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SEISMIC RETROFITTING OF SCHOOL BUILDINGS, CAPACITY BUILDING OF COMMUNITY, AND DISASTER EDUCATION (SESI) of the United Nations Centre for Regional Development (UNCRD)

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SUMMARY

The Disaster Management Planning Hyogo Office of the United Nations Centre for Regional Development (UNCRD) is, currently, promoting the School Earthquake Safety Initiative (SESI) through a project "Reducing Vulnerability of School Children to Earthquakes". 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.

INTRODUCTION

Devastating experiences from natural disasters in recent history have raised consciousness of the need for disaster preparedness and prevention in many parts of the world. In 2006, 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 the rise for the past 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 because 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 industrialized countries.

As with any other type of natural disaster, 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. While there are many factors that determine the scale of damage such as the time of the event, population density and building structural fragility, explanations for the different outcomes are likely to be found in different degree of past policy interventions in the two countries.

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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. Because the poor are not able to afford houses that are earthquake resistant, their houses are more vulnerable to collapse. To make matters worse, the

poor have less savings, insurance and access to credit that will enable them to finance reconstruction costs. This 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.

UNCRD and Disaster Management issues

United Nations Centre for Regional Development (UNCRD) Disaster Planning Hyogo Office was founded in 1999 in Kobe, after the Kobe (Great Hanshin-Awaji) Earthquake that occurred on 17 January 1995. The disaster took place in the midst of United Nations International Decade for Natural Disaster Reduction (IDNDR) 1990-1999. After the disaster, Kobe has established itself as one of the centers for international disaster prevention and recovery activities. In January 2005, the World Conference on Disaster Reduction (WCDR) was held in Kobe, which resulted in the Hyogo Framework for Action. In all these process and development, UNCRD Disaster Management planning Hyogo office has been playing a key role in terms of concept formulation of disaster risk reduction, advocacy and networking.

Established in 1971, UNCRD has been dealing with environment, human security and disaster management issues and its activities encompass training and capacity development of local government officials from developing countries in charge of regional development. The organization also offers consultations and expert services to governments of developing countries. Disaster risk reduction has been one of central issue in dialogues with governments.

Since, local governments are the Indispensable part of stakeholder groups in regional development issues, UNCRD promotes the policy and programs for leadership skills, capability, and spirit of cooperation among them to achieve the goal of sustainable development vis a vis disaster management. It is well acknowledged that there needs to be close cooperation among the central government, regional authorities, municipal governments, and communities and planning geared to immediate action, namely, action planning, which should be flexible and is designed to address real needs and demands. For instance, maps of the built environment should be drawn including the location of vulnerable facilities, paying special attention to hazard maps and ecological reserves.

Looking at these aspects of sustainable disaster management, UNCRD involves both central and local governments in its endeavors to protect physical facilities and infrastructures from imminent disasters. As a priority issue, UNCRD puts effort in making indispensable buildings such as houses, schools and hospitals safe from disasters through careful planning in terms of location, design, construction and maintenance. These facilities play a crucial role during disasters: attending the injured, maintaining public order, and serving as a place of refuge for the victims. A case of initiative to make school buildings safe from earthquake is presented in this paper.

REDUCING VULNERABILITY OF SCHOOL CHILDREN TO EARTHQUAKES

Project outline

UNCRD is, currently promoting the School Earthquake Safety Initiative (SESI) through a project "Reducing Vulnerability of School Children to Earthquakes" in the 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. 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.

Component 1

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 is the schematic diagram of the process of this component.

- (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

Component 2

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.

Component 3

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.

Component 4

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.

Preliminary Results (in 2005 and 2006)

The overall progress of the project and the activities as per the project document, are as follows. Detail discussion on this project is made in following section under "Lesson learned". Below is the country specific assessment of the interim project progress:

Fiji: The National disaster management office (NDMO), the government focal point for disaster risk management, has conducted several consultative meetings with stakeholders namely, ministry of education, Fiji Institute of Technology, Centre for Applied Technology and Development, Fiji Institute of Engineers, Mineral Resource Department, department of Public works, Fiji council of social service etc. A steering committee has been established and special technical sub-committees were formed for school assessment and retrofitting and for training of technicians separately. The first technical committee for school assessment has developed assessment methodology with UNCRD expert help and carried out analysis in 10 pilot schools in and around Suva. In the mean time, a detailed program of school safety has been developed and endorsed by National Disaster Management Council.

The technical committee has carried out further technical evaluation of school buildings selected for intervention. It was found that all buildings assessed failed to meet the earthquake safety standards with over 80% in the least and worst grade. As apart of this project, a special committee has been reviewing primary and secondary school curricula for possible incorporation of disaster education. The NDMO has requested Ministry of education for implementation of school retrofitting under the new funding from European Union under school improvement project. Feasibility study of application of retrofitting technology in all EU project schools is under consideration. The delay in execution of the project activities for retrofitting intervention of schools has hindered to best utilize the opportunity.

India: In India, it has been long time facing a problem in getting central government's buy-in in the proposed activities at the state government level in Himachal. The administration procedure of government requires approval from central government to the state or other local government to collaborate with international agencies, particularly UN agencies. In this project case, it was pending for more than a year in Ministry of Home Affairs (MHA) of central government of India. Only at the end of the year 2006, the Indian government agreed for the proposed activities

and recommended to engage Sustainable Ecological and Environmental Development Society (SEEDS) as counterpart agency to carry out the project activities locally. A steering committee was formed under the officers of ministry of home affairs to advise and guide the project implementation in Himachal. Representative from State government of Himachal, education directorate, department of public works, SEEDS, UNDP India are other members of the steering committee.

Nonetheless, SEEDS had been carrying out preparatory works in Simla city of Himachal state for school earthquake safety based on understanding with UNCRD. On the basis of assessment methodology for school building that UNCRD suggested, SEEDS had carried out survey in 10 schools and also in the typical residential houses. It also conducted seminars to local communities, teachers and students on the importance of school safety. With all these ground works, the project activities can be started once the ICA contract is finalized.

Indonesia: In the aftermath of the great Tsunami and earthquake in 2004 December, The government of Indonesia has requested to implement the proposed activities in Banda Aceh area so that the reconstruction process can get best utilize the demonstration effect of the school project. Based on their demand, some initial project activities like kick-off meeting and community seminars were carried out in Banda Aceh. The Badan Reconstruction and rehabilitation Agency (BRR) has requested to initiate the activities of school retrofitting in 2005 aiming to influence other agencies involved in reconstruction of schools and other infrastructures positively. The UNCRD counterpart institution, the Research Centre for Disaster Mitigation of Institute of Technology Bandung (CDM/ITB) had carried out building survey and other preliminary assessment of school buildings in Aceh region based on the understanding. Two community seminars were also organized in Aceh in collaboration with stakeholders. However, because of the delay in contract agreement with counterpart agency, those activities could not be started. Later, Department of Education (DOE) informed that all schools in Banda Aceh area were occupied by donors for intervention and UNCRD can not make useful retrofitting there. Considering the impact and potential hazard exposed by another earthquake in May 2006 in Yogyakarta, it was then suggested that this project would, in this context, be better in Java region. As per the advice, consultation works with local department of education in Java region is underway. With the grant agreement (GA) with ITB in place, the project activities can be started with immediate effect in Java.

Uzbekistan: In several round of consultation with Tashkent city government and Uzbek Research Institute for Typical and Experimental Building (UzLITTI), Tashkent city government expressed its willingness to collaborate with this project not only as beneficiary but also as collaborating for resource sharing in retrofitting of school buildings. Since the cost of school retrofitting in Tashkent is expensive and could not be covered only by the allocated budget in this project, Tashkent city's offer to allocate complementary final resources is critical for the successful outcome. As per the original plan of project, Tashkent city offered two school sites for and requested to make agreement with them or with UzLITTI for retrofitting in 2005. Since the agreement could not be made in time, the opportunity was lost. Later in 2006, with renewed consultation with UzLITTI and Tashkent city, two another schools were proposed for retrofitting, where Tashkent city expressed willingness for necessary resource sharing if needed during the course of project implementation. In the track of this development, national experts were hired for survey, assessment and design of school retrofitting and also for development of training guideline and educational material. The works by experts are underway. So far completed works were preliminary assessment of 10 schools, collection of educational resources.

Lessons learned

It is observed that interagency collaboration and partnership is very effective in every project country. The approach taken to get the concerned government agencies informed and consulted has resulted in

good collaboration with all stakeholders. Further, country-based UN agencies have been supporting the activities.

In Fiji, the NDMO, the government's focal point for disaster management, is playing a very effective role to bring all agencies together to work in a related field to the project advisory team. The project is being carried out with the support and active involvement from international organizations like SOPAC and CATD, civil society organizations like Fiji Institute of Engineers (FIE), Fiji Social Service Council (FSSC), and other technical public institutions like Public Works Department (PWD), Fiji Institute of Technology (FIT). In Uzbekistan, the Tashkent city government office is helping to form partnerships and improve collaboration with all government and research institutions related to this project. UNESCO country office is supporting the project with their expertise and experience in this field in Uzbekistan. The local UNDP office and Ministry of Home Affairs are collaborating for this project in India. There is strong support from Institute of Technology Bandung (ITB) for technical expertise and administrative support from the National Department of Education in Indonesia. Local UNDP office and UNESCO office are extending support and collaborating in the project through the exchange of information.

At international level, a good collaborating partnership has been developed with UN and other agencies working the field of school safety and disaster management. The United Nations secretariat for International Strategy for Disaster Reduction (UN ISDR), National graduate institute for policy studies (GRIPS), National society for earthquake technology (NSET) have been collaborating in school earthquake safety cause in organizing international events and campaigns.

CONCLUSIONS

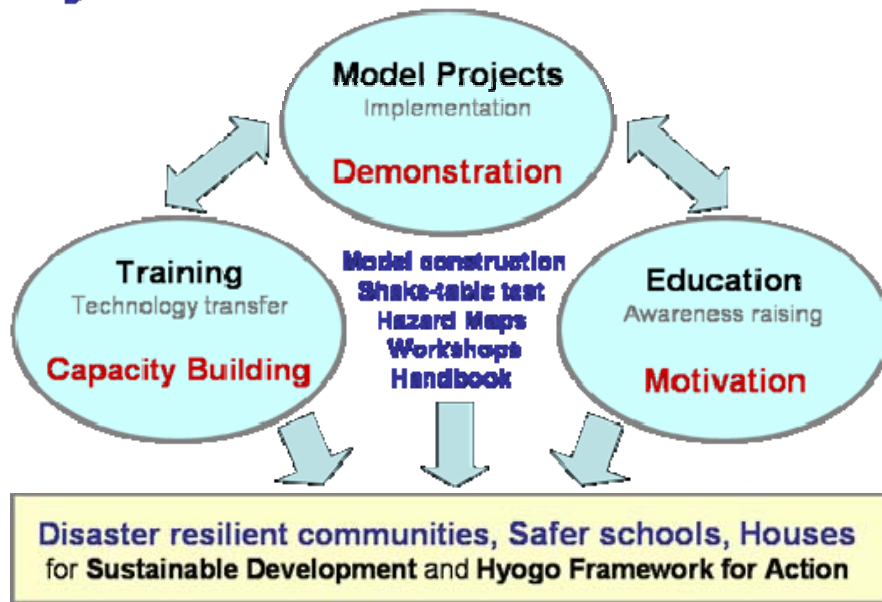
The United Nations Centre for Regional Development (UNCRD) has been implementing a research project on "Reducing Vulnerability of School Children to Earthquakes" under execution by UN Department of Economic and Social Affairs (UN-DESA) in the Asia-Pacific Region since 2005. The project aims to ensure that school children living in seismic regions have earthquake-safe schools and that the local communities build their 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, training for technicians on safer construction practices, and disaster education in schools and communities. These activities are being carried out in Fiji, India, Indonesia, and Uzbekistan as pilot cases which will be disseminated throughout the respective geographical regions through regional and international workshops.

As the primary goal of the project is safety of the most vulnerable group in society, children, the project contributes towards the objective of human security which is defined as removal or reduction of vulnerability to various risks including natural disasters. Expected outcomes of the project are seismically retrofitted school buildings to demonstrate the appropriate technology, capacity enhancement of communities to adopt seismically-safer houses, educated and trained school teachers, students, and parents about earthquake-safe practices. A strong partnership has been established in all participating project countries to implement the project activities.

Primarily, the project gets the fund from the UN Trust Fund for Human Security (UNTFHS) for all planned activities. The project received some additional resources from partner institutions and also through additional allocation of resources by UNCRD to support complementary activities.

In each project countries, preparatory works like formation of institutional set up and other basic survey works were carried out. The interagency coordination and partnership with concerned organizations is satisfactory in all countries. National and local governments have already taken steps to upscale the activities through their own efforts for a wide coverage.

Objectives and Activities of UNCRD



APPENDIX

Publications in English of UNCRD related to disaster management since 1999

2000:

Wooden Architecture and Earthquakes in Istanbul; A Reconnaissance Report and Commentary on the performance of wooden structures in the Turkish earthquakes of 17 August and 12 November 1999

2001:

International Workshop On Earthquake Safer World In The 21st Century : Emphasis on Self-help, Cooperation and Education through Community Involvement

The report about the International Workshop On Earthquake Safer World In The 21st Century : Emphasis on Self-help, Cooperation and Education through Community Involvement

GESI; The report summarizing the purpose, the methods and the activities of the GESI (Global Earthquake Safety Initiative) pilot project

2002:

The Sustainable Community Rehabilitation HANDBOOK; UNCRD Sustainable Environment and Ecological Development Society (SEEDS) October 2002

Proceeding on 2002; The report on the Workshop on Gujarat Earthquake Experiences, Earthquake Disaster Mitigation □ Issues for Sustainability□ and □Future Needs and Challenges□

Proceeding 2002; The report on the International Workshop on Earthquake Safer World in the 21st Century □ □Emphasis on Community and Culture□

2003:

GUIDELINES For Earthquake Resistant Design, Construction, and Retrofitting of Buildings in AFGHANISTAN; Ministry of Urban Development and Housing / Government of Afghanistan UNCRD Hyogo

Proceedings of ACTAHEAD International Workshop; The report on the ACTAHEAD International Workshop about Community Based Disaster Management in India

PROCEEDINGS on 2003; The report on the International Workshop 2003, “Earthquake Safer World in the 21st Century □—People, Community, and Disasters—”

Kizuna; From Disaster to Community Development: The Kobe Experience

Patanka New Life Plan; The report summarizing the purpose, the methods and the activities of the PNY (Patanka New Life Plan) project

Sustainability in Grass-Roots Initiatives Focus on Community Bases Disaster Management; The report about the sustainability in grass-roots initiatives focusing on community based disaster management

2004:

Proceedings of International Symposium “Community Legacy in Disaster Management” on 2004; The report on the international symposium on “Community Legacy in Disaster Management”, the pre-event for the UN World Conference on Disaster Reduction 2005

UNCRD Digest; The abridged publication of describing the variety of activities that were deployed in the course of implementing the community based disaster management

UNCRD Tapestry; The publication of defining the past and building the future of the community based disaster management

2005:

User's Guide ;Sustainable Community Based Disaster Management (CBDM) Practices in Asia

Proceedings on 2005; The report of the activities of UNCRD during UN World Conference on Disaster Reduction 18-21 January 2005 Kobe, Japan

All publications are available to download at: <http://www.hyogo.uncrd.or.jp/publication/index.html>