overseas disaster assistance programs were conducted by the NGO network of Kobe, including the Gujarat earthquake of 2001. To increase the effectiveness of the efforts, and to promote enhanced cooperation, a citizen group has been formed, called Citizen for Overseas Disaster Emergency (CODE). The purpose is to prepare a framework and guideline to make a comprehensive effort towards the post-disaster activities outside Japan. The participants include a wide range of people from professionals, academics, NGOS, international organizations. This demonstrates a unique example of cooperation among different groups of people.
With these words, Mr. Nakagawa stated that most of the earlier presentations have touched upon the framework of cooperation, however there are two important aspects remaining: one is the level of awareness and preparedness in the part of the citizen, and the other is the need to realize the role of the community and community based organizations for actual implementation of disaster countermeasures. The collaborations between these smaller sized organizations should be emphasized more, from the framework of internal collaboration to the external world.

Mr. Okazaki, in his final comments, stated that the technology is there, but it is required to bring the technology into practice, and there lies the responsibilities of the experts. The journalists can also play a very important role in this regard to understand the local reality. With regards to the perspective to the UN organization, working with national governments is a traditional approach, but most recently, grass root initiatives are becoming more important, it is realized all over the world.

Mr. Ogawa pointed out the language problem as one of the major barrier of international cooperation. English is spoken as the common language, but many countries face problem in this regard. This should be considered seriously. Legal system is something that tries to

handle some things happening at local levels. Therefore, in the local level where people are in small communities, small societies, that society have to be converted into a safe area. The efforts should start from small-scale initiative.

Mr. Watanabe, in his last comment showed some photographs of Tokyo after the World War II in 1945, when there was no concept of disaster prevention. The need at that time was food, which is the situation in most of the developing countries now. Then, following the economic development, various information systems for the sake of disaster prevention was enhanced. Disaster prevention culture cannot be established over a night. When people have a rich education and health, and safe and stable society, stable economic development, other issues for the safety can be achieved. Thus, the key word for disaster prevention is the economic development.

Mr. Nakase shared his experiences of India in September, 2001, and pointed out the need to think at the local context. In India, NGO or local governments have their own activities and initiatives. He emphasized that Japan could learn a lot from India, and it is necessary to create that relationship. In Hyogo, there are tremendous amount of information through the accumulation of different organizations, and it is required to share these information through training programs. Especially for the students of Maiko High school, he hoped that there would be more opportunities for them to be connected to the people of the world. Younger generation should be the leaders for the cooperation.

Mr. Nakagawa closed the session with the comment that he felt that a common language existed among all different organizations, and it was the time to start communication using the common language. Everyone should try not to be self-centered, and should be connected to other people in order to make the world a better place to live.

Panel Discussion 3:

Future Perspective of UNCRD DMP Hyogo Office

The objective of the panel discussion was to suggest recommendations for future operations of the Hyogo Office. As stated earlier, the international workshop was aimed to evaluate the projects and activities of the UNCRD Hyogo Office in last three years. For the evaluation, there was an evaluation panel, consist of five eminent personalities in the related field. The members of the panel discussion 3 were the members of the evaluation panel. The panelists were expected to provide an independent evaluation of the activities of the Hyogo Office. Their role was to read the DMPHO publications carefully, listen to the presentations from the UNCRD staff members, to provide constructive criticism to improve on-going projects, and to suggest future directions based on their observations, experiences, and expertise.

The panel was moderated by Thomas Tobin, an eminent professional in the field of disaster management, and the advisor of the FEMA (Federal Emergency Management Agency) of the USA. The panelists consisted of eminent professionals from Japan and abroad. Professor Nino was the former President of Kobe University, and was involved in the disaster mitigation initiatives for several years, and served many important positions in both academics and government committees. Dr. Katayama is currently serving as the President of the National Center for Earth Sciences and Disaster Prevention (NIED), and is deeply involved in many international initiatives like WSSI (World Seismic Safety Initiative). Dr. Davis is an emeritus professor of the Cranfield University of UK, the winner of the United Nations Sasakawa Award for his contribution in the disaster reduction, and is a community development specialist. Mr. Briceno is the director of ISDR (International Strategy for Disaster reduction), and has extensive experiences in the field of international cooperation.

The structure of the panel discussion was as follow:

Introduction by moderator:	05 minutes
Comments by panelists on the achievements of the Hyogo Office (including moderator):	40 minutes
Discussion among panelists:	20 minutes
Comments by panelists on the future direction of the Hyogo Office (including moderator):	30 minutes
Questions from the floor:	15 minutes
Summary and closing (moderator):	15 minutes
Total:	120 minutes

The major topics of discussion was:

1. How the goal and objectives of the project meet the overall objective of the Hyogo Office?
2. What was the overall evaluate the achievements of the projects?

3. What shortcomings were noted, and how the projects would have been more useful to achieve the target?
4. Based on the current achievements, what should be the future direction and focus areas of the Hyogo Office under the framework of UNCRD mandate?

Mr. Tobin started with the direction and structure of the panel discussion. He added that it is difficult to evaluate the work of three years in two hours, but the panelists having lots of experiences in the related field will be able to through light on the current initiative and future directions.

Dr. Davis stated that the most impressive project were the rehabilitation in Gujarat and school project. The reasons are rather simple: there are a number of key elements in each projects: the projects are need-based, both adopt the broad development principles, and both are process oriented. Instead of providing just infrastructures, the projects focus on the building capacities within the communities. The projects bring together different stakeholders, NGOs, technical experts, UN, national governments, local governments and so on. This defines a kind of a synergy and power when people meet up and start working together, and learning how other people think and feel. They both involve international cooperation, in the case of the Gujarat, the international exchange program in bringing some Nepali masons across the boarder to help teach local masons is excellent. In the school project, a grass-root collaboration is visualized in five cities. They are both balanced between technical and social projects, and they are both community based. To focus on the vernacular buildings is an important aspect, which has been neglected for many years. In this respect, both these projects are very distinctive. However, some of the other projects are too technical, and should not be regarded as the UNCRD's projects. They are more like technical research projects, which is done by the university. UNCRD, as a United Nations body has other mandates, and should not focus on academic research.

Mr. Briceno, following Dr. Davis's comments, started with the cooperation between the ISDR and UNCRD. Both the offices shared same concern and common objectives. The main goal of the UNCRD Hyogo Office was to promote sustainable regional development, through improving the capacity of communities, to develop and implementing plans, and by strengthening public awareness in natural hazards, and the mission of ISDR, was to contribute to building disaster resilient societies

and communities by promoting increased awareness of the importance of disaster reduction. Therefore, there is a clear, common mission. A strong partnership has been built throughout the years during the International Decade for Natural Disaster Reduction (IDNDR), through the RADIUS initiative. UNCRD contributed financially to the project with specific focus on the training components, and UNCRD also undertook evaluation of the Asian cities. The GESI project was built on the network of the RADIUS work. The project focused on assessing community earthquake safety, estimating the risk of life loss from earthquake in cities around the world. Some of the RADIUS cities, actively participated in the project. The ISDR participated in the mid-term review workshops in Kobe and in Quito. More recently, the Hyogo Office and ADRC initiated a project to develop databases and GIS maps. This is leading to one of the recommendations that there is a great complimentarily among the various projects that the UNCRD Hyogo Office has been undertaking. And the ISDR Secretariat would be happy to contribute to disseminating the information on these activities as well. The Hyogo Office work on Kathmandu, Gujarat and School Project are extremely complimentary and it is believed there could be much greater impact to have even a multiplying effect if they could all be integrated into a wider project on sustainable development perspective. Recently, there is a plan to make a joint proposal for the other hazards, including the water related disasters. In this regard, the experiences of the Hyogo Office will be very useful.

Dr. Katayama gave a grade for the projects: Grade A for Gujarat PNY project; B for GESI and SESI, and C for rest of the projects. The PNY project was very straight forward, and got good and convincing results. The project is one the best forms of cooperation among UNCRD and other organizations. For GESI, the general goals and objectives were acceptable, and UNCRD should be a simple catalyst in this project to use the name of UN to ask national government for official participation. For SESI, although the goal and objectives are well defined, but as a proposal to the United Nations Headquarters, they are little bit weak. It gives an impression that some of the sub-projects belong to other projects, and this makes the decision of funding agencies very difficult.

Dr. Niino started with the disasters in Japan and the background of the Great Hanshin-Awaji earthquake. He pointed out that the establishment of UNCRD in 1971 and formation of Hyogo office in 1999 were very bold and right step toward development practice. The Hyogo office had tried to promote various research activities to find out what would be the best way to create towns and cities, which can be sustainable against various types of disasters. Thus, the projects are well within the objectives.

Mr. Tobin told that the roots of the organization in the idea of community development, was an unusual arrangement. It was very powerful and very important to take advantage of this very distinct goal and objective. There are lots of works on mitigation, done throughout the world. These are lead by the people who understand the emergency management, but yet the solutions in terms of mitigations and reducing the risk over the long-term rest in the hands of land use planners and engineers, people who are making decisions for the expansion of cities or how they deal with human issues. In this perspective, the work of Hyogo office is very convincing. Working at the community level, with helping people making their decisions about their future, training them on how to build buildings that will resist earthquakes, not for great expense, but is done in a very practical way. That is a sustainable approach, and can be replicated throughout other parts of the world. The GESI project has been carried out very much at the community level, with leaders, in terms of what were the risks, that threaten the community, causing interaction where people have to make their own observations or their own decisions, coming to their own judgments on what the risks are in their own community. This leads to ownership of a problem and ownership of a responsibility for taking on the solution. This is a very powerful way. The process of GESI and the process in Gujarat working at the grass roots level, bringing some ownership and responsibility for long-term sustainability in these issues, are very insightful contribution, which can be replicated over time.

Dr. Davis in his second set of comments, point out the problem of the name of the organization, and stated that a more easy to remember name would be useful for the people to understand about the organization. There are many key words and themes, the office could use for its name, and to make a clear vision: e.g., non-engineered construction, schools, community safety and sustainability. He also pointed out that every future project of the office should incorporate an evaluation, which is a common practice in the international organizations and the non-government organizations. This will be useful to learn from the past experiences.

Mr. Briceno stated that he believed that the Hyogo Office of UNCRD needed to be further developed, and strengthened and the work accomplished so far has been, in his view, was very valuable. The office has a very strong and motivated team that needs to be supported, and whose skills and capacities point in the direction of technical cooperation for capacity building. The mission of the office was more than ever relevant, but it needs more explanation. There should be a distinction between the mission and vision. There are definitely areas of improvements, where a more comprehensive set of objectives should be set in the context of sustainable development. The office should have closer network more actively with the relevant UN and other international government and non-governmental organizations working in the area. That networking is an essential component of technical cooperation for it to have a greater impact, and here UNCRD can do a lot. IT is needed to start a good cooperation with the neighboring organizations like ADRC, to make joint planning of activities, sharing

resources, undertaking joint projects. Regarding the name of the organization, he thought that the people should remember organizations name through the good work done, and therefore, UNCRD should not bother much on the name, but do good work.

Dr. Katayama told that there is a need to make a distinction of UNCRD, and to establish the uniqueness of the organization. There are many similar organizations in Kobe, and therefore, it is needed to have a clear goal, mission and objective. The Hyogo Office should have its original approach, and should start a flagship project, where the organization can takes its pride. There should be a strong tem work among the staff members. The office being small, only a good team-work can make good results. The office should not focus on the research projects, and should be more implementation oriented. The Office should focus more down to earth implementation orientated initiatives and projects.

Dr. Niino also stressed the need to appeal more about the work of the office in the people of Hyogo and Kobe, and to have more visibility. He mentioned that these types of symposium, conferences are very much useful to promote the results and achievements of the office. Mass media can play a very important role in this regard. The Kobe earthquake had a severe socio-economic impact, and thus people in the region are very much aware of the problem. The rehabilitation process was well documented in different publications. It is better to utilize this experience to disseminate it to other parts of the world.

Mr. Tobin pointed his idea about the 'motivation', an issue which has been discussed in several times during last two days. People are motivated when they hear a message more than once, if they hear from more than one person, if they hear from institutions that have come to respect and regard highly, if the messages are consistent, and if they have time to think and digest the information they have received. Many projects addresses this part of motivation, and this is very important. The Center should invite outside researchers who come from the social sciences and psychology and cultural anthropology to help the center better understand the problem, process and the issues of motivation. There were a few inconsistencies among the opinion of the panel members, and he asked if someone wanted to make some cross questions.

Dr. Katayama pointed out that there should be a distinct difference between a report and a proposal, sometimes it was rather confusing. He also stressed that the team work was lacking in the office, which is related to motivation. It should be more implementation oriented, rather than research work. There should be more attractive proposals, which should get funded from the UN or other organizations.

Dr. Davis stressed on the need of changing people's attitude. Citing the examples from Dr. Arya, he said that while one house needs 300 US$ for retrofit, the Gujarat government had to spend a direct cost of 2,000 US$ per house, where six houses could have been retrofitted. Thus, disaster mitigation and prevention issues should get higher priorities. For the GESI project, he thought that it was needed to focus on the different types of vulnerabilities, starting from physical, social, cultural, economic etc. He also touched on the political commitment as

one of the key issue of sustainability of efforts.

Mr. Briceno once again stated his commitment and support for the collaboration between ISDR and UNCRD. He stated that there are several organizations working on the vulnerability studies. A networking is necessary not to duplicate the effort. Training and partnership in this term are very important issues. There is always a trade off that one has to make using time, either one goes in depth into a subject, or uses the time to connect to those that are doing it, and then multiply the work.

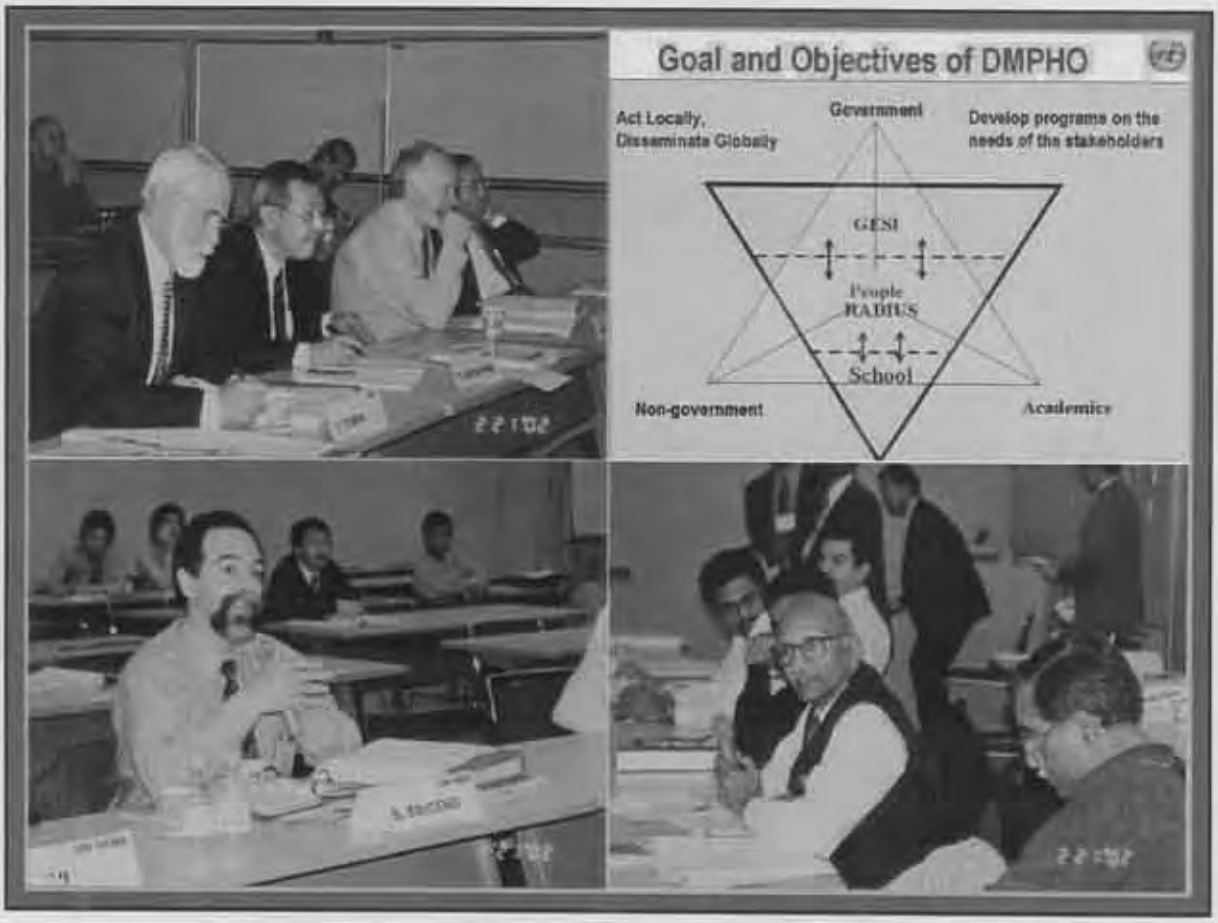
Mr. Tobin pointed out the possibility of funding sources. Mr. Briceno told that the problem is huge, and one organization can not solve it in isolation. There is no fear of duplication. Hundreds of UNCRD and ISDR will be needed to solve the problem. For that, funding should not be a problem. A good project is always funded. Mr. Davis suggested the possibility of partnership with the private organizations, for funding. The other choice was the development banks, who needs good ideas and projects. It is stated that the UNCRD had capabilities for making good projects, which would be attractive for the banks to fund. JICA was another possibility, and strong partnership was strongly advocated. Mr. Briceno also pointed out the possibility of involving IFAD (International Fund for Agricultural Development) for the rural development and disaster reduction project.

Dr. Niino in his comment pointed out that there should be a large-scale initiative for disaster reduction with the determination like that of USA, which was working strongly to eradicate terrorism after the September 11 incidence of 2001.

This was followed by a short question answer session with the audience.

An Evaluation:

Three Years of Operation of Hyogo Office



Purpose of the Evaluation[1]

This report presents the findings from an independent evaluation of projects carried out by the United Nations Centre for Regional Development, Disaster Management Planning Hyogo Office between 1999 through the end of 2001. The report offers observations on achieving the objectives of UNCRD, and offers constructive suggestions to improve the effectiveness of on going and future activities.

Methodology

The evaluation methodology is straightforward. Project materials were provided to panel members before the workshop. Panel members listened to workshop presentations by the Hyogo Office staff, their partners and other panelists. The Future Perspectives Panel met over lunch twice and engaged in on going discussions of observations. Many of the observations and recommendations in this report emanate from these discussions.

Observations

Several observations were gleaned from presentations, written material and discussions. Hyogo Office should be commended for thinking about its overall objectives as an office, as part of its overarching programs and with each project. Few organizations have the discipline exhibited as every project participant spoke in terms of objectives. Every project had merits and in one way or another will contribute to reducing earthquake risk in the affected countries. Hyogo Office's frugal approach seems to attract participants motivated by the desire to improve the human condition, and stimulate ingenuity in approaches. The results from each of the projects appear to exceed the meager financial resources provided. Project personnel are skilled, dedicated workers. The following review of project presentations is cursory, but intended to highlight important observations. These observations are summarized at the end of this section as weaknesses, opportunities, threats and strengths (WOTS).

Global Earthquake Safety Initiative (GESI)

GESI is intended to motivate risk reduction actions by comparing estimates of risk expressed in lethality for cities, and by explaining the source of lethality. Hyogo Office use of partners and transfer of ownership to communities who engage in GESI data collection is an excellent strategy. The effort initiated discussions between government officials, academics and NGOs. There is tremendous educational value in understanding the source of risk and risk reduction measures.

Although GESI is intended to motivate comparing earthquake risk to life, the index alone may influence decision makers. However, the process of consulting with community representatives and holding workshops where people meet and confer, results in training regarding the hazard, vulnerability, consequences of events and risk management measures. Once the index is calculated, and the Hyogo Office team leaves, remaining is a cadre of people with an understanding of risk and a new found interest in the issue. Much of the responsibility for risk reducing decisions rests with these partners. Whether their level of interest will wane or grow is unknown. The short-term completion of these activities does not assure long term success in achieving a culture of mitigation or sustaining interest. Hyogo Office most likely

[1] This report is an edited version of the Evaluation Report prepared by Thomas Tobin.

cannot provide the ongoing spark in many communities especially if it engages in widespread application of GESI determinations. Regardless, a formal, ongoing mechanism is needed to keep the interest in risk reduction alive, and push for policy changes that address risk and create a mitigation culture.

There needs to be a continuing effort to refine both the GESI and the RADIUS methodologies. Of particular concern is the degree to which emergency response capability, search and rescue decrease lethality. The effort spent to manage earthquake risk though medical care, emergency response and search and rescue might best be expressed by a separate index. A major issue surfaced regarding whether to emphasize on urban, rural or urban and rural areas. UNDRC cannot do everything for everyone.

Patan Navijian Yojna or Patan New-life Project (PNY)

UNCRD Hyogo Office is working with several Indian and Japanese organizations on the rehabilitation of areas of Gujarat Pradesh devastated by the Buhj earthquake of January 26, 2001. An Indian NGO, SEEDS, is implementing the project in the field. The project intends do develop a model with safer living quarters, and inhabitants trained to engage in sustainable livelihoods and educated about earthquake safety measures. Reconstructed villages provide a healthy environment and support for those in need. The strategy addresses the lack of knowledge of earthquakes, lack of masons and engineers skilled in earthquake-resistant construction, skepticism regarding the value and reliability of seismic resistant construction and the lack of a strategically planned approach to rehabilitation. The results are improved conditions for the communities where the model is developed, and an approach and techniques that can be applied elsewhere. Policy makers from the central government and international organizations are included as well. A shake table test that compares scale models of typical houses built with and without earthquake resisting devices is used to dramatically demonstrate the value of the technology recommended.

The project is impressive. The approach involves people, gives ownership of the problem and solutions to the community, builds confidence in the technology, uses traditional designs and materials, and trains people to engage in a wider dissemination effort. The project illustrates well the UNCRD strengths and the effectiveness of its strategies to work in partnership with communities, NGO and others. Training of brick masons will be sustained as mason trains apprentice and other villages learn of the project. The use of Nepali masons as trainers will benefit construction practices in Nepal as well when masons return home with even greater understanding of their craft and the reasons for the practices they espouse. Continuing training for masons from all seismically active areas of India and Nepal is appropriate. The project serves as an excellent example of Hyogo Office collaboration with other organizations, developing a comprehensive strategy to achieve sustainable results.

Nepal Kathmandu Project

The presentation and paper on Building a Disaster Resistant Community: A Case for Lalitpur Submetropolitan City, Nepal was interesting and potentially useful for addressing the earthquake risk of one of the worlds most charming and vulnerable cities. The analysis of

earthquake risk, the development processes that led—and continues to lead—to severe vulnerability, and description of existing policies and programs sets the stage for a an implementation phase which is implied by the project objective, but not well developed. However, the brevity of conclusions and recommendations for reducing vulnerability suggest that other members of the Hyogo Office staff did not advise the investigator effectively. Broader staff involvement among those with expertise in community-based solutions could design an implementation project consistent with Hyogo Office's objectives and strategies. This project raises a question regarding the extent of interaction—teamwork—among the staff on projects, and how initial investigations like this lead to implementation projects. DMPHO intentions regarding the use of this information is unclear. Is it the basis for a future community-based project? If not, it is unclear how it advances Hyogo Office's objectives.

Active Fault Project Uzbekistan

The project addresses a legitimate need to identify active faults and prepare database of historic fault activity. The intention is to implement this project in several Asian countries. The Uzbekistan project takes advantage of partnerships with ARDC and the Academy of Sciences of Uzbekistan. The project does not seem to build from the Hyogo Office strength of community-based regional development and capacity building.

The main objective of this project is to transfer technology for mapping active faults and preparing databases of historical earthquake activity to regions of Asia where they do not yet exist. Indigenous geologists and planners are trained in fault mapping and GIS technology. They can continue using the techniques after the Hyogo Office/ADRC involvement is over.
Although mapping faults using stereo pair photographs and dating fault offsets using paleontologic evidence has been used for several decades, these techniques have not been conducted in many seismically active locations. This project transfers this well-developed mapping, age-dating and database technology, and combines it with a geographic information system, an Internet-based distribution system, and issuance of CD-ROMs and hard copies of reports. Mapping active faults is carried out in developed nations. Information derived from these efforts can be crucial to understanding risk and for decisions regarding existing and proposed critical projects such as major dams, electrical generating plants, water distribution systems and other types of new development. The results are used to describe the earthquake shaking hazard (intensity and probability of occurrence) and locations of ground failure. Understanding the hazard is the first step to understanding the earthquake risk and can inform community-based mitigation strategies. Faulting and shaking from events often has a multi nation, regional context, involvement of a multi national organizations is important to providing a broad context for understanding faulting and describing the hazard. Given the long interval between damaging events, the faulting record displayed by surface geology can bring attention to the presence of the hazard in areas where it may have been overlooked because events haven't occurred in modern memory
This project is being carried out in cooperation with the Asian Disaster Reduction Center and the International Lithosphere Program. Hyogo Office role is to transfers the map making, database, GIS and Internet technology to Asian countries and to organize occasions for exchanging ideas towards mitigation strategies. While this project involves Hyogo Office

strategies (cooperation, transfer), the Hyogo Office participation does not seem to rely on or use core strategies and capabilities, nor does it benefited from experience working at the community level to improve safety. Although reservations were expressed regarding Hyogo Office participation in this type of "research" project, not enough information was presented on the extent of Hyogo Office participation, the extent of staff involvement, or the resources provided. In the future, a well-thought out strategic plan could clarify whether Hyogo Office resources should be devoted to this type of project, if so what Hyogo Office involvement would want to accomplish.

The presentation implied that the mapping active faults should be relied on to determine where earthquake risk management measures should be applied. This concept raises a note of concern regarding the degree to which reliance should be placed to distinguish between localities based on this single source of information. Given the uncertainty in faulting processes, the small number of data points relative to long term recurrence intervals, presence of faults without surface expression, and the limited view provided by maps of active faults, policy decisions of this type should consider other factors as well. There are few locations where enough is known with an acceptable level of certainty to make this kind of policy decisions implied possible. It is more appropriate to rely on larger scale understanding of plate tectonics, rather than the micro scale of precise active fault mapping to determine rates of activity and hazard potential for large regions. Moreover, site conditions that lead to amplified ground shaking or ground failure (liquefaction induced settlement and spreading) and landslides may be of equal or greater importance in describing earthquake hazard.

School Earthquake Safety Initiative (SESI)

The School Safety Initiative (SESI) is a globally applicable effort to improve safety through local projects based on local needs and priorities, and for any type of natural hazard. It strives to create a culture of mitigation by improving the earthquake safety of school buildings, promoting cultural exchange, providing training, and disseminating best practices. It promotes community cooperation, builds confidence in mitigation measures, and strives for sustainability by promoting mitigation culture, training students to lead future generations, and by enabling communities to do the work without outside assistance. The basic strategy is to instigate cooperation by capitalizing on strong community interest in school safety. Individual projects involve community participation. A variety of partners are involved in the initiative. Projects are being carried out in the Chamoli region of India, Bandung and Bengkulu, Indonesia, Kathmandu, Nepal and Tashkent, Uzbekistan.

- In Chamoli the project has strengthened local building practices by training masons on earthquake-resistant construction. It emphasizes community participation and teaches skills that will improve the local economy to make the effort sustainable.
- In Bandung the focus has been on improving earthquake safety awareness, providing disaster education and training, and sponsoring earthquake drills.
- In Bengkulu efforts have been to train masons and teachers and to improve the capacity of local engineers in earthquake-resistant practices. School retrofitting provides the training for these three target groups.
- In Kathmandu school retrofitting served as the foil for training masons, and raising

earthquake safety awareness of the entire community and improving the capacity to build and retrofit additional buildings. The project engendered widespread community involvement, awareness exercises, and preparation of educational tools. Scale models of school buildings were used to demonstrate the ability of a properly constructed building to withstand earthquake shaking while a building constructed using normal practices, collapsed. The demonstration improves community understanding of the problem and inspires confidence in seismic resistance construction techniques. A measure of success and sustainability was observed when trained masons applied their training when constructing other buildings.

- In Tashkent the project promoted school retrofit, engineer training and community education. The project transferred knowledge and promoted low-cost means of improving earthquake safety.
- The Bal Vikas Secondary School in Kathmandu and the Maiko High School in Kobe are involved in a cultural exchange to promote disaster mitigation culture among students in both countries, to share learning experiences and to disseminate experience gained in the 1995 Great Hanshin-Awaji earthquake. "Cultural boxes" were exchanged to improve mutual understanding and create an environment for exchanging ideas and experiences. Funds raised in Kobe were used to finance retrofitting of a school building in Kathmandu.

The January 2001 earthquake in Gujarat, India inspired additional exchange. The Hyogo-Gujarat Friendship Fund comprised of money raised by the residents of Hyogo Prefecture, Japan sponsored a school project in Gujarat. The community-level project focused on safer construction, education and sustainability.

This initiative is multi faceted and exhibits the ability to work with other organizations and to work through practical and repeatable community-based projects. A fundamental objective of improving the earthquake safety of school children in Kathmandu was reached, and masons were trained who will provide improved earthquake safety the general population as they ply their trade. A fundamental objective of improving earthquake awareness and knowledge about mitigation was reached as the project brought the entire school community together in the project, parents and community leaders learned more about the risk and the feasibility of increasing safety. The continued presence of NSET-Nepal will improve the sustainability of the effort, but no follow up strategy was discussed. The later use of masons trained on schools in Gujarat took advantage of the training to transfer the lessons to another country and additional masons.

WOTS Analysis

While considering the projects mentioned above, it was apparent that the DMPHO's considerable accomplishments could be even greater in the future if it were to become more strategic when raising funds, and defining projects. An analytical system used in strategic planning is to record Strengths and Weaknesses, and Opportunities and Threats. While a planning exercise should involve stakeholders in the process, it makes a simple way to categorize observations.

Strengths

- The United Nations identity lends importance and prestige to activities and collaborators
- Unique understanding of community development and expertise in community-based training and advisory services
- Strategies to involve and empower community participants
- Understanding of regional development as a means to improve public safety
- Strategy to integrate risk reduction into other activities and the missions of other entities
- Credibility
- Ability to network with a strong cadre of collaborators and community-based partners
- Strong knowledge base
- Proven good performance on initial projects
- Motivated, multi disciplinary and accomplished staff

Weaknesses

- Unclear strategic plan (vision, mission, too many objectives, and strategies and activities are mixed with objectives)
- Small size of staff
- Lack of teamwork among staff on projects
- Low level of funding and lack of a reliable, long-term source of funds to expand
- Agency name does not covey mission and is not memorable

Opportunities

- Many communities need projects and would welcome DMPHO
- Many potential public and private partners are willing to share the work load
- Collocation with ARDC and EDM-NIED could allow mutually beneficial cooperation
- Growing international interest in reducing risk from natural hazards
- Future disasters will create an interest in services

Threats

- Mission creep
- Becoming overly cautious and unwilling to try new and risky measures (fear of failure)
- Becoming overly bureaucratic and rigid in scope and approach
- Low name recognition and potential for confusion with other organizations (especially those located in Kobe)
- Competition for funds

Conclusions

Hyogo Ofice is to be commended for sponsoring an evaluation workshop and for seeking an independent critique of its programs. Expanding the work of the office responds to a moral imperative to apply knowledge developed in developed countries, to developing countries. It fits nicely into the resolution adopted by representatives of the government of Japan and the United States. Disaster prevention clearly is an essential element of sustainable development

and Hyogo Office serves an important, but underutilized role in reducing the risk of natural hazards in developing countries. Hyogo Office's leadership to crystallize this concept and promote it aggressively is a significant contribution to risk-reduction efforts worldwide. Given the magnitude and frequency of natural disasters in developing nations, and the threat they pose to human security, the Hyogo Office role should grow. Hyogo Office needs to develop expertise in additional hazards, its capacity to conduct more projects, n the number of activities it conducts and in its ability to see successful efforts replicated.

The impressive accomplishments of Hyogo Office projects justify further development of its regionally-based, capacity-building strategy to reduce earthquake risk and human suffering. Notably the Gujarat Rehabilitation project employed person-to-person exchanges, participatory decision-making, training that improves the skills and position of the trained persons with results that will continue throughout their careers and the careers of those they train. The master masons from Nepal will return home with improved skills and notoriety that will increase their influence.

Hard work on individual projects produces commendable contributions to humankind, but the mandate must be much broader. By its mere existence and UN mantle, Hyogo Office occupies a responsibility that results in others deferring to them. It is a duty or mandate that must be exercised aggressively, or abandoned in favor of others to pursue.

The evaluation and discussion was made difficult by the plethora of goals and objectives, and strategies and activities that were stated as objectives. There are too many objectives to focus decisions on projects and how they are conducted. Virtually every proposal can find support among the objectives. There is a lack of clarity in your vision and mission and occasional confusion between strategies and your objectives. The translation between Japanese and American English may be at the root of this observation, but assuming that is not, a list of definitions I use when doing strategic planning is given to clarify my terminology.
Three years of effort provides a good foundation for the office to revisit its strategic plan. I recommend you engage in a formal strategic planning effort to sharpen the vision, your mission, objectives and strategies. A clear plan, formed in consultation with funding entities, target clients, staff and community of colleagues can maximize your effectiveness, make fund-raising easier, guide program growth, and inform difficult decisions regarding project opportunities. Hyogo Office does exemplary work when it brings people together in grass roots, practical community-based projects. It is a good catalyst and good at leveraging the knowledge, programs and resources of others to address problems.

Wise counsel was given to consider the broad context of societal forces that interact in various ways to increase the risk from natural hazards especially in many developing countries. This context is comprised of growing poverty, urban migration, population growth, intolerance, gender inequality, ignorance, war, failed agricultural production and distribution, and other factors on a scale beyond the community and regional scope of Hyogo Office. Unfortunately, little advice was given on how Hyogo Office could consider these factors beyond being sensitivity to them when conducting community-based projects, and working to integrate (or

main stream) strategies that address risk into other United Nations, bilateral and unilateral programs of sympathetic nations and other organizations. However, the question remains: What is the UNCDR Hyogo Office role in this aspect of the problem? This question should be addressed during strategic planning.

Motivating decision makers is a vision of Hyogo Office. Learning how to most effectively motivate is a key issue worth careful consideration. Those of us who care about these matters, engineers, geologists, emergency managers, government employees, while filled with good intentions, are seldom expert at motivation. Experts in this area often are in sales, politics, advertising, community organizing, psychology, sociology, and cultural anthropology should be consulted on an ongoing basis to improve strategies.

The projects presented represent impressive accomplishments of a very small office. They were achieved only because of the effort, skill, ingenuity and dedication of a small professional staff. Even though the number of projects reviewed was few in number, and the time available was brief, there was ample opportunity to gain valid insights into each project and the office efforts, and to draw strong conclusions for future improvements. Clearly in short time of three years, the Hyogo Office has had several successes. There is a widespread and ongoing need for the office to continue it work—the challenge is to take the insights gained and apply them in tens of thousands of communities in dozens of countries.

Recommendations

The Hyogo Office program deserves to be continued and grow in its number of projects and reach of implementation. The following recommendations flow from this basic conclusion and are met to guide decisions regarding continuing and future projects as well as the future development of the office.

1. **Do strategic planning.** Several of the following recommendations depend on Hyogo Office having and following a strategic plan, or will be accomplished in part through strategic planning. Clarity of the vision (what you wish to achieve in the long term) and mission (how you will achieve it), objectives (outcomes you seek that when added up achieve your vision), and strategies. Involve staff and stakeholders and neighboring organizations with similar visions. Specifically Asian Disaster Reduction Center (ADPC) and the Earthquake Disaster Mitigation Research Institute (EDM-NIED). The need for additional strategic planning was evident from the mix of projects, number of vague objectives, and the differing expectations voiced by members of the review panel. A list of typical definitions is given at the end of this paper to clarify this recommendation.
2. **Pursue your objectives.** I was impressed that every project articulated objectives. However, some statements appeared to be more like strategies or techniques, than objectives. From my perspective an objective is a statement of values, or something one desires to achieve. An objective should have a decision context, an object and a direction of preference. Cooperating with other organizations, visual teaching, identification and dissemination of best practices, and self-help are not objectives in that they lack a decision context. Improving (a direction) the safety of people in the community (the object) is an objective. It informs decisions regarding whether to do a project or not, which strategies to

employ, how resources should be spent.

3. **Raise funds.** Raising funds to attract experienced staff, maintain a core office capability and to conduct projects is the challenge of every public and private sector organization. Formulate and seek funding for projects that further your objectives, rely on your strengths, and employ the strategies you know to be effective, and then promote the projects to international development banks, multi national companies, bi- and multi-lateral organizations, foundations and trusts. While responding to requests for proposals from funding organizations should not be avoided, the projects you create are more likely to achieve your objectives. Funding will always be difficult to secure, but organizations with funds look for good ideas, and capable and honest organizations to carry them out. Every program manager with money seeks organizations that will execute successful projects. Help them spend their money. Consider working with funding organizations to shape their projects in ways consistent with the Hyogo Office strategic plan.
4. **Avoid mission creep.** Because UNCRD Hyogo Office is a respected, capable organization, it will attract offers that deviate from the mission. Mission creep is a threat to long-term effectiveness. While thoughtful strategic planning is a fundamental recommendation, caution is urged to avoid projects unless they are consistent with the mission, are further one or more fundamental objective, and take advantage of the program's strengths. Have an exit strategy for every project to avoid projects becoming entitlements.
5. **Emphasize what you do best.** Activities carried out by the office should build on your core competencies, your reputation for accomplishments and honesty, and address one or more of your objectives.
6. **Stress teamwork.** The staff is small and members have expertise in a variety of technical, programmatic and cultural areas. Chances of success will be enhanced through teamwork, and individual project managers will grow professionally.
7. **Seek recognition.** Continue to issue reports, brochures, make presentations, apply for awards and seek international recognition for the agency and its program. The objective is to strengthen the program, not so much as to garner laurels for the individuals involved. The reward from successfully serving people and the recognition for your accomplishments will help with recruiting new staff, maintaining moral in the face of hard work, long hours, low pay. Seek ways to increase program visibility. Initiating a project that becomes known as your unique contribution can help improve the recognition by those who can help you advance your cause.
8. **Initiate a flagship project.** Being known and recognized for a particularly successful project will bring notoriety and recognition to the organization and the benefits to the cause that ensue.
9. **Reconsider research.** Hyogo Office should evaluate the extent that research is part of the mission. How will research projects help achieve long-term objectives? How do they take advantage of your strengths?" Because research can be defined in a variety of ways it can mean the unfettered search of truth through a line of inquiry that may or may not result in results useful to the initial reason for the inquiry and is often carried out in academic and research institute environments. It also can mean the mere gathering of information relative to topic and crucial to project-level decision making, or simply thoughtful and

careful consideration of a matter. Research can be of a fundamental nature, or problem focused. Consider carefully the question: What type of research furthers Hyogo Office objectives? Research that leads to improved effectiveness of core strategies (community capacity building, motivating individual decision makers, etc.) is necessary, while research that does not involve targeted communities or that does work only ancillary to the mission, should be reconsidered. Hyogo Office might steer away from conducting original, fundamental research, but to continue thoughtful examination of issues and gathering information and data in support of achieving your objectives. Moreover, because many Hyogo Office projects activities are innovative, they may serve as interesting objects of research by outside organizations.

10. **Seek to understand motivation.** As a corollary to the admonition to clarify how research meshes with your mission, there are topics where your projects and strategies can be informed by original research. Motivation is an example of a topic where research by others can serve your projects. Well-meaning efforts to improve public safety by influencing decision makers (from individuals, corporate officers, community leaders to heads of governments) have been hampered by a poor understanding of how decisions are made, what information is needed and when. Seek information from academic experts who study motivation as well as from social change activists. Seek the cooperation of persons who work on similar issues (e.g., community health and family planning, activists) to hone your strategies.
11. **Form an advisory committee.** Establish a standing advisory committee comprised of persons whose counsel you seek. This would include representatives of target communities and experts. Use the committee for strategic advice and project-specific feedback.
12. **Continue to evaluate.** Build a monitoring and evaluation element into every project to assure consistent assessment and continuous improvement. Budget from five to ten percent of each project for this work. Evaluations should improve projects and inform on going strategic planning.
13. **Increase private sector participation.** Clearly working with non government organizations is a Hyogo Office strength. Expand that success to seek corporate participation and financial sponsorship by offering them publicity wider than the project area, and the chance to claim credit for their contribution. Humanitarian projects help for profit companies giving them a way to demonstrate their concerns for the world community to customers, and it improves the employee morale and loyalty.

Appendix

- Newspaper Coverage
- List of Participants
- Contents of Enclosed CD-ROM
- CD-ROM

Newspaper Coverage

2002年2月20日 読売新聞 朝刊

インド西部地震の被災地で、地域住民とともに学校改修プロジェクトに取り組む兵庫事務所のメンバーら（2001年12月）

世界に震災経験発信

明日から神戸でワークショップ

防災教育事業など報告

阪神大震災の経験を世界に発信し、開発途上国の防災施策を支援している国連地域開発センター防災計画兵庫事務所（神戸市中央区）と県、読売新聞大阪本社などは二十一、二十二の両日、神戸市中央区のひょうご国際プラザで、国際ワークショップ「地震にまけない世界へ向けてⅡ」を開く。

一九九九年開設の同事務所は、震災の経験を基に活断層地図の作製や地域コミュニティーを中心にした防災計画づくりなどを世界各地で進めている。ワークショップで三年間の取り組みの成果をまとめるとともに、今後の活動方針策定へ向けて討議する。

二十一日は、都市の危険度判定や、学校を拠点に防災力を高める「スクールプロジェクト」など、インドやネパールなどで進めている各事業について、研究員や民間活動団体のメンバーらが報告。二十二日は、地震工学の世界的権威、インド・ルーキー大のアナンド・アリヤ名誉教授らがスクールプロジェクトの今後を討議。ネパールの学校と防災教育を通じた交流を進める県立舞子高校の生徒たちが将来の防災などを話し合うほか、防災科学技術研究所の片山恒雄理事長や新野幸次郎元神戸大学長らが講演する。定員は二十一日が三百人、二十二日は八十人。無料。問い合わせはファクス（078・230・7751）か電子メール（ws2002@hyogo.unchr.or.jp）で同事務所。

2002年2月21日 読売新聞 朝刊

スクールプロジェクトについて井戸知事に説明するアリヤ名誉教授（左端・県庁で）

防災教育の意義知事に説明

アリヤ名誉教授、県庁訪問

神戸市中央区のひょうご国際プラザで二十一、二十二日開かれる国際ワークショップ「地震にまけない世界へ向けてⅡ」（国連地域開発センター防災計画兵庫事務所、県、読売新聞大阪本社など主催）に出席するインド・ルーキー大学のアナンド・アリヤ名誉教授らが二十日、県庁に井戸知事を訪問した。

アリヤ名誉教授は、昨年一月のインド西部地震の被災地域で、県が一億七千万円の義援金で設立した基金をもとに倒壊した学校の再建と、防災教育に取り組む「スクールプロジェクト」を進めている。

アリヤ名誉教授は「貧しい階層の子を支援し、防災の継続的な生涯学習にも役立つモデルケースになる」と説明。井戸知事は「互いに不幸な出来事でしたが、これを機に協力関係を深めていきましょう」と呼び掛けた。アリヤ名誉教授はワークショップで、プロジェクトの狙いや現状について報告する。

アジアのNGO 災害時の連携討議

中央区でシンポ

アジア地域での民間活動団体（NGO）同士のネットワークづくりを目指す「アジア地域災害NGOシンポジウム」（アジア防災センターと県、国連人道問題調整事務所神戸支所主催）が二十日、神戸市中央区のホテルで開かれた。日本を含む十六か国からNGO三十団体が参加した、災害時の連携のあり方などについて話し合った。

同センターなどが進める「アジア地域での自然災害軽減のための人材育成プロジェクト」の一環。大規模災害の際に各国から被災地入りするNGOが、現地のNGOと連携して支援に当たれるようネットワークづくりを進めるのが目的。

シンポでは、西川智所長が「地域レベルでの防災への取り組みシステムを構築しなくてはいけない」とあいさつ。日本、インド、フィリピンなどのNGO代表らが、それぞれの取り組みや効率的なネットワークづくりについて報告した。

2002年2月21日 読売新聞 夕刊

地震ワークショップ開幕 神戸

国際ワークショップで講演するサルヴァノ・ブリセノ氏（21日午前10時20分、神戸市中央区で）

阪神大震災の経験を世界に発信し、開発途上国の防災施策を支援している国連地域開発センター（UNCRD）防災計画兵庫事務所が、これまでの取り組みや今後の活動方針を討議する国際ワークショップ「地震にまけない世界へ向けてII」（同事務所、兵庫県、読売新聞大阪本社など主催）が二十一日、神戸市中央区のひょうご国際プラザで始まった。

木村洋・UNCRD所長が「阪神大震災では地域住民、ボランティア、政府の連携が素早い復興を可能にした。この教訓を世界中で生かすため、働にきぬ着せずに議論してほしい」とあいさつ。国連国際防災戦略（ISDR）のサルヴァノ・ブリセノ所長は「災害被害軽減のため、地域住民や世界の各機関と幅広いネットワーク作りを進めていくことが大切」と基調講演した。

二十二日まで、都市の危険度判定や学校を拠点に防災力を高める「スクールプロジェクト」などについて報告や討議を行う。

2002年2月21日 産経新聞 朝刊

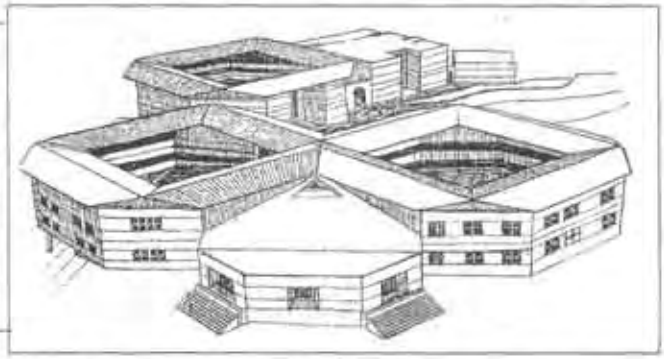
インドで10校を再建・補修

ひょうごグジャラート友愛基金

小・中・高校生1300人学ぶ

地震の被災者支援

1年半で工事完了



バチャウ市に建設される学校の見取り図

昨年一月に発生したインド西部大地震の被災者支援のための義援金をもとに設立された「ひょうごグジャラート友愛基金」の運営委員会が二十日、神戸市中央区の県災害対策センターで開かれ、現地に学校を建設するスクールプロジェクトについて、九つの学校を再建するとともに、一校を補修することなどを決めた。今後約一年半で工事が完了する予定だという。約千三百人の児童・生徒の学び舎がよみがえる。

県は大地震後、義援金募集委員会を立ち上げ、集まった約一億七千五百万円を、甚大な被害を受けたインド・グジャラート州の州政府災害対策委員会に寄贈。スクールプロジェクト推進を検討するため昨年九月、同基金をスタートさせた。

プロジェクトでは、小学校、中・高校の計十校の再建・補修を実施。ほとんどの建物が倒壊したカッチ県バチャウ市の学校は、延べ床面積約千四百三十平方㍍とプロジェクトでも最大で、日本でいう中学・高校にあたり、学生寮や教師たちの宿舎も備えている。

学校部分は鉄筋コンクリート製で、宿舎部分はレンガや石積みといった現地の伝統的工法で建設される。いずれも耐震性を備え、一般市民向けの防災教育を行う場にもなるという。

非日本人同理事委員会委員長で、インド・ルーキー大名誉教授のアナンド・アーリア博士は「現在、テントなどの仮設の学校で学ぶ子供たちに、大きなプレゼントになる。また、大人たちの防災教育の場としても活用していく予定で、兵庫のみなさんに感謝したい」と話していた。

2002年2月23日 読売新聞 朝刊

クプ ワーッ 震ョ 地シ

防災への取り組み紹介

舞子高生 授業での壁新聞作りなど

国際ワークショップ「地震にまけない世界に向けて Ⅱ」（国連地域開発センター兵庫事務所、県、読売新聞大阪本社など主催）は二日目の二十二日、県立舞子高校の生徒らが、各国の防災関係者らを前に、震災体験を通じて防災学習に取り組む思いや意気込みを語った。

同校では、生徒らが募金を呼び掛け、カトマンズのバラビカス高校に耐震改修費用を支援。その後、両校間で交流が続いている。

午前中のパネルディスカッションで、二年の中川知子さん(17)が「自宅が全焼して、家族と避難所や仮設住宅での暮らしを乗り越えた。住み慣れた地域を失うことは悲しいこと」と話し、防災に関する情報を集めた壁新聞作りや身近な地域の防災対策モデル案づくりなど、日常の授業の中での取り組みを紹介した。

会場からは「授業を通じ意識が変わったか」などの質問があり、同、田中貴之君(17)は「自分に何ができるか、振り返るようになった。震災を知る最年少世代と言われる僕たちには、（経験を）伝える使命がある」と訴え、同、中島純子さん(17)も「大学でも防災を学び、将来は広く世界に目を向け、少しでも人の役に立ちたい」と夢を語った。

バラビカス高校のラム・ハリ・シャルマ校長は「交流はかけがえのない大きな財産として地域に根付きつつある。同校の防災カリキュラムを持ち帰り、我が校でも実践する」と話した。

午後からは、二日間のまとめが行われ、国連国際防災戦略のサルヴァノ・ブリセノ所長や新野幸次郎・神戸大元学長らが、開発途上国での支援活動について「住民への防災教育などきめ細かい対応を進めていくことが大切」「取り組みを広く知ってもらうため、効果的なPR法を検討し直すべき」などと意見を交わした。

2002年2月22日 読売新聞 朝刊

クプ ワーッ 震ョ 地シ

耐震技術定着など報告

防災啓発の取り組みも紹介

二十一日、神戸市中央区のひょうご国際プラザで始まった国際ワークショップ「地震にまけない世界に向けて Ⅱ」（国連地域開発センター防災計画兵庫事務所、県、読売新聞大阪本社など主催）は、午後から兵庫事務所の事業報告などが行われた。

インド西部地震の被災地で実施中の復興報告では、事務所のラジブ・ショウ研究員や被災地NGO協働センター（神戸市兵庫区）の鈴木隆太さんのほか、アメリカやインドなどの民間活動団体メンバーや技術者、学者ら約二十人が参加。

鈴木さんは、小学校の耐震化に住民と一緒に取り組んだ体験を紹介し、「阪神大震災が教訓として残したコミュニティー作りの大切さをインドの復興にも生かしたい」と訴えた。

耐震補強をした家の模型を使い、建物の倒壊に関する知識を学ぶ「シェイク・テーブル・テスト」など、防災啓発への具体的な取り組みも紹介され、参加者からは「インドでの取り組みを、どのように世界の国々に広めていくべきか」などの意見や質問が出た。

このほか、大工の訓練などを通し耐震補強の技術の定着を図るカトマンズでの試みや、ウズベキスタンで行った活断層地図の作成プロジェクトなどの報告があった。二十二日はネパールの学校と防災を通じた交流を進める県立舞子高校の生徒らによるパネルディスカッションなどが行われる。

List of Participants

Name: **Anand Arya**
Title: Seismic Advisor
Organization: Gujarat State Disaster Management Authority (GSDMA)
Address: (1) 72/6 Civil Lines, Roorkee-247667, Uttar Pradesh,
(2) Udyog Bhovoun Blk 11, 5F, Gandhinagar, India
Tel: (1) +91-1332-72631 (Mobile)+91-98250-71738
Fax: (1) +91-1332-73560 (2) +91-79-3259218
E-Mail: arya_gsdma@hotmail.com, skt@rurkiu.ernet.in
Country: India

Name: **Rajendra Desai**
Title: Joint Director
Organization: NCPDP
Address: (1) A/6, Manali Apartments, Dr. Vikram Sarabhai Marg, Near ATIRA, Ahmedabad, Gujarat, 380015, India
(2) 204 Santoor Apt., Near Parimal crossing, C.G. Road, Ahmedabad, Gujarat, 380004, India
Tel: (O) +91-79-643-8012 (R) +91-79-630-9712
Fax: +91-79-640-6123
E-Mail: ncpdp@yahoo.com
Country: India

Name: **Manu Gupta**
Title: Joint Director
Organization: SEEDS
Address: 315 Tower 1, Mount Kailash, New Delhi, 110065, India
Tel: +91-11-6262489
Fax: +91-11-625-0475
E-Mail: manu@seedsindia.org
Country: India

Name: **Anshu Sharma**
Title: Joint Director
Organization: SEEDS
Address: 315 Tower 1, Mount Kailash, New Delhi, 110065, India
Tel: +91-11-6262489
Fax: +91-11-625-0475
E-Mail: anshu@seedsindia.org
Country: India

Name: **Kenichi Aoto**
Title: Chief of Emargency Management
Organization: Hyogo Prefectural Government
Address: 5-10-1 Shimoyamate-dori, Chuo-ku, Kobe 650-8567, Japan
Tel: +81-78-362-9802
Fax: +81-78-362-9920
E-Mail: kenichi_aoto@go.phoenix.pref.hyogo.jp
Country: Japan

Name: **Hiroshi Arai**
Title: Deputy Team Leader
Organization: Earthquake Disaster Mitigation Research Center (EdM), NIED
Address: 2465-1 Mikiyama, Miki, Hyogo 673-0433, Japan
Tel: +81-794-83-6637
Fax: +81-794-83-6695
E-Mail: arai@edm.bosai.go.jp
Country: Japan

Name: **Takanori Fukushima**
Title: Student
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Country: Japan

Name: **Hideaki Goto**
Title: Associate Professor
Organization: Faculty of Education, Fukushima University
Address: 1 Kanayagawa, Fukushima, 960-1296, Japan
Tel: +81-24-548-8166
Fax: +81-24-548-8166
E-Mail: hgoto@educ.fukushima-u.ac.jp
Country: Japan

Name: **Tsuneo Katayama**
Title: President
Organization: National Research Institute for Earth Science and Disaster Prevention
Address: 3-1 Tennodai, Tsukuba, Ibaraki 305-0006, Japan
Tel: +81-298-51-1620
Fax: +81-298-52-8260
E-Mail: katayama@ess.bosai.go.jp
Country: Japan

Name: **Yo Kimura**
Title: Director
Organization: UNCRD
Address: 1-47-1 Nagono, Nakamura-ku, Nagoya 450-0001, Japan
Tel: +81-52-561-9377
Fax: +81-52-561-9375
E-Mail: director@uncrd.or.jp
Country: Japan

Name: **Masami Kobayashi**
Title: Professor
Organization: Department of Global Environment Engineering,
Graduate School of Engineering, Kyoto University
Address: Yoshida Honmachi, Sakyo-ku, Kyoto, 606-8501, Japan
Tel: +81-75-753-5773
Fax: +81-75-753-5773
E-Mail: makoba@archi.kyoto-u.ac.jp
Country: Japan

Name: **Kiyoshi Kobuna**
Title: Associate Expert
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku,
Kobe 651-0075, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7565
E-Mail: kkobuna@hyogo.uncrd.or.jp
Country: Japan

Name: **Kazushi Maki**
Title: Associate Expert
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku,
Kobe 651-0076, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7565
E-Mail: maki@hyogo.uncrd.or.jp
Country: Japan

Name: **Madhab Mathema**
Title: Senior Human Settlements Advisor
Organization: UN Habitat Fukuoka Office
Address: ACROS Fukuoka Bldg. 8th Floor, 1-1-1, Tenjin, Chuo-ku, Fukuoka 810-0001, Japan
Tel: +81-92-724-7121
Fax: +81-92-724-7124
E-Mail: madhab.mathema@fukuoka.unhabitat.org
Country: Japan

Name: **Kazuyuki Nakagawa**
Title: Staff Writer
Organization: Jiji Press Kobe Branch
Address: Mainichi Shimbun Kobe Bldg. 6th floor, 4-3-5, Sakaemachi-Dori, Chuo-ku, Kobe 650-0023, Japan
Tel: +81-78-362-5606
Fax: +81-78-362-5692
E-Mail: n-kaz@kh.rim.or.jp
Country: Japan

Name: **Tomoko Nakagawa**
Title: Student
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Country: Japan

Name: **Yuko Nakagawa**
Title: Jr. National Expert
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0074, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7751
E-Mail: nakagawa@hyogo.uncrd.or.jp
Country: Japan

Name: **Yoichi Nakai**
Title: Researcher
Organization: United Nations Administration Division, MOFA
Address: 2-11-1, Shiba-Koen Tower, Shiba-Koen, Minato-ku, Tokyo 105-8519, Japan
Tel: +81-3-6402-2565
Fax: +81-3-6402-2561
E-Mail: yoichi.nakai@mofa.go.jp
Country: Japan

Name: **Naoyuki Nakano**
Title: Director
Organization: Educational Planning Office, General Affairs Division, Hyogo Prefectural Board of Education
Address: 5-10-1 Shimoyamate-dori, Chuo-ku, Kobe 650-8567, Japan
Tel: +81-78-362-9431
Fax: +81-78-362-4283
E-Mail:
Country: Japan

Name: **Kenichi Nakase**
Title: Director General of Emargency Management
Organization: Hyogo Prefectural Government
Address: 5-10-1 Shimoyamate-dori, Chuo-ku, Kobe 650-8567, Japan
Tel: +81-78-362-9804
Fax: +81-78-362-9920
E-Mail:
Country: Japan

Name: **Junko Nakashima**
Title: Student
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Country: Japan

Name: **Kojiro Niino**
Title: Director
Organization: Kobe Institute of Urban Research
Address: Kobe Shoko-trade Center Bldg. 18th Floor, 5-1-14, Hamabe-Dori, Chuo-ku, Kobe 651-0083, Japan
Tel: +81-78-252-0984
Fax: +81-78-252-0877
E-Mail: tmk1@abox8.so-net.ne.jp
Country: Japan

Name: **Hiroko Nishinaka**
Title: Vice-Principal
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Tel: +81-78-783-5151
Fax: +81-78-783-5152
E-Mail:
Country: Japan

Name: **Yujiro Ogawa**
Title: Special Advisor to the Chairman
Organization: Asian Disaster Reduction Center (ADRC)
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0073, Japan
Tel: +81-78-230-0346
Fax: +81-78-230-0347
E-Mail: ogawa@adrc.or.jp
Country: Japan

Name: **Satoru Ohya**
Title: Chairman
Organization: Oyo Corporation
Address: Ichigaya Bldg., Kudan-kita, Chiyoda-ku, Tokyo 102-0073, Japan
Tel: +81-3-3234-0816
Fax: +81-3-3234-0383
E-Mail: ohya-satoru@oyonet.oyo.co.jp
Country: Japan

Name: **Kenji Okazaki**
Title: Coordinator
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0073, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7751
E-Mail: okazaki@hyogo.uncrd.or.jp
Country: Japan

Name: **Rajib K. Shaw**
Title: Researcher
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0074, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7751
E-Mail: shaw@hyogo.uncrd.or.jp
Country: Japan

Name: **Bjaya K. Shrestha**
Title: Researcher
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0074, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7565
E-Mail: shrestha@hyogo.uncrd.or.jp
Country: Japan

Name: **Michiyo Sugai**
Title: Senior Researcher
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0074, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7565
E-Mail: msugai@hyogo.uncrd.or.jp
Country: Japan

Name: **Seiji Suwa**
Title: Teacher
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Tel: +81-78-783-5151
Fax: +81-78-783-5152
E-Mail: seijisuwa@yahoo.co.jp
Country: Japan

Name: **Ryuta Suzuki**
Title:
Organization: NGO Kobe
Address: 2-1-10, Nakamichi-dori, Hyogo-ku, Kobe 652-0801, Japan
Tel: +81-78-574-0701
Fax: +81-78-574-0702
E-Mail: ngo@pure.ne.jp
Country: Japan

Name: **Yasuhiro Suzuki**
Title: Associate Professor
Organization: Faculty of Information Science and Technology, Aichi Prefectural University
Address: Kumabari Nagakute Aichi, 480-1198, Japan
Tel: +81-561-64-1111
Fax: +81-561-64-1108
E-Mail: y-suzuki@ist.aichi-pu.ac.jp
Country: Japan

Name: **Takayuki Tanaka**
Title: Student
Organization: Maiko High School
Address: 3-2, Manabigaoka, Tarumi-ku, Kobe 655-0004, Japan
Country: Japan

Name: **Yuriko Tsunehiro**
Title: Jr. National Expert
Organization: UNCRD DMP Hyogo Office
Address: IHD Center Bldg. 3rd Floor, 1-5-1 Wakihama-Kaigan-Dori, Chuo-ku, Kobe 651-0074, Japan
Tel: +81-78-230-7561
Fax: +81-78-230-7751
E-Mail: ytsune@hyogo.uncrd.or.jp
Country: Japan

Name: **Masayuki Watanabe**
Title: Senior Advisor
Organization: JICA
Address: International Cooperation Center, 10-5 Ichigaya Honmura, Shinjuku-ku, Tokyo 162, Japan, Japan
Tel: +81-3-3269-3851
Fax: +81-3-3269-6992
E-Mail: Watanabe.Masayuki@jica.go.jp
Country: Japan

Name: **Luis Mendoza**
Title: Researcher
Organization: Centro de Investigacion Cientifica y de Educacion Superior de Ensenada(CICESE)
Address: Kilometro 107, Carretera Tijana a Ensenada, Ensenada, Baja California, Mexico C.P. 22860, Mexico
Tel: +52-64-61-750564
Fax: +52-64-61-750559
E-Mail: lmendoza@cicese.mx
Country: Mexico

Name: **Antonio H. Rosquillas**
Title: Director
Organization: Tijuana Civil Protection
Address: Calle Sta 7727 Z.C. Tijuana, Mexico
Tel: +52-664-4853300
Fax: +52-664-6854392
E-Mail: arosquillas@hotmail.com
Country: Mexico

Name: **Amod Mani Dixit**
Title: General Secretary
Organization: National Society for Earthquake Technology - Nepal (NSET-Nepal)
Address: Kha-2-731, Mahadevsthan, Baneshwor, Kathmandu-10, Nepal, G.P.O.Box #13775, Nepal
Tel: +977-1-474-192
Fax: +977-1-490-943
E-Mail: adixit@nset.org.np
Country: Nepal

Name: **Ram Hari Sharma**
Title: Headmaster
Organization: Balabikas Secondary School Alapot VDC
Address: Gagal Phedi Ward no.7 Bhorle Tar Kathmandu, Nepal
Tel: +977-1-450-196, 450827(res)
Fax:
E-Mail: dukhinp@yahoo.com
Country: Nepal

Name: **Salvano Briceno**
Title: Director
Organization: UN ISDR
Address: UN/ISDR Secretariat, Palais de Nations, CH-1211 Geneva 10, Switzerland
Tel: +41-22-917-9701
Fax: +41-22-917-9098
E-Mail: briceno@un.org
Country: Switzerland

Name: **Ian Davis**
Title: Visiting Professor
Organization: Cranfield Disaster Management Centre (CDMC), Cranfield University
Address: Cranfield University, RMCS, Shrivenham, Swindon, SN6 8LA, UK
Tel: +44 1793 785287
Fax: +44 1793 785883
E-Mail: idavis@n-oxford.demon.co.uk
Country: UK

Name: **Laura Dwelley Samant**
Title: Technical Director
Organization: GeoHazards International
Address: 200 Town and Country Villege, Palo Alto, CA 94301, USA
Tel: +1-650-614-9050
Fax: +1-650-614-9051
E-Mail: samant@geohaz.org
Country: USA

Name: **L. Thomas Tobin**
Title: Director
Organization: Tobin and Associates
Address: 134 California Avenue, Mill Valley, CA 94941, USA
Tel: +1-415-380-9142
Fax: +1-415-380-9218
E-Mail: LTTobin@aol.com
Country: USA

Name: **Sergey Tyagunov**
Title: Senior Researcher
Organization: Academy of Sciences of the Republic of Uzbekistan Institute of Seismology
Address: Zulfiyahonim str., 3, Tashkent 700128, Uzbekistan
Tel: +998-71-2-415692
Fax: +998-71-2-415314
E-Mail: sergey@seisan.ccc.uz, tyagunov@yahoo.com
Country: Uzbekistan

Contents of Enclosed CD-ROM

Time	Program	Name	Paper	Presentation
Day 1				
9:30-10:30	**Opening Session**			
	Welcome Address	UNCRD, Y. Kimura	–	–
	Opening Remarks	Hyogo Pref., K. Aoto	–	–
	Guest Speech	OCHA NY, E. Tsui	–	–
	Keynote Address	ISDR, S. Briceno	○	●
11:00-12:00	**UNCRD DMPHO's Activities 1**			
	Overview	Kyoto Univ., M. Kobayashi	○	●
	GESI	UNCRD, R. Shaw	○	●
	-- Commentator	GHI, L. Samant	–	●
		SEEDS, A. Sharma	○	–
		CICESE, L. Mendoza	○	●
13:00-15:00	**UNCRD DMPHO's Activities 2**			
		UNCRD, R. Shaw	○○○	●
		SEEDS, A. Sharma	○○	●
		NGOs Kobe, R. Suzuki	–	–
		NCPDP, R. Desai	○	●
		EdM, H. Arai	–	●
	-- Commentator	GSDMA, A. Arya	–	●
15:30-17:30	**UNCRD DMPHO's Activities 3**			
	Nepal Kathmandu Project	UNCRD, B. Shrestha	○	●
	-- Commentator	Habitat, M. Mathema	–	–
	Active Fault Project	UNCRD, M. Sugai	○	●
	– Commentator	Aichi Pref. Univ., Y. Suzuki	–	●
		Uzbekistan, S. Tyagunov	–	●
		Fukushima Univ., H. Goto	–	–
Day 2				
9:30-11:00	**School Earthquake Safety Initiative**			
	School Earthquake Safety Project	UNCRD, R. Shaw	○	●
	Hyogo-Gujarat Frendship Fund	GSDMA, A. Arya	○	●
	Kobe-Kathmandu Collaboration	Balabikas, R.H. Sharma	○	●
		Maiko HS, H. Nishikawa	○○	–
	-- Commentator	Hyogo Pref., N. Nakano	–	–
11:15-12:00	**Panel Discussion 1**			
	-- Moderator	Maiko HS. S. Suwa	–	●
	-- Panelist	Maiko HS. Students	–	–
13:00-14:30	**Panel Discussion 2**			
	– Moderator	Jiji Press, K. Nakagawa	○	–
	– Panelist	Hyogo Pref., K. Nakase	–	–
		ADRC, Y. Ogawa	–	–
		JICA, M. Watanabe	○	–
		UNCRD, K. Okazaki	–	●
15:00-17:00	**Panel Discussion 3**			
	-- Moderator	Tom Tobin	–	–
	– Panelist	NIED, T. Katayama	○	–
		Kobe Univ., K. Niino	–	–
		ISDR, S. Briceno	–	–
		Cranfield Univ., I. Davis	–	–

Others		
	GESI	○○○
	PNY	●

CD-ROM

System Requirement

Hardware requirements:

- CPU: Pentium 75 MHz or above
- Memory: 24 MB RAM or above
- Display Setting:
  Color: High color (16 bit) or above
  Screen Display: 800 x 600 or above

Software requirements:

- Operating System: Windows 95, 98, ME, NT4.0, 2000, or XP
- Web Browser: Internet Explorer 4.0, Netscape 4.0, or later
- Application: Acrobat Reader 4.0 or later

Getting Started

1. Insert the Kobe 2002 Workshop CD-ROM into your CD-ROM drive, then the top-page will be opened automatically.

2. If it does not work automatically, double-click "top-page.htm" in the "bin" folder.

United Nations Centre for Regional Development
Disaster Management Planning Hyogo Office

IHD Centre Building, 3rd Floor 1-5-1
Wakinohama-kaigan-dori, Chuou-ku
Kobe, 651-0073, JAPAN

Tel: +81-78-230-7561
Fax: +81-78-230-7751
e-mail: rep@hyogo.uncrd.or.jp
Web Site: http://www.hyogo.uncrd.or.jp