

SCHOOL EARTHQUAKE SAFETY INITIATIVES

Reducing Vulnerability of School Children to Earthquakes

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United Nations Department of Economic and Social Affairs
United Nations Centre for Regional Development (UNCRD)
Disaster Management Planning Hyogo Office

Mission Statement of UN / DESA

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FOREWORD

Schools have important roles to play in disaster risk reduction and their importance is recognized at all stages of disaster risk reduction cycle: from prevention to response. Communities in seismic region need earthquake resistant schools to protect the lives of children. Strongly built schools are safe haven and can also be used as relief and rehabilitation shelters after earthquakes. Furthermore, strong leadership of teachers has been proven to be very effective in dealing with emergency situations in disaster-prone countries, and by raising awareness among children, the message can reach their families and further, the 'culture of mitigation' can be spread through the communities.

Realizing the importance of schools, UNCRD has been promoting School Earthquake Safety Initiative (SESI) since 1999. In the SESI project, UNCRD has always emphasized the multifaceted role of schools in building resilience of communities and the projects have been instrumental not only in building safe schools but also in propagating message of culture of safety to the communities. The current SESI project under the theme of "Reducing Vulnerability of School Children to Earthquakes" also aims to ensure that school children living in seismic regions have earthquake safe schools and that local communities build capacity to cope with earthquake disasters. This project is designed in four components: Seismic retrofitting of school buildings; Capacity building of communities; Disaster education and awareness raising; and Knowledge and experience dissemination. These components complement each other and contribute towards the overall goal of building the resilience of nations and communities to disasters.

This publication is summary of some of the activities under the ongoing SESI project and includes introduction and background of the project along with country reports from the four project countries: Fiji, India, Indonesia and Uzbekistan. As one of the components of the project is dissemination and sharing of knowledge, experience and information from the project countries to a wider audience throughout the region, this report is expected to disseminate good practices from the project countries to other countries in the region. This report should also serve to the interest of wide range of stakeholders from policy makers to field workers working in school safety, in particular, and disaster risk reduction, in general.

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I. School Earthquake Safety Initiatives

Background

Disasters claim thousands of lives, destroy million dollars worth of properties and cause irreversible damage to the infrastructures. Devastating experiences from natural disasters in the recent history have raised awareness in many parts of the world on the need for disaster preparedness and prevention. In 2006 alone, the world experienced more than 380 natural disasters with the total economic damage exceeding \$20 billion. A trend suggests that the occurrence of natural disasters has been on rise for the last 30 years.

Natural disasters affect countries, both developed and developing, through mass human casualties and economic losses. However, the extent of the damage is more profound in developing countries as they are less equipped to prevent or mitigate damages caused by disasters. More than 95 percent of all deaths attributed to natural disasters occur in developing countries and disaster-induced economic losses, as a percentage of GDP, are 20 times larger in developing countries than in the industrialized countries.

Out of all natural disasters, earthquakes are the least predictable disaster. While there are many factors in earthquakes that determine the scale of damage such as the time of the event, population density and building structural fragility, the damages vary from country to county and the negative impacts of an earthquake are more acute in developing countries. An earthquake that struck Bam, Iran in 2003 destroyed close to 90% of the city's buildings, killing 26,796 people. In contrast, an earthquake of the same intensity that struck



the city of San Simeon in California four days earlier damaged 40 buildings and killed two people.

Disasters caused by earthquakes severely undermine countries' efforts to achieve the Millennium Development Goals (MDG). With respect to poverty reduction, an earthquake pushes the poor into graver poverty through destruction of their homes. As the poor are not able to afford houses that are earthquake resistant, their houses are more vulnerable to earthquakes. To make matters further worse, the poor have less savings and no access to insurance and credit that enables them to finance reconstruction costs. These phenomena could lead to an increase in the number of slum dwellers.

The achievement of universal primary education can also be hampered because household asset depletion makes schooling less affordable. Children and women are more likely to be pressured to contribute to household work, exacerbating gender inequality. Adverse health effects are also inevitable because financial constraint makes clean water, food, and medicine less accessible. At the national level, fiscal constraint of the affected government results in reallocation of international assistance from development to relief and recovery operations.

One of the most effective and efficient approaches towards alleviating the damages from earthquakes is to reduce the underlying risk factors by protecting and strengthening physical infrastructures. As a priority issue, there is a need to put efforts in making housings and critical public facilities such as schools, hospitals, water and power plants and transport lifelines through proper planning in terms of location, design, construction and maintenance.

Temporary shelter in Ache, Indonesia

Schools in Disaster Risk Reduction

Earthquake damages not only residential buildings but also infrastructures like roads, hospitals and schools. Earthquakes in the past have exposed that vulnerability of school buildings is disproportionately high compared to the other infrastructures. For instance, in the 1999 Chi-Chi Earthquake, Taiwan 43 schools in Nantou and Taichung area were completely destroyed and a total of 700 schools nationwide were damaged to different extent. The 2001 Gujarat Earthquake in India caused damages to over 11,600 schools (World Bank 2001). The 2005 Kashmir earthquake resulted in collapse of 6,700 schools in North-West Frontier Province and 1,300 in Pakistan-administered Kashmir.

Recognizing that school age children spend majority of their waking hours at school, there is a high possibility that an earthquake struck while they are at school. When an earthquake hit Spitak area of Northern Armenia during school hours in 1988, many children lost their lives due to collapse

of school buildings. For example, 285 children out of 302 in total died at one school. This resulted in almost 2/3 of total deaths of 25,000 were children and adolescents. Another case is 2005 Kashmir earthquake. The earthquake occurred as the school day was beginning and led to death of 18,000 children trapped in damaged schools.

Therefore, school buildings need to be protected from disasters as they save life of children and they can also help to work as shelter in post disaster scenario. Moreover, safe schools are effective medium for disseminating disaster risk reduction awareness in the communities, can act as center of learning, can be instrumental in transfer of technology to the communities and will have significant role to build disaster resilient communities. The activities like retrofitting of school and new construction with safety measures can spread message to the community of the importance of safe buildings to reduce disaster impact.



A class after an earthquake, Iran

School retrofitting can also be opportunity to disseminate the technology and train local masons about the safe construction practices. Therefore, it is important to underscore the fact that the final product as safe school is important and equally important is the process of achieving safe schools. Furthermore, it needs to be emphasized that strengthening school is only a part of keeping schools safe from disasters. In order to build resilience of nations and communities, a continuous process of understanding the hazard, reducing the risk and responding the disaster efficiently has to be institutionalized in the schools and a process has to be created for effective interfacing with the community.

Recognizing the importance of school earthquake safety, several initiatives have been taken in countries such as Canada, India, Nepal, and United States. At international level, Hyogo Framework of Action (HFA) 2005-2015 – adopted in January 2005 by 168 member countries in Kobe, Japan, as the guiding blueprint for realization of disaster risk reduction in the next 10 years – has focused on 'Use of knowledge, innovation and education to build culture of safety and resilience at all levels' as one of the five priorities of action. The focus has been laid on including disaster education in schools and formal and non-formal education and protection of public facilities. As a part of implementation of Hyogo Framework for Action 2005-2015 and the United Nations Decade of Education for Sustainable Development (2005-2014), UN/ISDR with cooperation with UNESCO coordinated The World Disaster Reduction Campaign 2006-2007 with the central theme of "Disaster Risk Reduction Begins at School," aiming to encourage the integration of disaster risk education in school curricula and the safe construction and retrofitting of school buildings to withstand natural hazards. This campaign was successful in bringing focus of different stakeholders on importance of safe schools against disasters.

United Nations Centre for Regional Development (UNCRD) has been promoting the School Earthquake Safety Initiatives (SESI) through various projects since 1999. Currently, UNCRD is implementing a project on "Reducing Vulnerability of School Children to Earthquakes" (2005-2008) in Asia-Pacific region. The project aims to make schools safe against earthquakes and build disaster resilient communities through a process of self-help, cooperation, and education. The project includes retrofitting school buildings in a participatory way with the involvement of local communities, local governments and resource institutions, training on safer construction practices to technicians, disaster education in schools and local communities.

We have a moral, social and economic obligation to act now in building resilient communities and nations. Last year saw the launch of a global awareness campaign entitled "Disaster risk reduction begins at schools". Its aims to mobilize Governments, communities and individuals in making disaster risk an integral part of school curricula, while ensuring that school buildings are built or retrofitted to withstand natural hazards.

Ban Ki-moon,
UN Secretary-General

Message on the International Day for
Disaster Reduction
10 October 2007



II. UNCRD and School Earthquake Safety Initiatives (SESI)

UNCRD and School Earthquake Safety Initiatives

Disaster Management Planning Hyogo Office

Since its establishment in 1971, United Nations Centre for Regional Development (UNCRD) has been engaged in research and training to promote regional development particularly in the field of human security, environment and disaster management. The UNCRD Disaster Management Planning Hyogo Office (Hyogo Office) was established in 1999 in Kobe to reflect the experiences from the Great Hanshin-Awaji Earthquake of 1995. The Hyogo Office undertakes research and information dissemination activities to implement the "Hyogo Framework for Action", adopted at the UN World Conference on Disaster Reduction (WCDR) in 2005.

Regional Development and Schools

Schools play a vital role in every community and region. The extent and nature of the contribution of schools go beyond traditional forms of education to school children. Their contribution to their regional development varies from cultural to economical, informational to environmental and vice versa. Recognizing the importance role of schools in regional development, each region and community needs to strive to improve quality of education and facilities. Capacity building of human resources and securing financial basis to provide adequate education and facilities must be considered in the process of formulating education policy at regional level.

Past experience has indicated that the basic problems related to disaster mitigation and preparedness in developing countries can be attributed to lack of capacity, awareness, education, and self-reliance within the communities. An appropriately educated and self-trained community is much more capable of coping successfully with natural disasters, and of reducing their impacts. The current SESI project aims to promote culture of mitigation through community participation and the empowerment process tailored to residents with specific needs will

complement, enlarge, and sustain the ongoing efforts. As disaster risk reduction is also a key for sustainable regional development, concept of disaster risk reduction should be integrated into school curricula and school facility management.

School Earthquake Safety Initiatives

UNCRD Disaster Management Planning Office initiated School Earthquake Safety Initiative (SESI) in 1999. SESI is aimed to promote self-help and education for disaster mitigation by building safe and sustainable communities. The participatory approach to community development and capacity-building among the local people is the key focus area of the initiatives. Schools have been found to be the key element for community involvement in Japan and other countries worldwide. Schools not only provide education, they can provide emergency shelters immediately after earthquakes. Through this school-strengthening programme, a community programme has been formulated to spread the technologies rooted in culture and heritage.

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 governments and the community as a whole.

As the initial stage, field survey was conducted to study the issues of School Earthquake Safety in Bengkulu, Indonesia, Kathmandu, Nepal, and Chamoli, India.



School building in Chamoli, India

MAIN ISSUES IN EARTHQUAKE SAFETY OF SCHOOLS

- 1) Earthquake Hazard assessment of the area.
- 2) Local soil conditions affecting the seismic impact.
- 3) Typology of the buildings (class rooms, laboratories, gymnasia, hostel buildings).
- 4) Vulnerability of these buildings to the probable maximum Intensity of the earthquake
- 5) Assessment of risk at various Intensity levels including the population density of the schools and the knowledge base of the pupils to protect themselves during occurrence of an earthquake.
- 6) To have appropriate legislative measures in place regarding siting of the schools.
- 7) Improvement of Building Codes and their mandatory provision in the Building Byelaws of the Local Bodies (municipalities, town area committees etc.)
- 8) Seismically safe construction of new school buildings using local materials and skills.
- 9) Guidelines for extension of the building horizontally or vertically.
- 10) Guideline to achieve good quality of construction.
- 11) To take into account the increase in the population density in the schools due to population increase with time, and the degradation of the building due to aging.
- 12) To create awareness about safety in earthquakes through Do's and Don'ts and training of teachers and pupils in observing the same in various phases of the earthquake occurrence.
- 13) To involve communities in safety aspects through awareness, training and technology transfer.
- 14) To find funding organizations to help build new schools and retrofit existing unsafe schools.
- 15) To study the evacuation of the occupants of the school buildings after a major earthquake event.
- 16) Open access to the school in case of a disaster so that children and their teachers could be evacuated safely and quickly.

Consultation Report on Field Survey of Natural Disasters, 2002



Left: School children in Bengkulu, Indonesia
Right: School children in a classroom, Kathmandu, Nepal

Hyogo – Kathmandu Collaboration on Earthquake School Safety (2001 -)

As a part of the SESI, UNCRD Hyogo Office contributed to start an exchange programme between schools in Kathmandu and Kobe in collaboration with National Society of Earthquake Technology-Nepal (NSET), Nepal based NGO.

Recognizing the importance of education for disaster risk reduction especially after the experience of Kobe Earthquake of January 17, Maiko High School, located in Kobe started Environment and Disaster Mitigation course in April 2002 with a purpose to promote culture of disaster mitigation to young generations.

In Nepal, NSET-Nepal started an initiative to raise Earthquake Awareness in Nepal focusing on retrofitting vulnerable school buildings in the Kathmandu Valley, and Bal Vikas Secondary School was selected for this purpose. The retrofitting work of the school started in 2002 through mason-training program, with resources from parents and local villages. The activities aimed not only to protect lives of children, but also to empower communities by providing safer construction practices.

While Maiko High School promotes the disaster education curriculum, Bal Vikas Secondary School attempts to raise awareness for disaster education through the retrofitting activity. Therefore, UNCRD Hyogo Office and NSET-Nepal linked up two activities to exchange information, culture, and learn from each other. Students are expected to be the ambassadors for disaster mitigation in the future.

As of 2008, this exchange programme between Maiko High School and Bal Vikas Secondary School still continues.



Bal Vikas Secondary School, Nepal
Top: Before school retrofitting Bottom: After retrofitting

Hyogo Gujarat Friendship Fund (2001-2004)

Hyogo prefecture, Japan was devastated by the Kobe Earthquake (Great Hanshin-Awaji Earthquake) in 1995. The people of Hyogo resolved to do something about rehabilitation in other earthquake affected areas and decided on more concrete, long- term commitment – setting up a task specific fund for a rehabilitation project involving school children.

After the devastating Gujarat Earthquake of 2001, UNCRD Hyogo Office assisted them to initiate a project to utilize the fund by giving expert advice and coordinating stakeholders. The basic concept is to establish a safer and sustainable community through self-help, cooperation and education. The overall objective is to conduct the comprehensive

earthquake disaster mitigation training-cum-capacity building programme for community development and long-term sustainability with special focus on the school system and the non-engineered construction procedures in the affected areas. The scope of work included construction of one training cum dissemination center in Gujarat, retrofitting of schools, construction of new school cum community centers, and conducting trainings to local masons in the process of construction and retrofitting work.

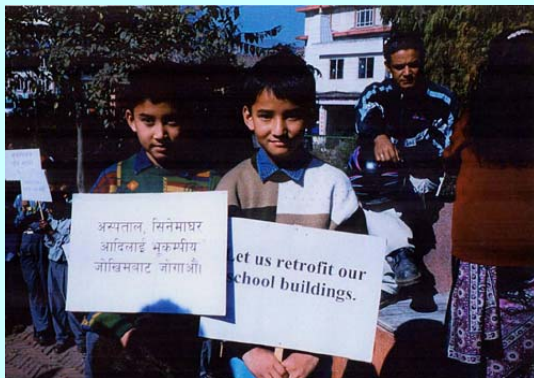
Project on "Reducing Vulnerability of School Children to Earthquakes"(2005-2008)

UNCRD is currently implementing a project on "Reducing Vulnerability of School Children to Earthquakes" in Asia-Pacific region under project execution by UN Department of Economic and Social Affairs (UN-DESA) and funded by UN Trust Fund for Human Security (UNTFHS) since April 2005.

This project is undertaken in four earthquake prone countries in Asia-Pacific: Fiji, Indonesia, India, and Uzbekistan.

The project aims to ensure that school children living in seismic regions have earthquake safe schools and that local communities build capacities to cope with earthquake disasters. The project includes retrofitting of some school buildings in a participatory way with the involvement of local communities, local governments and resource institutions, trainings on safer construction practices to technicians, and disaster education in school and communities. These activities are carried out in Fiji Islands, India, Indonesia and Uzbekistan as demonstration cases which will be disseminated throughout the respective geographical regions through regional and international workshops.

The details of the projects are introduced in the next session.



Left top: School children in Nepal
 Left bottom: A class in a tent in Ache, Indonesia
 Right: A class outside, Iran

Also, it is our right to have a safe school. We don't build out school building ourselves. But if it is very weak then earthquake will destroy it and kill us. Why should we children die from weakness which other create? That is not because of our fault. It is their fault who build houses. So we request all our parents, teachers to build safe school buildings for us.

Letter by Ms. Sony Maharjan (13),
addressed at UNESCO conference,
Mexico, 2003

*OECD publication: keeping schools
safe from earthquakes"*



Top: School children at a public seminar supported by Shimla District Commissioner with a support from DIPECHO in Shimla, India

Bottom: School children at the disaster awareness week,



III. Reducing Vulnerability of School Children to Earthquakes

Introduction

The current SESI on “Reducing Vulnerability of School Children to Earthquakes” project aims to make schools safe against earthquakes and build disaster resilient communities through a process of self-help, cooperation, and education. The project includes retrofitting school buildings in a participatory way with the involvement of local communities, local governments and resource institutions, training on safer construction practices to technicians, disaster education in schools and local communities. These activities are being carried out in Fiji, India, Indonesia, and Uzbekistan as demonstration cases which will be disseminated throughout the respective geographical regions through regional and international workshops.

Objectives of SESI are as follows;

- I. To ensure the seismic safety of schools through retrofitting of school buildings, disaster education and training of teachers and students
- II. To build safer communities through demonstration of school retrofitting, training of masons and technicians, community workshop, and educational campaigns
- III. To disseminate a culture of safe schools and safe communities through regional and international workshops

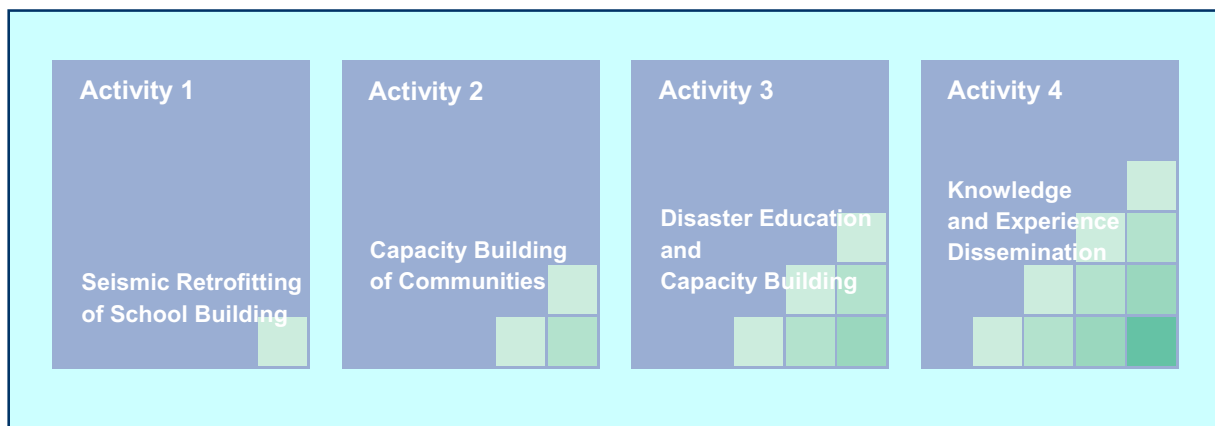
The project includes seismic vulnerability analysis of about 10 selected schools in the project city in each country and the retrofitting of some of them

which incorporate prominent construction typologies of the region. This leads to the development of country specific guidelines on earthquake safe construction which incorporates solutions to the practical problems experienced during school retrofitting. Following is the schematic diagram of the process of this component.

Seismic Retrofitting of School Buildings

The project includes seismic vulnerability analysis of about 10 selected schools in the project city in each country and the retrofitting of some of them which incorporate prominent construction typologies of the region. This leads to the development of country-specific guidelines on earthquake safe construction which incorporates solutions to the practical problems experienced during school retrofitting. Following stepwise approach is adopted for retrofitting of school buildings:

- (1) Criteria Development for School Selection
- (2) Guideline Development for Preliminary Assessment / Evaluation
- (3) School Selection
- (4) Preliminary Evaluation of School Buildings
- (5) Detail Seismic Analysis and Retrofit Design of Selected Schools
- (6) Retrofitting of School Buildings
- (7) Retrofitting Guideline Development



Capacity Building of Communities

Retrofitting of schools in local communities can act as a demonstration of proper earthquake technology to residents. Masons in these communities get on-the job training during the retrofitting of schools. In addition, technicians in each project city get training on earthquake design and construction of houses. Consideration is given to local practices, material availability, indigenous knowledge, and affordability of earthquake technology during trainings.

Disaster Education and Awareness Raising

The project includes the development and wide distribution of educational booklets, posters and guidebooks on teachers' training and students' drills for earthquake disaster preparedness and response. The guidebooks gain verification and are updated through training and mock drills.

In order to integrate disaster risk reduction (DRR) education into school curricula, current curriculum

is being assessed. Integration modality and plan will be developed for the improvement of school curriculum to take the DRR measures into account. The project also develops an interactive educational tool for awareness-raising on earthquake disasters and simple seismic risk assessment of buildings aiming to motivate householders to plan the seismic upgrading of their houses.

Knowledge and Experience Dissemination

Regional and international workshops on school seismic safety will be held to disseminate lessons from the project cities to a wider audience. It is expected that distribution of guidelines on safe construction, training manuals for technicians, and education and awareness booklets will help to generate a sustainable demand for the seismic safety of schools and buildings.

Educational interactive software on general awareness and risk assessment at the household level will be published in local languages to facilitate their application and distribution.



Republic of Fiji Islands

Introduction

The Republic of Fiji Islands, situated in the Pacific “Ring of Fire,” has frequent small earthquakes. An earthquake of magnitude of 6.75 in 1953 caused considerable destruction of property and life. It is a growing concern now that next large earthquake close to Suva would result more damage because of increased vulnerability owing to haphazard urbanization in the past decades. In order to cope with future earthquakes, several initiatives have been taken at national and local level in recent times. Fiji is also vulnerable to other natural disasters such as the wind storms, floods and drought. Disaster data reveal that one wind storm hits the country one and half years.

The project “Reducing Vulnerability of School Children to Earthquakes” builds on the past achievements of managing the earthquake risk in the country. Schools in and around Suva city are selected for the intervention for this project. The project maintains synergy with policy and programs of National Disaster Management Office (NDMO), a government focal point for disaster management, which carries out community based disaster management activities. Ministry of Education has also placed high priority in staging the school safety program into national campaign for safe school.

Partnership

UNCRD in Fiji coordinates its activities along with project counterpart, National Disaster Management Office (NDMO). NDMO is a unit within the Ministry responsible for disaster management, wherein the day to day functions of the disaster management are conducted. NDMO deals with disaster management at the national level. It is the prime policy formulating body and is also responsible for disaster rehabilitation. One of its core activities includes disaster management training and public education on par with its coordinating requirements with other governmental departments.

UNCRD-NDMO partnership is focused both at the policy advocacy level as well as at the community level in the field of disaster preparedness with special focus on schools. UNCRD recognizes the importance of working with the government on par with the local NGOs and the Civil Society Organizations in order to make the interventions replicable and sustainable. UNCRD’s efforts in making the schools safer place for learning are realized with the active participation of its partners and the involvement of the community.

UNCRD also involves the expertise of local scientific institutions such as the Fiji Institute of Technology (FIT), the Centre for Appropriate Technology and Development (CATD) and the Fiji Institute of Engineers (FIE). In order to mainstream earthquake preparedness as an integral part of education and for facilitating wider dissemination of information, UNCRD collaborates with Fiji Social Service Council (FSSC) as well. The local government bodies such as the Public Works Department (PWD) are also involved for greater accountability and implementation of the project at the community level.



Balantine School in Suva, Fiji

School Building Assessment

NDMO has conducted several consultative meetings with stakeholders namely, Ministry of Education, Fiji Institute of Technology, Centre for Applied Technology and Development (CATD), Fiji Institute of Engineers (FIE), Mineral Resource Department, Public Work Department (PWD), Fiji Council of Social Service and others. A steering committee has been established and special technical sub-committees were formed for school assessment and retrofitting.

The first technical committee for school assessment carried out analysis in 10 schools in and around Suva. The committee developed seismic structural assessment methodology with UNCRD expert advice and carried out further technical evaluation of 5 schools as pilot project. The evaluation process provides a systematic and uniform

approach for engineers and technicians to use in deciding the Structural Performance Score (SPS) of building with an assigned Grading of Seismic Risk. It was found that all buildings assessed failed to meet the earthquake safety standards with over 80 percent in the least and worst grade.

Training Manual Development

As the project focuses on the on-site implementation of training and capacity-building programme for earthquake disaster mitigation to transfer the technology of earthquake resistant construction and hence ensure the safety of school children and communities in general. The local engineering expert and training expert developed a draft a manual on disaster safe construction for local masons, carpenters and technicians. The manual was reviewed by experts and stakeholders in a national review workshop.



Balantine Memorial School in Suva, Fiji

The manual was tested for implementation through training of carpenters – one of the target groups. As the main part of the project is to conduct the demonstration training based on the manual, it served as platform to test and get feedback from the users which would be incorporated before printing the documents for public use.

One day demonstration training was held in December 2007 in Suva. Training workshop was conducted using the draft manual as participants' handbook. The training program received comments from the participants on the suitability of the content, presentation of the material and overall evaluation. Technicians from the Ministry of Education urged to make the manual as the national guideline for school construction.

Following is glimpse of the training program:

- Pre-training survey on risk perception on housing earthquake safety
- Hazard basic
- Building performance (how does building behave in earthquakes)
- Common deficiencies of buildings
- Planning for earthquake resistant construction
- Earthquake resistant construction
- Retrofitting of school and similar public buildings
- School building maintenance system
- Test and feedback.



Educational materials in development in Fiji

Review of School Safety Book

A national review workshop on school safety book was held in Suva. Participants were school supervisors from the Ministry of Education, education experts, selected school teachers in charge of the occupational health and hazard management unit, PWD and CATD. The workshop involved a series of presentations on key features of safety books followed by details discussion on the contents in group and plenary. The comments and feedbacks by stakeholders and experts are to be incorporated in the final version of the draft books. In the workshop, a review has been made from experts, stakeholder representatives, and representative of target users of the guidebooks. In the workshop, comments and reviews were received in the following areas:

- I. Hazard, vulnerability and risk of earthquake in the Fiji Islands in the context to safety of school system
- II. Preliminary self assessment of school facility against potential earthquakes
- III. Rapid response to emergency situations
- IV. Role of school administration, teachers and students in emergency management planning in the schools
- V. Preparedness and mitigation measures in schools
- VI. The structure of drill exercise to be carried by teachers and students in each school.

India

Introduction

Following the 2001 Gujarat earthquake, there has been concern over the need to promote earthquake safety in India. A majority of the states along the Himalayan belt are in highest seismic zone which includes Himachal, Uttaranchal, Assam among others.

The unique geographic setting at the northern-western fringe of the youngest mountain chain (The Himalayas) places Himachal Pradesh in the most active seismic zone (Zone V). Therefore, the project activities are to be carried out in Shimla district of Himachal Pradesh. Shimla city is commemorating the centenary of India's worst earthquakes till date – the 1905 Kangra Earthquake.

The project is taking momentum along with other initiatives by state and local governments in association with civil society in recent past, like preparation of Earthquake Mitigation Plan of Shimla District to put forward the concept of safe school and safe communities. Shimla Municipal Corporation implements the project at local level as a counterpart agency where as Shimla District and Himachal State Government provides policy support and interface with other states and countries for its outreach. Sustainable Environment and Ecological Development Society (SEEDS) serves as local resource institution to implement the project.

School Building Assessment

In order to select schools for retrofitting, SEEDS technical team consisting of engineers and community leaders went for rapid visual screening of the buildings in Mashobra block in Shimla district.

The main criteria of selection of the buildings are as follows:

- Condition of school building based on rapid visual screening
- Location of the school building

- Visibility of school with surrounding locations
- Number of students and teachers in School
- Accessibility of the school building

Problem of assessment of safety of existing structures against various loads, including earthquake load, has been recognized world over. In developing countries, about 50% of the construction industry resources are being utilized for problems associated with existing structures. The problem is slowly showing its extent in India as well.

Assessment of an existing structure is much more difficult task than evaluation of a design on paper. Firstly, the construction of the structure is never exactly as per designers' specifications and number of defects and uncertainties crop up during the construction. Secondly, the quality of the material deteriorates with time and the assessment of existing structure becomes a time dependent problem.

There are three sources of deficiencies in structures:

1. Defects arising from original design, such as under estimation of loads as per old standards or practices, inadequate section or reinforcement, inadequate reinforcement anchorage and detailing
2. Defects arising from original construction, such as under strength concrete, poor compaction, poor construction joints, improper placing of reinforcement and honey combing
3. Deterioration since the completion of construction due to reinforcement corrosion, alkali-aggregate reaction etc.

The survey was conducted using a survey form which consisted of two parts:

- Part A: General information
- Part B: Specific on building block

Their brief survey result is given in the following section.

1. Government Senior Secondary School, Mashobra

This school is having strength of 600 students ranging from the age of 5 years to 16 years old and 28 teachers. The school is owned by education department of Himachal Pradesh. This school was built during 1947. There are 20 rooms in this building for running classes and school administration.

The school building is having G+2 stories and made up with the traditional materials like stones, wood and burnt bricks. Building is having a plinth area of more than 500 sqm. Shape of the building is nearly rectangle as at one end of the building there is offset because of the staircase block. Position of the site for the building is fairly safe from different hazards like landslide, rock fall. Sub soil condition of the building is rocky and it's been built in a right manner.

There are lots of defects in the building due to deterioration and ageing effects. In lots of places vertical wooden members damaged and they are not strong enough to transfer the load safely to the foundation of the building. All the floors are made of the wooden planks and in lots of places wood is damaged. In many locations in the panels of infill masonry wall there are diagonal as well as vertical cracks in the building which shows that there were some subsiding at the site of building might have happened in the past.

2. Government Senior Secondary School, Kufri

The school has 15 rooms in the entire campus and is running classes from nursery to standard 12th with 300 students and 14 teachers. This building is also run by State Education Department of Himachal Pradesh.

One of the building blocks was surveyed. There were lots of flaws found in the design of the building. At many places we can see the spill out of the concrete covers from the slab of the building and corroded reinforcement could be seen from under the slab. There were lots of shear cracks in wall of the building which shows that load is not being transferred in a proper way. There are also columns which are not properly oriented in the building which can attract lots of stresses during the time of an earthquake. This school building can be one of the good examples for the community and administration for spreading earthquake safety in Himachal Pradesh.

3. Government Primary School, Koti

There are total 4 teachers and 78 students studying in this school. The building is owned by Education Department of Himachal Pradesh.

The school was constructed in 1953 and some rooms were added during 1990. This school building is having five rooms and construction materials used for the building are different based on the year of construction. Old portion was constructed with wooden bands and flat stones. There is no sign of mortar used as binding materials between two stones. Thickness of wall is 18".

As this school building is old, constructed during 1953, aging of the building is a serious problem and also there are lots of technological defects. As there is no proper use of the mortar, separation in the building wall can be observed clearly. At every cross wall of the class room there is no proper bonding and huge vertical cracks have been developed at every corner of the building as shown in the picture. There are lots of cracks developed at the corner of each opening which shows that building might have experienced lateral thrust in the past.



Left: Government Senior Secondary School, Mashobra
Center: Government Senior Secondary School, Kufri
Right: Government Primary School, Koti

4. Government Primary School, Junga

There are about 120 students in this government run school with classes from nursery to 5th standard. This school building is one of the oldest buildings as this was constructed during the British time by the King of that time. There are five teachers in this school who are running the classes. This school is also a part of education department of Himachal Pradesh.

This school building is situated in very large campus and this block for Primary School was constructed in 1931. Main construction materials used for the construction of the school is stone and wood with mud mortar. Thickness of the wall is 18" and partitions are made out of the plywood.

This school building is having lots of defects into building because of the aging of the structure and poor quality of materials used for the construction of the building. There are lots of cracks in the walls and around the openings of the building. Plaster is being chipped off in many places. There is no continuous band provided in the building for resisting any lateral loads. Condition of roof structure and roof covering is better in comparison with other elements of the building. Integrity and continuity in walls of the building can be seen.

5. Government school for differently abled children, Dhali

This school is run by the state government for deaf and blind children from Himachal Pradesh. There are 120 students in this school from nursery to 10th standard and 12 teachers work in the school. In order to support differently abled children 8 people are working apart from the teaching staff.

This school campus is having four building blocks which are situated at different levels because of the hilly terrain and two blocks are used as hostel. The rapid visual survey of hostel block was conducted.

This school building was built during 1980s and because of weather and aging it has developed lots of defects. There are diagonal cracks around openings. There are lots of vertical cracks also on exterior wall of the building. Condition of the flooring is really deteriorated and students are facing lots of problems due to the same. This building is not only lacking the proper earthquake resisting features but it also lacks the universal design for differently abled children.

6. Government Primary School, Mundaghat

This school campus is consisting of three blocks. It is having Primary as well as Secondary Schools. The survey was carried out in Primary School because of the area and condition of the school building. In primary school there are total 30 students and 3 teachers and the school is running classes from nursery to 5th Standard.

This building block was constructed during 1950s with stone masonry and mud mortar. Workmanship of the building is very poor as there are lots of elements missing in the structure. This building is having G+1 storey and the storey above ground floor is in very bad condition which is not being used by school authorities. There is no open space in the school.

The roof is supported by slender brick column which can't transfer the load. There are lots of other defects in the school. Walls are not in a good condition and cracks can be seen in every wall. There is no coherent load path in the building. There is a broken verandah which can be very dangerous for the school children even during normal time. This building is in such bad condition that retrofitting is not possible.



Right: Government Primary School, Junga
Center: 5. Government school for differently abled children, Dhali
Right: Government Primary School, Mundaghat

Public seminar and exhibition on earthquake safety, Shimla Ridge

The Public seminar and exhibition was organized by Shimla District Commissioners office with support from DIPECHO, SEEDS, UNCRD, and other local stakeholders took part in the event. Following was the seminar and exhibition program:

Venue: Shimla Ridge Open Ground
Date: 4th April 2007 (11:00- 15:00)

1. Opening Remarks
 - Shimla district commissioner
2. School earthquake safety demonstration (emergency evacuation and first aid)
 - SEEDS / UNCRD
3. Demonstration of Search and Rescue in the aftermath of the earthquake
 - Army division of government India in Shimla
4. Demonstration of fire fighting
 - Fire fighting Division of Shimla, ministry of Home affairs
5. Street drama on earthquake safety
 - SEEDS in association with local



- Public Seminar and Exhibition: From top
1. Commemorating 1905 Kangra earthquake
 2. School children participating the public seminar
 3. School children held exhibition booth to promote earthquake safety
 4. First aid demonstration

Republic of Indonesia

Introduction

Indonesia lies in seismically very active region which is characterized by numbers of major earthquakes frequently. This location makes Indonesia an earthquake prone country and has experienced more than twenty earthquakes of magnitude 6.5 or higher during the past five years alone. It was the most affected country by the great Sumatran Earthquake and Tsunami Disasters in 2004 and the following Earthquake 2005. Many schools were collapsed or damaged in these earthquakes due to inappropriate design and construction. Many of these school buildings still remain damaged.

Realizing importance of school safety, SESI project was implemented in Indonesia from 2005. The schools and communities for this project are from Bandung city, which was affected by an earthquake in February 2005. The concept of long term mitigation in this project, particularly towards safer schools and communities, influence the reconstruction process resulting in sustainable development.

Institute Bandung Technology Center of Disaster Mitigation (CDM/ITB) serves as local resource institution to implement the project with a support of Bandung City, Bandung District and Department of Education.

School Building Assessment

Bandung City Department of Education Office, Center of Disaster Mitigation / Institute of Technology Bandung (CDM/ITB) and UNCRD jointly carried out school building assessment in Bandung City which was struck by an earthquake in February 2005. The assessment clearly showed that there was an urgent need to retrofit of school buildings to protect children from the future earthquakes.

The followings are pictures of schools that were assessed under the project.



Left top: SDN Cirateun
Left bottom: SDN Cibodas II

Right top: SDN Legok Jambu
Left bottom: SDN Sukamulia

School Retrofitting Intervention

Aside from the project, Hanshin Department Store Labor Union where members experienced the Kobe Earthquake (The Great Hanshin-Awaji Earthquake) proposed to support the UNCRD SESI and the project by making a financial contribution to retrofit a school in Bandung as a part of their 50th memorial anniversary initiative to.

In consultation with Department of Education of the City of Bandung, Cirateun Kulon 2 Public Primary School (SDN Cirateun) was selected for the retrofitting intervention. The consultation meeting was held with School Management Committee followed by agreement between Union and school management committee.

The assessment by experts revealed problems in existing conditions such as poor roof truss connection, inadequate roof truss support, inadequate ring beam, no reinforced concrete for brick column, inadequate foundation. Some of them are shown in the pictures. After the structural condition was assessed, the design was developed by engineering experts from CDM/ITB. The consideration was given to the affordability, availability of materials, local technology.

In the process of retrofitting, CDM/ITB provided basic on-site training and briefings to the local contractor on retrofitting works and supervised the work by inspection, control, and guidance/direction.



SDN Cirateun before retrofitting



Problems with existing conditions: From top

1. Poor roof truss connection
2. Inadequate ring beam
3. Inadequate foundation

Retrofitting Work: From top (next page)

1. Strengthening of roof truss connection
2. Anchorage of wall
3. Bottom: Finishing work

(CDM/ITB)



SDN Cirateun after retrofitting

Awareness Raising for Disaster Risk Reduction

In addition to providing expert service, experts from CDM/ITB interacted with school children about disaster risk reduction and school earthquake safety. The program was followed by earthquake evacuation drill. The whole program was very effective as the school children became aware of preparedness and the importance of structural mitigation of building to protect lives of themselves and their family members.

With the completion of the retrofitting work, the one day program was organized by Cirateun school management committee and ITB to inaugurate the retrofitted school and disseminate earthquake technology that was employed in the school. The program consisted of formal inauguration, speech by representatives of participated institutions, description of the retrofitting techniques, visit to school components and demonstration of school preparedness drill.



Top: Education for DRR
Bottom: Earthquake evacuation drill

Republic of Uzbekistan

Introduction

Uzbekistan is situated in tectonically active region and exposed to high seismicity. Tashkent, the capital city, was hit by strong earthquake in 1966 causing huge damage to lives and properties. In the last decade, there have been several initiatives to contain the risk of earthquakes in Tashkent. It was one of the case study cities for IDNDR RADIUS and Global earthquake safety Initiative (GESI).

The government of Uzbekistan recently initiated National Program for Improvement of Educational Facilities which includes improvement of school buildings among others. This program provides base for the current project.

The current UNCRD project site in Uzbekistan is Tashkent city where Hokimiyat office is a counterpart agency. Ministry of Education is taking stake in the project to spread similar program throughout the country. Research Institute for Experimental and Typical Building (UzLITTI) serves as local resource institution to implement the project in Tashkent.

School Building Assessment

The project carried out a preparatory field survey to assess conditions of school buildings and to recommend measures to solve the structural problems by school building typologies. In Tashkent city there are more than 360 schools. Nearly 20% of school buildings have had damages of different level at present. Preliminary analysis of seismic risk for Tashkent city showed that more than 25% of school buildings may be completely destroyed and 30% may be heavily damaged in case of design earthquake.

The buildings of schools and pre-school facilities in Tashkent are represented mainly by 2 constructive systems: Bricks and RC frame-panel and few buildings from adobe bricks. Nearly 35% of school buildings were constructed before earthquake of 1966 for design intensity 7 by MSK scale. Since

1966, half of school buildings were erected using assemble RC frames of IIS-04, which are not seismic resistant as has been revealed by results of engineering analysis of consequences of Spitak (1988) and Kairakum earthquakes (1985).

Many school buildings in Tashkent are situated in the zone with slumping soils, and in the result many buildings as brick as frame panel type were damaged.

The survey showed that typical structures used for school building in Tashkent basically consist in brickwork up to 4 storey buildings, and in reinforced concrete frame-panel for the more recent buildings. Recurrent structure typologies for school buildings were then catalogued in the following three groups:

- Mixed type of brickwork and reinforced and reinforced concrete or wood reinforcing frame-residual buildings – year of construction '40s
- Brickwork structures, frequent typology used until late 60s
- Frame-panel, widespread used in the modern construction

In order to realize and effective recognizable link to the local Educational and Professional tradition in the area, and allow a standard analysis, the characterization has to deal with the previous study on the Risk Assessment in the area in the framework of IDNDR RADIUS project.



School retrofitting, in Tashkent, Uzbekistan

Main Technical parameters assessed during preliminary field survey

- Year of construction and building codes acting in this period
- Constructive type of bearing elements of the building
- Existing antiseismic measures and comparison with modern requirements
- Design intensity
- Relative bearing capacity of the building main elements
- Soil conditions
- Existing damages

Building affected by soil parameters

It has been found in Tashkent that even important structures like schools are frequently constructed in alluvial deposits or filling layers of former depressions, canals or river beds. As observed during the survey, buildings damaged by deformation of foundations due to soil settlement is very frequent. The main reasons for these failures are:

- quality of foundation soils, composed of highly compressible soil, even under small contact pressure.
- the leakage of pipelines or lifelines that produce, even in not highly compressive soils, variation of water content and increasing deformation at the same stress level
- the variation of water level, related to the natural seasonal variation of rainfall height and to the hydrological regime of drainage axis
- variation of boundary conditions in the building area: excavation, fills, construction of new buildings or other

According to preliminary survey two old brickwork school buildings with damages, constructed in late 30th, 40th and up to 1964 were identified for retrofitting. Among the frame panel school buildings, one school was identified to reinforce which suffered damage basically from soil subsidence.

Community Seminar on Earthquake Safety

Community seminar was held to raise awareness of parents on earthquake safety. 30 parents (29 females and 1 male) from Makhala (neighborhood association) of school #116 which was under retrofitting participated the seminar.

Venue: School # 116, Tashkent
Date: 6th July 2007 (10:00- 12:30)

1. Earthquake Risks at Schools and Earthquake School Safety
2. Earthquake safety (including Do and Don't Do) and movie on life safety
3. School safety and role of parent for overall safety of children



Community seminar at school #116

Training workshop on Earthquake Safety Education in School

A training workshop was jointly organized by UNCRD, Tashkent Khokhmiyat Office, Uzbek Research Institute of Building Architecture and Construction (UZLITTI), NGO HAYOT, INSONIYLIK Training Centre of Red Crescent Society of Uzbekistan. 30 school teachers in Tashkent city participated in the training. The School Safety Manual for Teachers developed by the local experts were used for this training.

Date: 2-3 July 2007 (10:00- 12:30)

2nd July 2007 – Day 1

1. Introduction to the workshop and needs assessment
2. Earthquake Safety Basic
3. Earthquake Risk Communication:
4. Emergency Preparedness:

3rd July 2007 – Day 2

5. School Emergency Preparedness and Plan
6. Field exercise and Group Work
7. Disaster Education in Curricula
8. Earthquake safety of school buildings



Group work at Training Workshop

Training workshop on Earthquake Resistant Construction

A training workshop was jointly organized by UNCRD, Tashkent Khokhmiyat Office, Uzbek Research Institute of Building Architecture and Construction (UZLITTI), NGO HAYOT, INSONIYLIK Training Centre of Red Crescent Society of Uzbekistan. Local technicians and engineers participated in the training. Guidelines for Earthquake Resistant Construction developed by the local experts were used for this training.

Date: 4-5 July 2007, Tashkent

4th July 2007 – Day 1

1. Earthquake Basic
2. Building performance in earthquakes
3. Earthquake resistant construction of RC
4. Case study of school retrofitting of masonry (Tashkent school no:116) by designer
5. Design of masonry buildings – lecture and movie
6. Explanation of guidebook on earthquake resistant construction developed under UNCRD school project in Uzbekistan
7. Group Work

5th July 2007 – Day 2

Filed visit of school retrofitting sites

1. Tashkent school number 94
Building Type: Masonry, two buildings
2. Tashkent school number 116
Building Type: RC frame panel building with total 6 blocks



IV. Activities Reports

Asia-Pacific Regional Workshop on School Education and Disaster Risk Reduction

The workshop was jointly organized by UN/ISDR, UNCRD, UNESCO, UNICEF, IFRC, ADPC, ASEAN, UNESCAP, ASB, OCHA and ADRC with aim of reviewing the progress made in the Asia and Pacific region in advancing priority 3 of Hyogo Framework for Action (2005-2015): Building the resiliency of Nations and communities to disasters (HFA) and identify remaining challenges facilitate the integration of disaster risk reduction as part of school curricula and the promotion of school safety as part of national DRR strategies through increased political awareness of stakeholders.



UNCRD Session

UNCRD led sessions in the workshop

The UNCRD organized a plenary session on “Making schools safe from disasters” in the workshop on 9th October 2007 followed by working group session on the same theme. Both of the sessions focused on government policy in adopting safe construction policy for schools and the technology dissemination and adaptation issues including guidelines. The session focused on government policy in adopting safe construction policy for schools and the technology dissemination and adaptation issues including guidelines. In specific, the session has following objectives:

- To share knowledge and experiences of school earthquake safety at Asia –pacific regional level
- To define the challenges, critical needs and opportunities in implementing the school earthquake safety programs
- To identify the policy issues for institutionalization of school safety into national development program

Outcome of the workshop

Recognizing the wealth of valuable initiatives and key networks already existing at the regional level, and in a spirit of building on the latter and strengthening them through increased coordination and synergies, the participants adopted the “**Bangkok Action Agenda**” that sets out four key priority areas of focus:

- Integration of DRR into school education
- Strengthening Disaster Risk Reduction Education for community resilience
- Making Schools Safer
- Empowering children in DRR

Recommendations included in particular

- Formal recognition by Governments / Ministries of Education through a set of concrete recommendations highlighting the importance and urgency to include DRR as a priority in school curricula agendas and to develop further systematic school safety construction measures
- Guidelines to assist Governments and schools in integrating DRR into school curricula and school construction
- Recognition of traditional and indigenous knowledge for DRR as an important non formal education tool and the need to involve more systematically local communities, NGOs, villages leaders in the educational process
- Children were recognized as key players in DRR who deserve special attention and consideration and should be empowered through the constitution of Youth Parliaments for DRR

International Workshop on Keeping Schools Safe from Earthquakes 2006

An International workshop was organized on June 1-2, 2006 in Kathmandu, Nepal on the theme of Keeping Schools Safe from Earthquakes. The workshop was organized with following objectives.

- To share knowledge and experiences of school earthquake safety at the global level, including experiences from pre-disaster mitigation and post-disaster reconstruction
- To identify major elements of sustainable school earthquake safety relating to its institutionalization at national level
- To define the challenges, critical needs and opportunities in implementing the school earthquake safety
- To understand the field level experience of community based school earthquake safety program

Thematic focuses of the Workshop

1. Public Policy and School Safety

The workshop explored most appropriate approach to link the school earthquake safety with national poverty alleviation, millennium development goal and educational for all.

2. School Retrofitting Technology

Prior to retrofitting, seismic vulnerability assessment of existing school buildings and prevailing construction practice is necessary. The vulnerability assessment methodologies and suitability of specific technology for the seismic retrofitting of existing school buildings according to material availability, socio-economic condition, prevailing construction system and national and local government's standards among other reasons was be discussed in the workshop.

3. Training, Disaster Education and Earthquake Risk Communication

The issue how to best utilize the school retrofitting and disaster education was discussed in the workshop and recommendation was made for current and upcoming school retrofitting program to utilize the process for making earthquake resilient communities.

4. Field Study of Community Based School Retrofitting Program

In Nepal, a number of community schools were retrofitted for earthquakes with involvement of community people and local governments. The innovative approach to involve the community people in their school safety program provided the opportunity for training and replication of technology to individual houses to make them safe from earthquakes.



Top: Opening Session
Bottom: Field Trip

International Disaster Management Symposium 2006

An International symposium was held on January 18, 2006 in Kobe Japan on the main theme of Creating Safe Schools, Homes and Communities. One of the sub-themes of the symposium was "For Children: Earthquake Resistant Schools and Disaster Management Education." The symposium was organized with the objective of promoting a better understanding of Safe schools and disaster education. The symposium drew participation from wide range of interest groups and was an opportunity for academics, professionals and international agency representatives to interact with wider public.

Besides papers on schools and disasters, lessons from previous earthquakes on school safety, technical issues on earthquake vulnerability reduction of school children, the symposium was instrumental in bringing up issues for future intervention in the panel discussion. The panel

discussion focused on three questions to find a general strategy for future intervention.

- What are the most appropriate themes of disaster risk knowledge?
- What sort of strategy is appropriate to include these contents in school education?
- How can we evaluate the effectiveness of such measures in light of lessons from recent past earthquakes of Sumatra and Pakistan?

The symposium was held in collaboration with Yomiuri Shimbun Osaka, 2006 Symposium Committee, Hyogo Prefecture, Kobe city, Hanshin-Awaji Earthquake Memorial Research Institute, Disaster Reduction and Human Renovation Institute, International Recovery Platform (IRP), CODE, Asia Disaster Reduction Center (ADRC), JCA Hyogo, United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) Kobe, and others.

Highlight of the Session

Welcome Address : Kazunobu Onogawa, UNCRD, Director
Opening Remarks : Shoichi Oikawa, The Yomiuri Shimbun Osaka, President
Introductory Remarks : Toshizo, Ido, Hyogo Prefecture, Governor

Keynote Presentation

Hyogo Framework for Action and Humanitarian Reforms: Reaffirming the Relevance by Puji Pujiono, UN OCHA Kobe, Head

Presentation Session: Earthquake and Schools

Introduction: Earthquakes and Schools, Building earthquake Safe Community through School by Kenji Okazaki, National Graduate Institute for Policy Studies (GRIPS), Japan

Lessons from the Pakistan Earthquake: Damages of Schools by Masahiko Murata, Senior Expert, IRP

Research on Earthquake Resistant School Building, Isao Mitani, Professor, Kobe University

Keeping Schools Safe from Earthquakes: Bishnu Hari Pandey and Ayako Fujieda, UNCRD

Panel Discussions

New Strategy for Disaster Education: Shoichi Ando

Perspective and Future Plan of Disaster Education at Schools: Yoshio Toda

Expansion of Disaster Mitigation Education: Seiji Suwa

Disaster Education in Development Countries: Rajib Shaw

ANNEX

Project Counterparts

FIJI

National Disaster Management Office

The National Disaster Management Office, within the Ministry of Provincial Development is the section responsible for the day to day operations of disaster management activities and is headed by a Director, who is also the National Disaster Coordinator. This office is charged with the responsibility to carry out the policies of the NDMC with regard to disaster preparedness, mitigation, prevention and actual emergency operations, relief and rehabilitation during disasters.

Main function of NDMO include:

- To implement or initiate the implementation of policies prescribed by the NDMC and Cabinet.
- To advise the Permanent Secretary for Regional Development, NDMC and other relevant bodies on disaster related matters.
- To initiate formulation of policies for the development of disaster management organization and activities
- To arrange meetings of the NDMC and its Committees and Sub-Committees, provide Secretariat support and initiate follow-up action.
- To deal with disaster management related issues at the National level.
- To initiate and coordinate the preparation of rehabilitation plans after natural disasters.
- To review disaster preparedness arrangements and carry out post-disaster reviews.

Ministry of Provincial Department
National Disaster Management Office
1 Knolly Street, 1st Floor, Knolly Plaza, Suva, Fiji
Tel: (679)3313400; Fax: (679)3319315

INDIA:

Sustainable Environment and Ecological Development Society (SEEDS)

Founded in 1994, SEEDS emerged as a non-profit voluntary organization with vision to make vulnerable communities resilient to disasters. SEEDS comprise young professionals drawn from various development related fields and is governed and advised by a board of eminent academicians and practitioners from international organizations.

SEEDS has worked extensively to empower communities across Asia. In the past decade, SEEDS have been associated with disaster response, rehabilitation and preparedness measures. It has also undertaken extensive research, participated with governments on issues that echo community concern and aspiration towards safer living standards. Its campaign includes "Patanka Navjivan Yonjna", "Orissa vulnerability assessment", "India tsunami response", "Delhi earthquake safety initiative", "Rebuilding a safe Afghanistan", "School earthquake safety initiative", and "Seeds Mason Association".

In particular, SEEDS, in partnership with the government are currently involved with 150 schools in Gujarat. The Himachal initiative, an extensive programme, involves 750 schools. SEEDS is also implementing a pilot programme for schools in Delhi. All activities include both structural and non-structural safety measures.

SEEDS India
D-11, Panchsheel Enclave, New Delhi-110017, India
Tel: 91-11-26498371, 41748008; Fax: 91-11-26498372

INDONESIA

Institute Technology Bandung, Center for Disaster Mitigation (CDM/ITB)

In 1959, Institute Technology Bandung (ITB) was founded by the Indonesia government an institute of higher learning of science, technology, and fine arts with a mission of education, research, and service to the community. Center for Disaster Mitigation (CDM/ITB) was established on January 10, 2003 to respond national needs in reducing disaster impact. It was also established as an effort to institutionalize research activity in disaster mitigation that had been done in the past twenty years by ITB and also to make this research activity sustain.

CDM/ITB is an organization under the framework of Institute for Research and Community Service – Institute of Technology Bandung that support the university programs in multidisciplinary disaster mitigation activities. Many related activities and research in disaster mitigation had been done by CDM/ITB to promote the disaster management and mitigation in Indonesia. These activities were implemented with the support of national and international organizations. CDM/ITB conducts disaster mitigation research and development in urban and rural area, through an advocacy to support the strategic policies and legal mechanisms, to identify and analyze the disaster impacts, to disseminate and transfer knowledge and skills through training, workshop, seminar, and community-based research action activities.

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UZBEKISTAN

Uzbek Research Institute for Typical and Experimental Building (UzLITTI)

AO UzLITTI (former TashZNIIEP of GOSSTROI of USSR) has been founded in 1963 in Tashkent on the base of scientific-research institute on construction. Since its establishment, UzLITTI has contributed to technology and design development of earthquake resistant buildings in Central Asia. In the past, the UzLITTI, prepared the new 1996 release of the Seismic Design of Construction, which replaced the old SNIP code (Soviet Union). It is still responsible for the study of new codes, and standards for the Uzbek Government. It also develops new anti-seismic systems, by means of testing procedures, computing methods, reinforcement criteria, and keeps archives on the seismic activities in the former Soviet Union since 1966.

The main activities of UzLITTI are:

- development of design codes for the earthquake loads taking into account regional peculiarities of seismic hazard
- development of approaches to assessment and mitigation of seismic risk
- investigation of structure response by analytical-experimental methods on model and in situ during the earthquakes, engineering analysis of the earthquake consequences;
- development of new construction systems of increased safety, the methods of anti-seismic reinforcement of existing dwellings (including architectural monuments), seismic resistant buildings design
- development of the codes and standards

UzLITTI

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