



Earthquakes and
Megacities Initiative

A member of the U.N.
Global Platform for
Disaster Risk Reduction



Jakarta
Provincial
Government

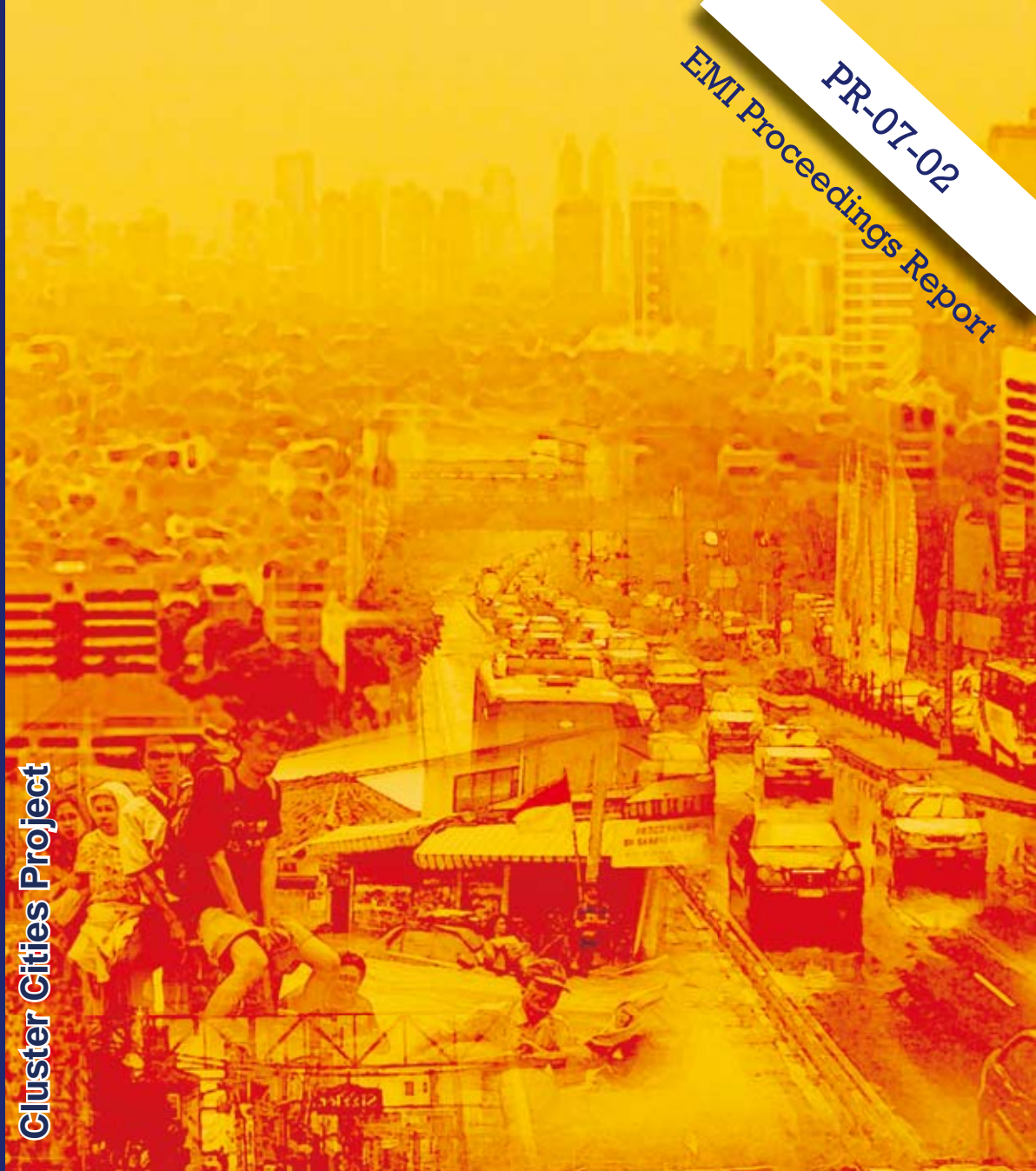


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Cluster Cities Project



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Science, Knowledge Sharing and Planning for Megacities Disaster Risk Reduction

*Proceedings of the Asia Megacities Forum 2007
Jakarta, Indonesia, 24-26 October 2007*

December 2007

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**Earthquakes and
Megacities Initiative**

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Abbreviations / Acronyms

3cd - Cross-Cutting Capacity Development Program
AKOM - Afet Koordinasyon Merkezi, Istanbul, Turkey
BCPR - Bureau of Crisis Prevention and Recovery, UNDP
BMG - Meteorology and Geophysics Board, Jakarta, Indonesia
C2C - City-to-City Sharing Project
CCP - Cluster Cities Project
CEA - China Earthquake Administration
DPOS - Department of Public Order and Safety, Quezon City, Philippines
DRM - Disaster risk management
DRMMP - Disaster Risk Management Master Plan
DRR - Disaster risk reduction
EMI - Earthquakes and Megacities Initiative
EMPI - Earthquake Master Plan of Istanbul
FFB - Flood Forecasting Branch, PAGASA
IIT - Indian Institute of Technology, Mumbai, India
IMM - Istanbul Metropolitan Municipality
ISDR - International Strategy for Disaster Reduction
ITB - Institut Teknologi Bandung, Indonesia
JICA - Japan International Cooperation Agency
JPG - Jakarta Provincial Government
MCGM - Municipal Corporation of Greater Mumbai
MEGA-Index - Megacity Indicators System
MEGA-Know - Megacity DRM Knowledge Base
MEGA-Learn - EMI's training platform for urban and megacities DRM
MEGA-View - Megacity Map Viewer
MIS - See MEGA-Index
MMDA - Metro Manila Development Authority
MMEIRS - Metro Manila Earthquake Impact Reduction Study
PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services
PHIVOLCS - Philippine Institute of Volcanology and Seismology
ProVention - ProVention Consortium
RISTEK - Ministry of Research and Technology, Indonesia
SCEC - Southern California Earthquake Center, Los Angeles, USA
UNDP - United Nations Development Fund
UN/ISDR - See ISDR
WB - World Bank
WBI - World Bank Institute

Acknowledgments

The success of the Asia Megacities Forum 2007 would have been impossible without the help and cooperation of key institutions and individuals. First, we are grateful to the Pacific Disaster Center, ProVention Consortium, United Nations Development Program-Bureau of Crisis Prevention and Recovery, and the United Nations International Strategy for Disaster Reduction, for their unwavering support, financial and otherwise, to the Cluster Cities Project (CCP), EMI's platform for establishing a worldwide network of megacities engaged in disaster risk reduction, under which the Forum was held.

On behalf of our partner cities and institutions, we would like to thank the Jakarta Provincial Government (JPG), under the leadership of H.E. Governor Dr. Fauzi Bowo, for hosting the Forum this year. We are greatly indebted to Ms. Tuty Kusumawati and her office staff, particularly Ms. Sonti Lubis whose dedication, patience and persistence eventually paved the way for the organization and hosting of the Forum by JPG.

We would also like to thank the Ministry of Research and Technology (RISTEK) and Institut Teknologi Bandung (ITB) not only for their technical inputs to the Forum's agenda, but also for their crucial role in forging the EMI-JPG partnership. This would not have been possible without the hard work and determination of Dr. Pariatmono, Assistant to Deputy Minister of RISTEK, and Prof. Harkunti Rahayu of ITB.

Furthermore, we would like to express our gratitude to the Forum moderators and rapporteurs who have done an excellent job in facilitating and capturing the key points of the panel presentations and discussions. We are thankful to Prof. Louise Comfort, Mr. Tom Haase, Dr. Bijan Khazai, Ms. Kusumawati, Dr. Pariatmono, Prof. Rahayu, and Dr. Ravi Sinha.

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Lastly, we would like to thank all the cities and institutions who attended the Forum and participated in the Share Fair. Had it not been for your presence and active participation, all our efforts and preparation would have gone to naught.

EMI

Executive Summary

- ☑ Background
- ☑ Objectives
- ☑ Highlights
- ☑ Policy Lessons
- ☑ Next Steps



Background

The Earthquakes and Megacities Initiative (EMI) and the Provincial Government of Jakarta (JPG), in partnership with Indonesia Institute of Technology, Bandung (ITB), Indonesian Ministry of Research and Technology (RISTEK), ProVention Consortium, Pacific Disaster Center (PDC), the United Nations Development Programme (UNDP/BCPR), and the United Nations International Strategy for Disaster Reduction (UN-ISDR), organized the Asia Megacities Forum 2007 in Jakarta, Indonesia on 24-26 October 2007. The Forum was intended to contribute to the local implementation of the Hyogo Framework for Action. The first day of the Forum was held jointly with the participants of the Asia Network of Major Cities, which held its congress in Jakarta from 22-24 October 2007.

Represented were Jakarta (the Host City), Metro Manila (Quezon City and Makati City), Seoul, Beijing, Shanghai, Tianjin, Kobe, Mumbai, Dhaka, Tashkent, Istanbul, and Tehran. There were also researchers, experts and practitioners from multilateral organizations and other cities such as Karachi and Pittsburgh.

Objectives

The Forum built on the accomplishments of the 2006 Asia Megacities Forum (Kobe, November 2006), and served as a platform to demonstrate knowledge of sound practices in disaster risk reduction (DRR) that other cities may validate, adapt, and apply to their own risk context. Held under the banner of EMI's Cluster Cities Project (CCP), it aimed to facilitate peer-to-peer learning exchange and empowerment among cities in building capabilities to implement DRR sound practices in their respective constituencies. The Forum also served as a knowledge dissemination platform and a coalition building mechanism for the local implementation of the principles and actions of the Hyogo Framework for Action.

Highlights

The Forum was opened with speeches from Dr. Fauzi Bowo, the Governor of Jakarta, and Dr. Fouad Bendimerad, EMI Chairman. They both stressed the need to use science and technologies to understand the threats that face the world's megacities, and to mitigate the consequences of natural and man-made disasters. The opening ceremony was concluded with the signing of a Declaration of Agreement between the city of Jakarta and EMI, which welcomed Jakarta into the East Asia Cluster of CCP. The signing of the Declaration of Agreement formally confirms Jakarta's participation in EMI's programs.

The Forum was organized into two primary components: (1) four presentation

sessions and (2) a Share Fair. The Share Fair provided a forum for the representatives of the cluster cities to share knowledge and information on sound practices for urban DRR. The sessions provided an opportunity for the city representatives and researchers to share lessons learned and findings from recent research.

Policy Lessons

The presentations and discussions confirmed that significant advances have been made in megacities DRR. In many cities, the reactive “wait and see” orientation has been replaced with a pro-active, strategic approach that is centered on disaster mitigation and sustainable development. This shift in perspective is characterized by the decision to make choices, rather than depend on fate. Notwithstanding this success, the presentations delivered during the Forum revealed that much work remains. Although the presentations provided specific insights into the knowledge acquired by megacities such as Jakarta, Metro Manila, Beijing, Shanghai, Tianjin, Mumbai, Tashkent, Istanbul and Tehran, these insights can be distilled into five primary policy lessons that can guide future DRR activities for megacities and complex urban metropolises.

1. Continue to conduct hazard and vulnerability assessments.

One of the major lessons contained within the Forum’s presentations was that scientific knowledge plays a critical role in effective disaster risk management (DRM), specifically in the identification of hazards, vulnerabilities and risks. To this end, urban safety depends upon the accurate assessment of risk. There is a wide variety of tasks that cities could undertake in order to begin to effectively manage and reduce the risk of disaster. These tasks include seismic microzonation studies, seismic evaluations of critical facilities and public infrastructures, studies of emergency transportation systems, and the development of a Disaster Risk Management Master Plan (DRMMP) that is based upon the EMI model.

2. Continue to research the success and failures that stem from disaster response activities.

A second major lesson was that cities need to continue to research the successes and failures that stem from disaster response activities. The presentations provided numerous recommendations that could be used to improve or strengthen disaster response activities in both large and small settings. These recommendations were primarily distilled from critical examinations of recent successes and failures in urban DRM. Local governments, for example, can increase their capacity by developing and implementing standard operating procedures. Policy-makers can identify, and where necessary, strengthen the relationships that exist, or could exist, between stakeholders within the city. Additionally, at-risk areas must educate their

populations about how to respond to disaster events. Finally, cities must identify and eliminate the bottlenecks that prevent the delivery of critical resources to those in need. Such lessons cannot be learned without a critical examination of DRR policies.

3. Use scientific information to improve public participation in disaster risk reduction activities.

The third lesson contained in the presentations is the absence of adequate public participation in the development of a DRM system. It was noted that one of the best ways to improve public participation in DRR is to increase the collection and dissemination of risk information before, during and after disaster events. Fortunately, existing scientific knowledge and disaster related information can be used as basis for public information and awareness campaigns.

4. Continue to improve and enforce building codes.

The fourth lesson derived from the presentations is that cities must continue to improve their building codes especially for those at risk. Scientific tools and technologies have enabled researchers to conduct systematic assessment of risks, which then provide a solid basis for formulating disaster preparedness initiatives and DRM plans. A critical component of such initiatives and plans include the strengthening of buildings and lifelines. Forum participants concurred that effective DRR requires the development of building codes, which when implemented and enforced, will make buildings and lifelines in cities more resilient to disasters such as earthquakes.

5. Continue to improve collaboration and cooperation among stakeholders involved in disaster risk reduction.

The fifth lesson provided by the presentations is that cities must continue to improve collaboration and cooperation among stakeholders involved in DRR. Effective risk management requires all the relevant departments of the government to work efficiently during normal times so that their capacity can be effectively expanded during a disaster.

Participants further noted other examples of how to go about improving collaboration and cooperation for effective DRR. First, decision-makers must be provided the knowledge they need to organize effective preparedness and response activities in at-risk areas. Second, local governments must enhance their institutional and technical capacity to prepare for earthquakes and other risks, and sustain their efforts in DRR. Third, interpersonal relationships among government officials of different agencies must be developed to improve inter-agency coordination. And finally, communication and coordination can be

improved through the development of a socio-technical disaster management system that links technical infrastructure for risk detection with the organizational capacity to mobilize action for disaster response.

6. Enhance knowledge sharing, validation and adaptation of sound practices and lessons learned in DRM by scaling up city-to-city sharing activities and networks.

The last lesson derived from the presentations is that existing experiential knowledge of various cities can be used as a resource for mutually beneficial learning exchanges. Cities should share their unique experiences, challenges and sound practices in implementing DRR initiatives with one another and contribute their respective knowledge in validating the lessons learned from these experiences. The development of tools and training programs such as those developed by EMI can contribute significantly in enhancing the capacities and competencies of city officials and personnel, but this is not sufficient. One efficient way to scale up knowledge acquisition and capacity development is through city-to-city sharing. City-to-city sharing promotes participatory peer-to-peer learning exchanges and empowers cities by learning from peers.

Next Steps

The participants agreed that the city-to-city sharing under the aegis of the CCP is a valuable and cost-effective means to improve DRR in megacities and complex urban metropolises. It was suggested that there remain significant gaps in DRR knowledge, and a thrust in capacity building is needed to create an environment where DRR can be mainstreamed. It was also suggested that while cities learn best from other cities, effective knowledge sharing must meet two criteria. First, there is a need for a focal point and clear formulation of priority areas. Second, there must be a process to ensure the longevity of the networks and information.

The participants agreed on a series of “next steps” that could help EMI and its CCP partner cities convert DRR knowledge into action. These are:

1. Developing a focal point for knowledge sharing that paves the way for cities to set up a comprehensive DRMMMP, which consolidates all the different elements of DRR into a single document.
2. Developing an effective knowledge sharing model that identifies areas of expertise and encourage cities to make their respective contributions.
3. Developing a methodological approach for knowledge sharing that will enable DRR information to be consolidated into practical manuals and

shared with stakeholders at the local level.

4. Developing a “sister city” program as a way for cities to learn directly from each other, for example, through internship programs and scholar exchanges.
5. Institutionalizing disaster mitigation with legal frameworks that address disaster mitigation and preparedness, as well as budget and resource allocations.
6. Developing community awareness, preparedness and grassroots activities as a prerequisite to implementing sound DRR practices.
7. Encouraging local governments and grassroot organizations to take more responsibility in the DRR realm, for example, by conducting regular tsunami drills, marking evacuation routes and planning escape activities, and incorporating DRR into spatial planning.
8. Developing training at the operational level, the absence of which makes it difficult to implement the DRR codes and standards that have been developed.

Session Reports

- ☑ Turning Science into Practice
- ☑ Disaster Management Master Planning
- ☑ Promoting Disaster Risk Reduction in Cities
- ☑ Building Networks and Knowledge Sharing



Turning Science into Practice

The first session, titled *Turning Science into Practice*, had four presentations describing the experiences of cities in the use and application of science and technology for disaster management in different parts of the world. The experiences of Jakarta, Los Angeles, Mumbai and Tehran demonstrated the critical role of science and technology in disaster risk assessment, mitigation, monitoring and early warning, emergency response, damage and loss estimation, and reconstruction.

Dr. Pariatmono, Assistant to Deputy Minister for Analysis of Science and Technology Needs, Indonesia, opened the session with a presentation on *The Role of Science and Technology to Support the Recovery of Yogyakarta Province After the 2006 Earthquake*. He described the extent of damage and destruction following the devastating 2006 earthquake in which over 7000 people lost their lives. The results of a recent seismic microzonation study of Jakarta showed that in several areas, the peak ground accelerations were in excess of the specification of the building codes. These areas also incurred very heavy losses, indicating the importance of more accurate assessment of seismic risk for urban safety.

He further presented Indonesia's earthquake-resistant building design that has been recommended by the Ministry for new school buildings. This earthquake-resistant design has been evaluated by scientific experts using sophisticated methods such as non-linear analysis to ensure that the building damage behaviour remains within acceptable limits.

Dr. Pariatmono also made a detailed presentation of microzonation studies of Jakarta. The procedure adopted for the seismic hazard assessment was briefly

discussed. He pointed out that about 20 percent of Jakarta is prone to high earthquake damage. He further highlighted the importance of scientific knowledge on hazard, vulnerability and risk for disaster management. It was pointed out that

In spite of Jakarta's distance from the major earthquake source zones, **scientific studies have** shown that the seismic risk remains high due to poor geotechnical conditions in large parts of the city.

in spite of Jakarta's distance from the major earthquake source zones, scientific studies have shown that the seismic risk remains high due to poor geotechnical conditions in large parts of the city.

The second presentation zeroed in on the *The Role of Science and Technology for Urban Disaster Management of Mumbai*, by Dr. S.S.

Kudalkar, Deputy Municipal Commissioner, Municipal Corporation of Greater Mumbai (MCGM), India. Dr. Kudalkar discussed the most common disasters in Mumbai, which are both natural (e.g., urban flooding) and human-made (e.g., urban terrorism and building collapse) in origin. He briefly described the situation arising out of these disasters in the recent past and illustrated the lessons from one disaster that becomes useful in dealing with other disasters in the future.

Dr. Kudalkar also shared the recent initiative of Mumbai to use a network of weather stations, including rain gauges, for monitoring and early warning of floods. It was shown that real-time information on rainfall intensity and a built-in alarm system have been very effective in generating timely action for early warning and response.

In Mumbai, real-time information on rainfall intensity and a built-in alarm system have been very effective in generating timely action for early warning and response.

The presentation highlighted that risk management requires all the relevant departments of the government to work efficiently during normal times so that their capacity can be effectively expanded during a disaster. The MCGM has recently launched a massive e-governance initiative that aims to make the normal functioning of the government more efficient, and will also enable more effective response during disasters.

Some other uses of science and technology such as automatic emergency vehicle tracking systems and inventory of disaster response equipment and machinery were also described.

In the ensuing discussion, the operational details of the control room were tackled. It was pointed out that all senior officials are assigned to control room duty at regular intervals even under normal situation. This ensures their familiarity with the control room protocol and procedures on a continuous basis.

The procedure for coordination between different departments was also discussed. It was pointed out that close personal interactions between officials of different

agencies ensure that they work together after a disaster. The personal interactions are found to be effective in ensuring proper coordination among various agencies.

The third presentation focused on *Earthquake Risk Management in Tehran*, by Mr. Maziar Hosseini, Director, Tehran Municipal Disaster Management Center, Iran. It described the seismic hazard of Tehran, a city that sits on several earthquake



Tehran's quick damage and loss estimation system (Hosseini).

sources and has experienced destructive earthquakes in the past. Tehran's disaster management objective in the short term is to save lives, while it aims to reduce losses through mitigation and preparedness in the long term.

The Tehran disaster management plan has emphasized the importance of evacuation in the event of a devastating earthquake and identified the evacuation routes. The city is currently developing a master plan covering all aspects of disaster management. Corollary to this, the city has placed great importance on scientific information for disaster management. Tools have been developed for rapid damage assessment, where the expected level of damage can be evaluated within 20 minutes of a major earthquake. The city has also constituted 22 specialist committees to prepare plans for such tasks as risk management, evacuation, etc.

Mr. Hosseini pointed out that a major challenge in such efforts is the absence of adequate public participation in the development of the disaster management system. He also noted the inadequacy of experiences in some aspects such as in quick damage and loss estimation, and limited time

A major challenge in the development of Tehran's disaster management system is the absence of adequate public participation.

and financial resources for the implementation of projects identified in the Master Plan.

In the discussion, the possibility of using Tehran's methodology and software for Indonesia was raised, as well as the possibility of cooperation between the two cities to carry out risk assessment in Jakarta.

The last presentation titled *Dare to Prepare*, was delivered by Mr. Mark Benthien,

For Los Angeles, hazard assessment has shown that **significant earthquake shaking** can be expected from Puente Hills fault right below the city as well as from the San Andreas fault that last generated a major earthquake in 1957.

Director for Outreach, Southern California Earthquake Center, Los Angeles, USA. It described the new strategy of Los Angeles to engage various stakeholders in disaster management through the theme of "Dare to Prepare" for possible earthquakes in the future. For instance, hazard assessment shows that significant earthquakes can be

expected from Puente Hills Fault right below the city as well as from the San Andreas Fault that last generated a major earthquake in 1957.

The "Dare to Prepare" strategy aims to synthesize available scientific information from existing sources to:

1. Describe the earthquake,
2. Develop a physical model,
3. Carry out vulnerability and risk assessment,
4. Determine the consequences of various damage and losses, and
5. Evaluate the changes that can be done to reduce disaster damage and losses.

Mr. Benthien provided examples of social and economic consequences of earthquake disasters that should be considered in the disaster management plan. He also mentioned that a state-wide exercise on disaster outcomes is being planned on November 13-18, 2008. The importance of sustainability was emphasized in the open forum that followed.

Disaster Management Master Planning

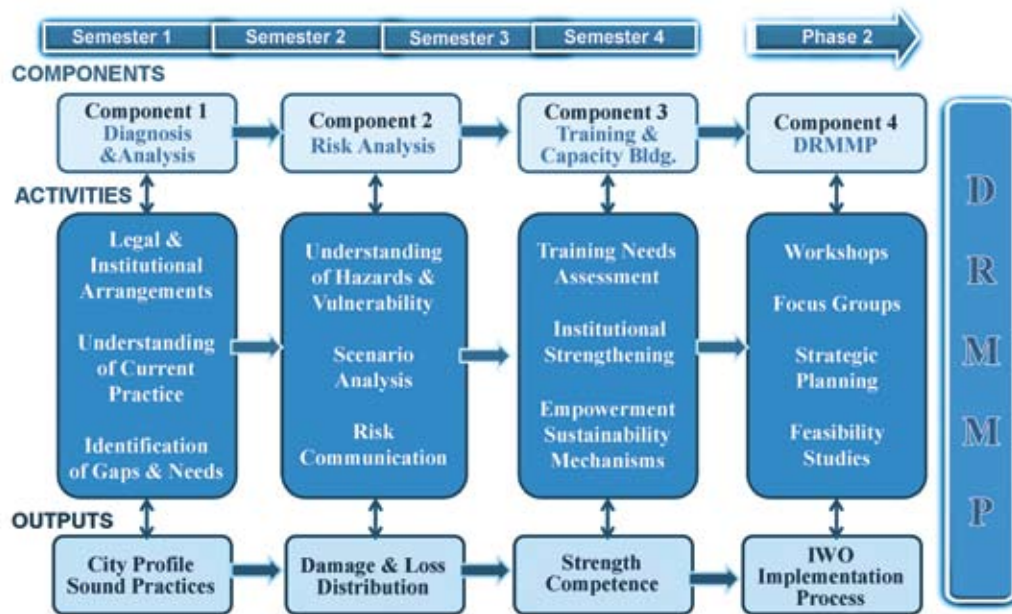
The second session focusing on *Disaster Management Master Planning* featured five presenters who discussed the experiences of local governments in the process of planning and managing disaster risk in their respective cities. The presentations and open floor discussions that followed underscored several key lessons learned and policy implications that cities at-risk can adapt to reduce their vulnerability and risk to disasters:

1. Existing scientific knowledge on disasters can be used as basis for public information and awareness campaigns.
2. A systematic assessment of risk such as microzonation and vulnerability assessment provide a solid basis for formulating disaster preparedness initiatives and disaster risk management plan.
3. A multi-hazard approach to risk assessment is important to draw realistic disaster scenarios and management plans.
4. Communicating existing knowledge on disaster risk to decision makers is the first important step towards disaster preparedness efforts.
5. Local governments need to enhance their institutional and technical capacity to prepare for earthquakes and sustain their efforts in disaster risk reduction.

To provide a conceptual backdrop, Dr. Fouad Bendimerad, EMI Chairman, discussed *The Concept of the Disaster Risk Management Master Plan*. He gave an overview of how EMI assists cities in developing a disaster risk reduction agenda to mitigate losses due to natural disasters. In particular, Dr. Bendimerad highlighted

the Disaster Risk Management Master Plan (DRMMP) model, a centrepiece of EMI's Cross-Cutting Capacity Development (3cd) Program, which is a comprehensive, proactive approach that aims to protect city residents and assets. He summarized the DRMMP as a roadmap composed of four steps:

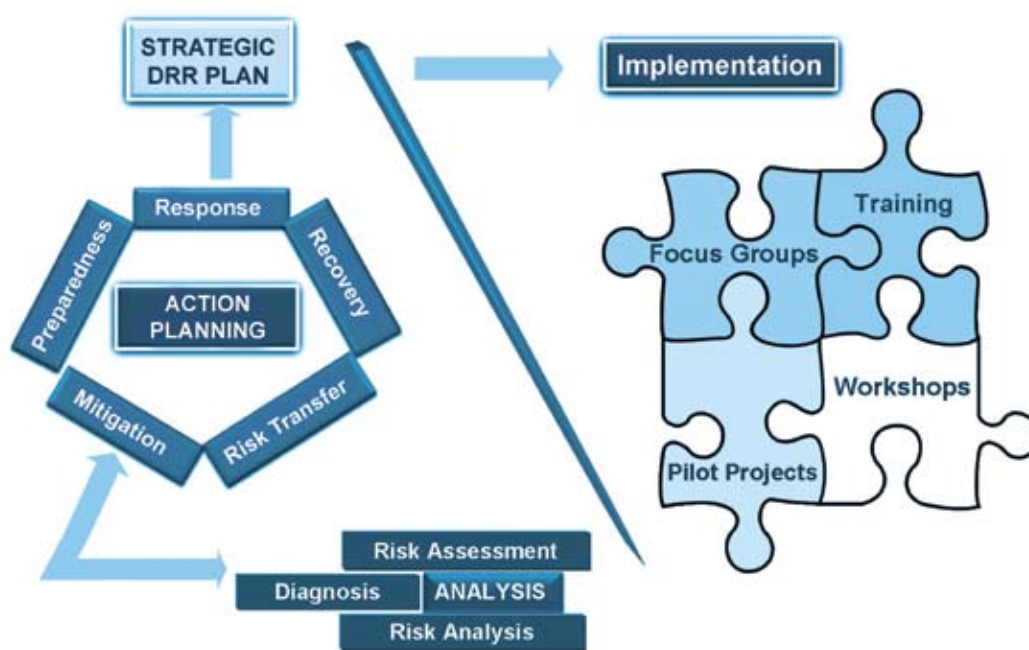
1. Assessing and analyzing risk, during which hazards and vulnerabilities are diagnosed.
2. Empowering the stakeholders, during which national and local government agencies, civil society, professional groups, and other stakeholders participate and engaged in the process of planning and developing the DRMMP of the city that consists of several components such as mitigation, recovery, risk transfer, etc.
3. Implementing the DRMMP, which includes creating partnerships, capacity- building, training, and collaborative work.
4. Sustaining the process, which requires local ownership by stakeholders and commitment from all.



The DRMMP Process (Bendimerad).

He stressed that while political commitment in the form of a written declaration or agreement of cooperation signed by the city government officials is necessary to be take part in the 3cd Program, genuine and sustained participation of the city is the key element that sustains the DRMMP process. Another key strategy of the DRMMP model for local ownership to be sustained is the formation of Focus

Groups. The focus groups are essential in forming partnerships and encouraging a broad-based participation of stakeholders. For example, in applying the DRMMP model in Metro Manila, six focus groups were formed to implement action plans towards risk reduction: (1) Use of information and communication technologies, (2) Integrating land use planning and disaster risk reduction, (3) Capacity building and training needs assessment for disaster risk management, (4) Mobilizing resources in civil society for disaster risk management, (5) Improving legal and



DRMMP Components (Bendimerad).

institutional arrangements for disaster risk management. Another focus group was later established specifically to facilitate the use of the Megacity Indicators System (MEGA-Index) in Metro Manila, the first application of the indicators to a megacity.

Dr. Bendimerad, in closing, briefly discussed several tools that EMI is developing to assist and support cities to implement their DRMMP. These include MEGA-Plan (an eLearning course on risk-sensitive land use planning), MEGA-Learn (an eLearning portal for disaster risk reduction), MEGA-Know (an online megacities knowledge base on disaster risk management) and MEGA-View (a web-based GIS map viewer designed for disaster risk management).

This was followed by a presentation on *Enhancing Disaster Risk Management in Megacities: The Metro Manila Experience* by Atty. Violeta S. Seva, Senior Adviser to the

Mayor of Makati City, Metro Manila, Philippines. As the National Capital Region, Metro Manila accounts for 32 percent of the Philippines' Gross Domestic Product. Being also highly exposed and vulnerable to natural hazards, the risk of suffering from a natural disaster is thus very high. Atty. Seva cited the Metropolitan Manila Earthquake Impact Risk Study (MMEIRS) that came up with a worst case scenario earthquake of magnitude 7.2 originating from the West Valley Fault. The scenario

Sustained efforts in capacity development and strengthening the commitment of the focus groups are key to successful implementation.

indicated a death toll of 33,500 people, 114,000 injured and about 1.3 million heavily damaged or collapsed buildings or 38 percent of the capital region's building stock, among other structural damages.

In view of this study, the Metropolitan Manila Development Authority (MMDA) partnered with EMI through a Memorandum of Cooperation in 2005 and engaged in the process of DRMMP. The

Philippine Institute of Volcanology and Seismology (PHIVOLCS) is designated as the Local Investigator, while the cities of Quezon, Makati and Marikina are identified as pilot cities. Metro Manila's DRMMP is implemented through the Focus Groups. Atty. Seva then elaborated on the 10 elements of the DRMMP, namely:

1. Strengthen the Metro Manila Disaster Coordinating Council.
2. Promote the adoption of disaster management ordinances by each city and municipality.
3. Promote the revitalization of city/municipal and community disaster coordinating councils.
4. Institutionalize disaster risk management within local government framework and financing.
5. Enhance lateral and vertical inter-agency and inter-governmental communication and coordination.
6. Enhance legal basis for disaster risk management at national level by updating or replacing PD1556.
7. Promote policies that encourage implementation of DRR and develop mechanisms for mainstreaming DRR within local government functions.
8. Promote local government mitigation planning through existing planning tools.
9. Conduct training needs assessments and develop capacity building programs.
10. Strengthen community preparedness level for disaster response and relief.

The DRMMP of Metro Manila also identifies five Implementation Work Outputs which correspond to the five Focus Groups previously discussed by Dr. Bendimerad. Trainings, workshops and seminars are organized during Field Trips by MMDA,

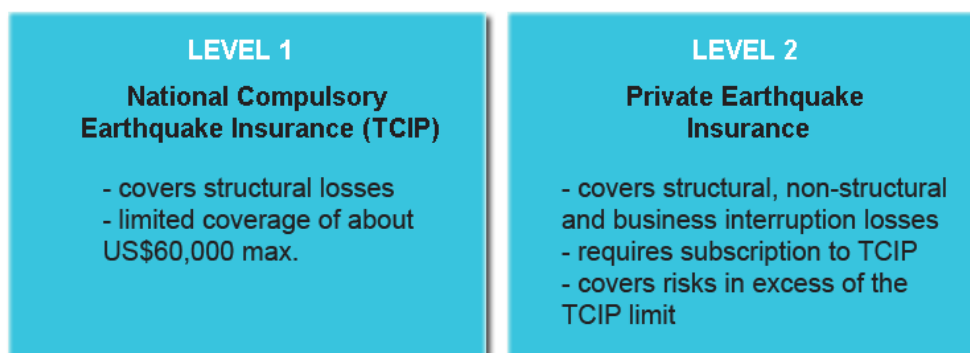
PHIVOLCS and EMI together with the pilot cities in order to provide technical assistance and guidance to the Focus Groups in implementing the DRMMP. According to Atty. Seva, the following have been accomplished thus far:

1. Development of the web-based GIS Map Viewer (MEGA-View) for Metro Manila and training of end-users,
2. Training and capacity building activities for local land use planners and DRM professionals,
3. Application of the MEGA-Index methodology in Metro Manila, and
4. Incorporation of risk reduction criteria into the proposed disaster risk management bill for the Philippines.

There are many difficulties encountered through the implementation process that pose a challenge to the partner institutions such as scarce resources, wavering commitment of Focus Group members, and changes in institutional leadership.

Some lessons have been learned in Metro Manila which could be applied in the ongoing 3cd Program in Amman and Kathmandu. Atty. Seva mentioned that one of these is continuous support from local government officials, especially the mayors, is crucial. Commitment, cooperation, coordination and communication at all levels are also necessary to sustain the planning and implementation of DRMMP. Sustained efforts in capacity development and strengthening the commitment of the focus groups are key to successful implementation. Lastly, she discussed the way forward for the DRMMP in Metro Manila in terms of institutionalizing tools and technologies for risk communication and risk reduction, enhancing institutional and technical capacities, and strengthening inter-institutional coordination and legal framework for disaster risk management.

A presentation on the topic of *Istanbul Earthquake: Mitigation and Transformation* was prepared by Prof. Metin Ilkisik, Adviser to the Lord Mayor of the Istanbul



Turkey's two-level earthquake insurance system (Ilkisik).

Metropolitan Municipality in Turkey but delivered by Dr. Bendimerad.

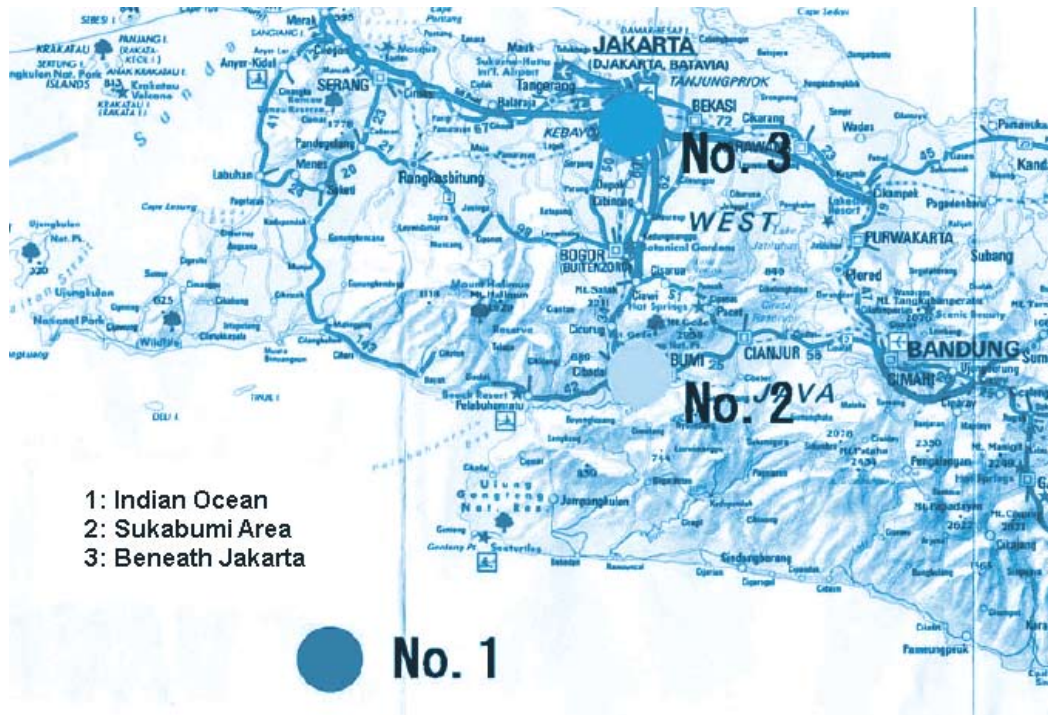
Dr. Bendimerad explained that the tectonic setting of Istanbul makes it highly prone to earthquakes. The probability of an earthquake with a magnitude 7 in 30 years is quite high at 43 percent. He added that a study conducted by the Japan International Cooperation Agency (JICA) estimated the likely damage and losses from a 7.5 to 7.7 magnitude earthquake that is expected to occur 20 kilometers away from Istanbul. The scenario earthquake would probably affect three million households in 750,000 structures, about 70,000-90,000 lives would be lost, and economic losses estimated at 40 billion US Dollars.

To mitigate the potential catastrophic impacts of such an event, Istanbul Metropolitan Municipality has instituted short, medium and long-term preparations. One of the short-term preparations is the establishment of Afet Koordinasyon Merkezi (AKOM) and development of the Earthquake Master Plan of Istanbul. The AKOM serves as the central body for fire fighting, search and rescue, drills, trainings, researches, and risk studies. It is also the lead implementer of the Earthquake Master Plan. Another initiative is the two-level Earthquake Insurance System of Turkey, a mandatory insurance policy that aims to strengthen the country's risk transfer mechanism. Level 1 involves national compulsory earthquake insurance on structural losses, while Level 2 refers to private earthquake insurance on structural, non-structural, and business interruption losses.

Medium-term preparations include microzonation and retrofitting initiatives. One project is the Istanbul Seismic Risk Mitigation and Emergency Project, which aims to enforce building code provisions, strengthen emergency management capacity, and enforce seismic risk mitigation for priority public buildings. Another medium-term project is the risk analysis phase of urban rehabilitation



Zeytinburnu Urban Redevelopment Project in Istanbul (Ilkisik).



Possible earthquake epicenters in the vicinity of Jakarta (Harjadi).

and transformation projects in Istanbul, including building stock inventory and analysis. These are implemented in Fatih and Zeytinburnu, two highly vulnerable districts in Istanbul. Long-term preparations include the implementation phase of the urban redevelopment projects, involving the demolition and reconstruction of hazardous structures in Fatih and Zeytinburnu. One of the aims of these projects is to change the dominant earthquake-prone design of medium-rise buildings in the districts.

All these preparations indicate that a paradigm shift has taken place in Istanbul after the earthquake—from a reactive and “Act of God” orientation to a proactive, strategic approach that is centered on disaster mitigation and sustainable development and characterized by making choices instead of depending on fate. The presentation concluded that these preparations will most likely result to large-scale protection of lives and properties.

The fourth presentation was prepared by Dr. Achmad Harjadi, Planning Bureau Head of the Jakarta Provincial Government, who elaborated on the *Current State of DKI Jakarta Activities and Capacities for Disaster Risk Reduction*. The presentation was delivered by Mr. Tauhid. Jakarta, the capital city of Indonesia, has a population of 8.4 million and growth rate of two percent and still rapidly urbanizing. It is part of the Jakarta Metropolitan Area (JABODETABEK, which stands for Jakarta and

surrounding cities of Bogor, Depok, Bekasi, and Tangerang), which is the national political, social, and economic center of the country. Mr. Tauhid continued that Jakarta has a high vulnerability to earthquakes due to several factors that include the prevalence of substandard buildings and infrastructure, presence of hazardous facilities, utilization of hazardous lands, and inadequacy of open spaces. He also pointed out Jakarta's population density (200 persons per hectare) and a large

The needs of Jakarta to effectively reduce the risk of disaster include: seismic microzonation, seismic evaluation of critical facilities and public infrastructures, study of emergency transport system, and a disaster risk management master plan.

number of low-income households (36 percent of total households) could increase its social vulnerability.

Although there has been no destructive earthquake that has affected Jakarta, Mr. Tauhid pointed out that three probable scenario earthquakes could affect the city: magnitude 8.1 earthquake originating in the Indian Ocean, magnitude 6.3 from Sukabumi Area, and magnitude 6.3 from beneath Jakarta. To reduce the risk, the Jakarta Provincial Government has

established a disaster risk management system that includes both regulatory and organizational frameworks. Regulations include Governor Decree No. 222/1998 setting standard operational procedure for disaster response and Governor Decree No. 96/2002 establishing the provincial coordinating unit for disaster and refugee management. In terms of organization, he described the Satkorlak PB or the Provincial Coordinating Unit for Disaster and Refugee Management, which is responsible for the overall coordination of disaster risk management efforts. Further, after a flood that devastated Jakarta in 2002, an Emergency Management Center or Crisis Center was established to integrate handling of complaints and assistance with disaster response. Mr. Tauhid revealed that the Crisis Center is still facing difficulties due to inadequate funds, facilities and human resources. Other programs of Jakarta include direct field simulations, information dissemination campaigns, trainings of Satkorlak and the community, and the celebration of a disaster awareness week.

Lastly, Mr. Tauhid identified the needs of Jakarta to effectively reduce the risk of disaster. These include seismic microzonation, seismic evaluation of critical facilities and public infrastructures, study of emergency transport system, and a disaster risk management master plan. Mr. Tauhid concluded by expressing the need for Jakarta to further enhance its capacities in risk management and adopt the DRMMP model of EMI.

The last presentation in this session was made by Dr. M. Syahril B.K. of the Center for Disaster Mitigation, Institut Teknologi Bandung (ITB), on the topic of *Microzonation and Hazard Mapping of Meuraxa District, Banda Aceh*. Dr. Syahril gave a very comprehensive presentation on the microzonation and hazard mapping

of the Meuraxa District of the City of Banda Aceh, Indonesia. He discussed the 2004 Indian Ocean earthquake site investigation, detailing the building damage, results of attenuation analysis, field observations, and evaluation of building and infrastructure damage.

Further, Dr. Syahril elaborated on the results of the tsunami site investigation, particularly the physical effects of the catastrophic tsunami caused by the Indian Ocean earthquake. Topographical and bathymetrical surveys were conducted using various methods and a global positioning system that established benchmarks necessary to monitor sedimentation and coastal changes. Tsunami identification and propagation have been updated using secondary data from various sources. A geotechnical survey was also conducted through the study of tsunami inundation and the damages it caused. The results of the ground survey have already been mapped.

The physical damage brought about by the 2004 event is due to a combination of building and infrastructure vulnerability and distribution of seismic **amplifications associated** with variation in local ground condition.

He also presented the seismic hazard analysis and microzonation map of Meuraxa with a return period of 500 years, given the city's tectonic setting and earthquake history. Several findings on the liquefaction potential and ground ruptures were likewise disclosed. Dr. Syahril showed a hypothetical running model of a tsunami and seismic source potential for tsunami generation based on probabilistic tsunami hazard modeling. Several other tsunami scenarios and inundation maps at different return periods and different moment magnitudes were also briefly discussed.

Dr. Syahril concluded that the physical damage brought about by the 2004 event is due to a combination of building and infrastructure vulnerability and distribution of seismic amplifications associated with variation in local ground condition. He suggested the provision of proper engineering parameters, improvement of building codes and guidelines, consideration of liquefaction potential, and proper design construction of new structures within the city to reduce potential damage in case of another earthquake.

For tsunami risk mitigation strategies, he stressed the need for further studies of the Megathrust Earthquake to come up with more accurate models. He also recommended using seismic and tsunami microzonation maps as bases for establishing engineering criteria for rehabilitation and reconstruction of structures and long-term spatial planning of Meuraxa District. Lastly, Dr. Syahril recommended that microzonation be conducted for Banda Aceh.



Asian Cities and Disaster Risks

Promoting Disaster Risk Reduction in Cities

The third session of the Forum was titled *Promoting Disaster Risk Reduction in Cities: Examples of Programs, Projects, and Sound Practices*. Moderated by Dr. Haji Pariatmono, Assistant to Deputy Minister of RISTEK, Indonesia's State Ministry of Research and Technology, the session brought together practitioners and scholars to discuss recent lessons learned by cities engaged in DRR activities. Although the participants spoke about the challenges and opportunities they faced, a common theme emerged from their presentations: that cities exposed to the risks of natural and man-made hazards must continue to improve their capacity for risk reduction. As the following presentation summaries demonstrate, the participants suggested that risk reduction capacity can be improved with the development of policies and procedures that:

1. Increase the participation of local communities,
2. Increase the participation of local, regional and national governments,
3. Increase the collection and dissemination of risk information before, during and after disaster events.

The session was opened by Dr. Noel Lansang, Head of the Department of Public Order and Safety in Quezon City, Philippines with a presentation on *The Barangay Flood Warning System in Quezon City*. Dr. Lansang reviewed the development of a flood-warning system in Quezon City, a city that is highly susceptible to flooding. This innovative system was designed as a cost-effective, non-structural solution to the problem of flooding, and it relies upon the dissemination of scientific knowledge to develop public awareness about the risks posed by flooding. The system is elegant in design and process, and its goal is to encourage the citizens

The Barangay Flood Warning System serves as an excellent example of how public participation can be used to implement an effective early warning system.

of Quezon City to take responsibility for their own safety. Officials have placed a network of rain gauges and flood gauges throughout the city. The citizens who live within the risk environment have been taught how to read the gauges, and told what to do when they detect conditions that would lead to flooding within their

communities. If an evacuation is needed, the citizens know that they must operate a bell or siren to inform the community about the emerging threat. Once they hear the warning, the citizens will move to shelters located on higher ground, where they will meet government officials who will provide them with emergency assistance. Dr. Lansang reported that this system serves as an excellent example of how public participation can be used to implement an effective early warning system. Moreover, this system also serves as a framework upon which a larger DRM system could be constructed. To implement such a system, however, it will require additional organizational and executive support from the government.



Quezon City's barangay flood warning system (Lansang).

The second presentation titled *Seismic Risk Management Practice of Tashkent City* was delivered by Dr. Tursunbay Rashidov, a Professor at the Institute of Mechanics and Seismic Stability of Structures, located at the Uzbekistan Academy of Science. Dr. Rashidov reviewed the development of the seismic hazard assessment for Tashkent, Uzbekistan, a city that is located within a high seismic zone. The hazard assessment and risk mitigation activities in Tashkent included (1) the collection of seismic risk data, (2) analysis of building construction, (3) inventory and modeling of past and future seismic damage, (4) development of robust mitigation action plans, and (5) implementation of good risk mitigation practices.

The result of hazard assessment indicated that an earthquake could destroy up to 25 percent of the city's infrastructure. In response, city planners have begun to reinforce Tashkent's lifeline systems, which include utilities such as water, electricity and gas, as well as implement mitigation strategies that not only improve the resilience of current buildings, but also ensure the continuation of sustainable economic development.

Although Tashkent has made significant improvements in its ability to mitigate seismic risk, Dr. Rashidov reported that many obstacles remain. Policy-makers must continue their efforts to facilitate public awareness, evaluate seismic risk, conduct building inspections, develop building codes, and identify how to best respond to the needs of refugees after a disaster event. Dr. Rashidov recommended that one of the best ways to overcome these problems is to strengthen the interconnections that exist between scientists and government officials. These interactions will not only help those who live in Tashkent to understand the extent of seismic risk to their community, but also how to best respond to that risk.

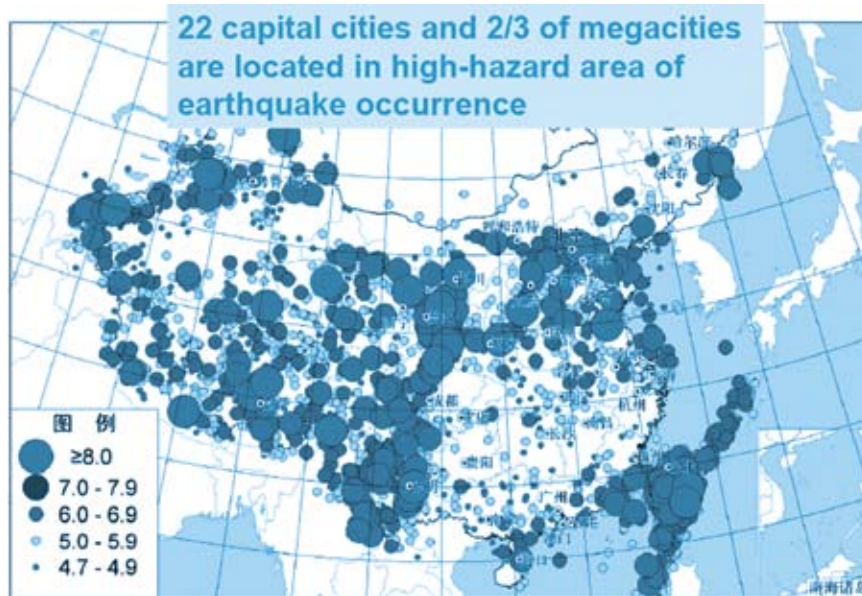
The third presentation, *Urban Earthquake Preparedness and Disaster Mitigation in China*, was delivered by Mr. Pan Huaiwen, Deputy Director for the Department of Personnel Education and Science and Technology, China Earthquake Administration (CEA). Mr.

City planners have begun to reinforce Tashkent's lifeline systems and implement mitigation strategies that not only improves the resilience of current buildings, but also ensures the continuation of sustainable economic development.

Huaiwen reported that China is highly susceptible to seismic activity and that recent urbanization of China's cities has increased the potential for large-scale seismic disaster. China, for example, currently has 40 cities with populations of over one million people, and estimates suggest that by 2020 approximately 60 megacities will be located within China. If an earthquake were to occur near one of these mega-cities, the human and economic toll would be considerable.

In response to this challenge, the Chinese government has organized its risk reduction activities around three primary areas. First, the government has

improved its disaster management system by passing legislation that delineates responsibilities among various stakeholders within the country, improves building codes, mandates the fortification of lifeline systems, requires contingency planning, and establishes Earthquake Command Centers in the most vulnerable



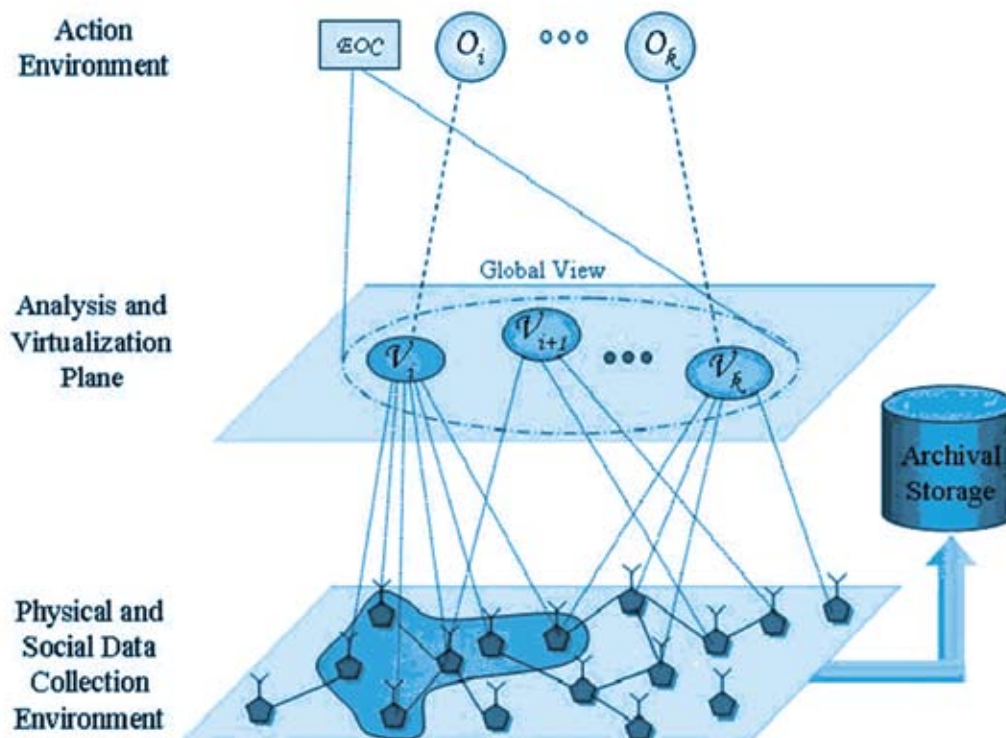
Earthquake occurrence in China's urban areas (Huaiwen).

cities. Second, the government has improved data collection efforts, and increased its efforts to locate active faults, and complete seismic micro-zoning and loss estimation studies. Third, the government is developing an urban seismic safety system that will use the Internet to link the general public with the government and providing the community with information related to fault locations, seismic risks, loss estimations, as well as general disaster management information.

The fourth presentation, *Designing Resilience for Communities at Risk: A Socio-technical Approach*, was delivered by Mr. Thomas W. Haase, a Doctoral Candidate at the Graduate School of Public and International Affairs, University of Pittsburgh. His presentation outlined a collaborative project between ITB, RISTEK and the University of Pittsburgh. This project will evaluate a socio-technical model for improving decision making in Padang, Sumatra, a city that is exposed to the recurring risk of tsunami. First, the researchers will explore the extent to which an alternative sensor system could assist with the time-sensitive processes of tsunami detection and warning. Second, the researchers will conduct a simulated operations exercise that models the processes of search, exchange, recognition, interpretation, communication, and action in reference to risk at three levels of information aggregation: individual, organizational, and system-wide. The scenario will proceed through the temporal phases of an escalating disaster: (1)

early stage, (2) emerging risk, (3) onset and response, and (4) rescue and recovery. At each stage, the human and social dynamics of the decision making processes will be captured electronically, which will allow systematic tracing of processes of cognition, interpretation, communication, and action that are very difficult to capture through direct observation alone. The benefit of this socio-technical approach lies in linking technical infrastructure of detection of tsunami risk with organizational capacity to mobilize action to reduce risk for continuing protection of the community.

The fifth presentation, *Cities and Catastrophes: Lessons from Recent Disasters in Indonesia*, was delivered by Mr. Josef Leitmann, Disaster Management Coordinator,



Multilayered architecture for a tsunami detection and response system (Haase).

World Bank-Indonesia. Mr. Leitmann provided a thorough review of the critical lessons derived from Indonesia's response to, and recovery from, the 2004 Sumatran Earthquake and Tsunami. First, cities must eliminate bottlenecks that prevent the delivery of critical resources to those in need. Second, cities must develop long-term policies that will ensure that corrective actions can take place within complex disaster environments. Finally, cities must expand their resilience by encouraging both people's involvement and implementation of effective disaster management

practices. Mr. Leitmann concluded his presentation by providing communities that are interested in improving their capacity to mitigate risk with some specific points of guidance. On one hand, he proposed that cities must be realistic about the timing of response and recovery activities. They must select the right partners and relief mechanisms. They must take care to examine the environmental impacts of their activities. Lastly, cities must not focus all of their attention on the construction and maintenance of relief shelters, must not neglect the role of logistics, and must not downplay the role of information in the relief process.

Cities must develop long-term policies that will ensure that corrective actions can take place within complex disaster environments.

The final presentation, *City Disaster Preparedness Plan: Lessons Learned from the Implementation of National End-to-End Tsunami Simulation Drill in Padang 2005, Bali 2006 and Banten 2007*, was delivered by Prof. Harkunti Rahayu, of the Institut

Teknologi Bandung. Prof. Rahayu's presentation reviewed the findings of an end-to-end simulation of a hypothetical tsunami event affecting the city of Padang, Indonesia. The simulation employed a model that considered wave elevation and location, population density, potential evacuation routes, and the distance that must be traveled by the local population to avoid the hypothetical tsunami. The simulation revealed that, to respond to the risks posed by tsunami, policy-makers within Padang needed to:

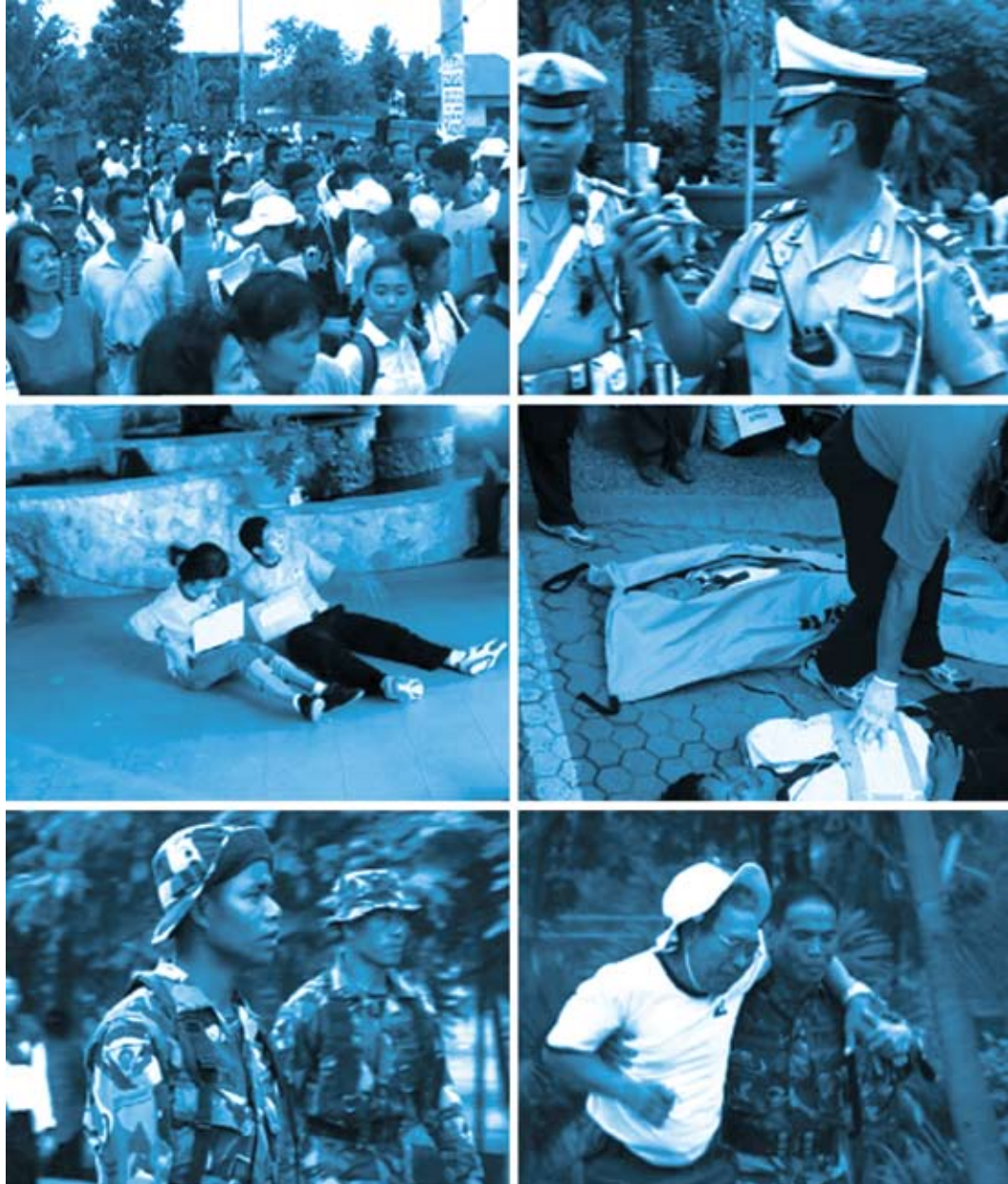
1. Develop standard operating procedures for responding to tsunami events;
2. Redesign evacuation routes to ensure that they do not parallel the coast; and
3. identify and isolate buildings that can be used as evacuation shelters.

Table 1. "Do's and Don'ts" in Disaster Response and Reconstruction (Leitmann).

Do	Don't
Be realistic about the timing and approach to rebuilding homes, considering the need for emergency, transitional and permanent shelter.	Construct only shelters; instead build settlements with infrastructure and land tenure through a participatory planning process.
Pick the right partners and delivery mechanisms in order to maximize the speed and effectiveness of investments.	Neglect logistics/transportation needs that can create real bottlenecks that will slow down both relief and recovery efforts.
Pay attention to environmental consequences in the relief and recovery phases to avoid costly mistakes later on.	Downplay importance of M & E and quality control that are critical for managing post-disaster response.

Prof. Rahayu concluded her presentation by noting that the simulation also provided valuable lessons for other cities. For example, local governments can increase their capacity by developing and implementing standard operating procedures. Policy-makers can identify, and where necessary, strengthen the relationships that exist, or could exist, between stakeholders within the city. Additionally, at-risk cities must also educate their populations about how to respond to disaster events. Finally, while the complexity of human systems makes disaster management simulations difficult, they are possible to conduct based on their experiences in Indonesia.

The simulation revealed that, to respond to the risks posed by tsunami, policy-makers within Padang needed to: (1) develop standard operating procedures for responding to tsunami events; (2) redesign evacuation routes to ensure that they do not parallel the coast; and (3) identify and isolate buildings that can be used as evacuation shelters.



Photos from Indonesia's end-to-end tsunami simulation drills.

Building Networks and Sharing Knowledge

This session was open to all participants representing cities and international organizations, namely, Jakarta, Mumbai, Makati, Quezon, Tehran, Tashkent, Beijing, World Bank, UNDP and EMI. Each of the participants addressed key issues related to knowledge sharing and contributed their perspectives on how to provide a regional and global dynamic for city-to-city sharing of information and experiences on disaster risk management.

Dr. David Hollister, Disaster Risk Reduction Advisor of the UNDP Bureau of Crisis Prevention and Recovery (BCPR), offered UNDP's perspective on the importance of knowledge sharing and networking. He suggested that in Indonesia, especially because of its diversity, knowledge sharing is a major challenge, and at the same time a key to DRM. He stated that cities most importantly learn from other cities and organizations like themselves. However, effective knowledge sharing must meet two important criteria. First there is a need for a clear focal point. Priority areas that need to be addressed should be clearly formulated. Then, there must be a process to ensure the longevity of the networks and information.

Dr. S. S. Kudalkar of the Municipal Corporation of Greater Mumbai, believes that cities have different capacities and each has gained a high level of experience on different aspects of disaster mitigation. He suggested that an effective knowledge sharing model would bring out the areas of expertise and encourage cities to make their respective contributions. Dr. Noel Lansang of Quezon City concurred that there are different levels of accomplishment on DRM in different cities. In Metro Manila, for instance, there are 17 different jurisdictions and the challenge in knowledge sharing is to bring these experiences together by focusing on the

Moderator: Dr. Louise Comfort, U. Pitt., USA

Rapporteur: Dr. Bijan Khazai, U. Karlsruhe, Germany

common goal of developing a DRMMP. He said that the Forum provides all cities with a benchmark, so that the work of those who have gained expertise in DRM can be shared with others. Ms. Tuty Kusumawati of the Jakarta Provincial Government also stated that a focal point of the knowledge sharing program must be to pave the way for cities to set up a comprehensive DRMMP which consolidates all the different elements into a single document.

Other ideas that were put forth by the participants in terms of creating a dynamic system for mutually beneficial learning and peer-to-peer knowledge sharing among cities included a “sister city” concept within the partner cities. Prof. Harkunti P. Rahayu of the Institut Teknologi Bandung, suggested the “sister city” concept as a way for cities to learn from each other, for example through the use of internship programs. Dr. Ashrakov from Tashkent stated that city-to-city sharing and a “sister city” concept can be very useful in Central Asian countries that have much in common with each other. He believes one of the critical challenges in city-to-city knowledge sharing is the way information and results from academic researches

One of the critical challenges in city-to-city knowledge sharing is the way information and results from academic researches are presented.

are presented. He suggested that a methodological approach is needed for such information to be consolidated into practical manuals and brought to communities to increase knowledge and awareness at the local level.

Some participants also highlighted experiences, challenges, and sound practices that they felt were important outcomes of their work that should be shared with other cities.

Dr. Ravi Sinha of the Indian Institute of Technology in Mumbai suggested that an important step towards institutionalizing disaster mitigation is to develop a legal framework for disaster mitigation and preparedness for allocating budget and addressing human resources for DRM. In Mumbai, the National Disaster Management Act, has given a focus to the efforts of institutions to implement DRM and an instrument by which institutions can see which of their activities have contributed to various aspects of disaster mitigation.

Dr. Maziar Hosseini of Tehran Municipality Disaster Management Center stated that Tehran has successfully implemented national earthquake drills in all schools in the city. As a result of the widespread public awareness created, the government is willing to commit funds to the school retrofit and safe construction work that the experts have been advocating. Dr. Kambod Amini Hosseini, an advisor to the Tehran Municipality Disaster Management Center, suggested the importance of community awareness, preparedness and grassroots activities as a prerequisite to implementing sound DRR practices. He mentioned that while the 1990 Manjil and 2003 Bam earthquake in Iran were threshold events that greatly informed disaster

management work in Tehran, the lack of training on the operational level makes it difficult to implement the codes and standards that have been developed.

Mr. Pan Huaiwen of the CEA talked about the emergency shelter planning and construction program implemented by Beijing as one of the initiatives in earthquake disaster prevention and reduction in China where two thirds of megacities are considered at high earthquake risk.

Dr. Pariatmono of RISTEK stated that the challenge in disaster management lies in the socio-technical domain. He brought up the case of Tsunami Early Warning System that has both technical and social components. He finds that the structural component has finality and clear goals. The social component is more challenging as it includes varied perspectives from many stakeholders. However, the critical interaction between technological and social components is a critical and challenging area, where he finds that local governments tend not to be sufficiently engaged. He suggests that local governments and grassroot organizations should take more responsibility in the socio-technical realm, such as conducting regular tsunami drills, marking evacuation route, planning escape activities, and incorporating DRR into spatial planning.

Dr. Fouad Bendimerad of EMI concluded that creating a dynamic for mutually beneficial peer-to-peer learning among cities is an area EMI has been involved



Emergency shelter zoning in Beijing (Huaiwen).

with since its inception. Tools such as MEGA-Know, its online knowledge base of sound practices, or MEGA-Learn which includes training programs, are important but not sufficient. While few cities have made progress in establishing sound disaster risk management practices, other still lag behind. There are significant gaps in knowledge and a significant thrust in capacity building is needed in order to create an environment where DRR can be mainstreamed within cities. Peer-to-peer sharing is a very efficient way to scale up knowledge acquisition and competencies. The America Megacities Forum and the Asia Megacities Forum are coherent groups which are designed to initiate and foster mutually beneficial

Peer-to-peer sharing is a very **efficient way to** scale up knowledge acquisition and competencies.

exchanges and provide a permanent recording and documentation as archives for knowledge sharing. The objective is to scale up and spread existing knowledge and practice throughout all partner cities.

Participants agreed that in order to address the knowledge gap among cities and to allow for a mutually beneficial exchange of knowledge to take place, information exchange must have a clear focal point, which some believed to be the process of setting up a DRMMP. It was also expressed that another basis for sharing knowledge should be the promotion of areas of expertise and encouragement of cities to make their respective contributions. Some of the highlighted areas of expertise of the cities cited included the National Disaster Management Act in Mumbai, Tehran's earthquake drills program in schools, and the emergency shelter planning and construction program implemented in Beijing.

Share Fair



Photo: AMF07 Share Fair
Marqueza Reyes / 2007

Background

The CCP, through several years of its experience, has become a regional platform for several networks of cities established by EMI around the world. As a platform for knowledge sharing and knowledge validation on DRR, the CCP has effectively built a coalition of informed city managers and disaster management professionals and supported the implementation of sound DRR practices at the local level. The CCP provides a structure for knowledge acquisition, validation, and coalition building for cities at varying levels of capacity in disaster risk management. Its overarching goal is to empower cities by building their capacities and developing competencies through sustained knowledge exchanges and strengthening the city-to-city dynamic within the cluster towards mainstreaming and implementing DRR.

To facilitate the process of knowledge sharing and sustain the regional partnerships, EMI serves as the central node in the network. EMI coordinates the organization of a yearly megacities forum in collaboration with the member cities of the cluster. The megacities forum is organized in such a way that cluster city members will derive maximum benefits from interacting with their peers through various methods such as plenary presentations, panel discussions, small group meetings, and site visits.

Share Fair Concept

This year's Asia Megacities Forum featured a Share Fair, an innovative, participatory process of further validating the learning and experiences of cities in implementing disaster risk reduction and scaling up peer-to-peer learning exchange and empowerment among members of the cluster.

The Share Fair concept supports the cluster by providing a less formal venue where more intensive one-on-one interactions among cities can take place. The basic premise is that cities implement sound practices in disaster risk reduction that they can share with their peers and could be replicated by other cities. Hence, the Share Fair seeks to facilitate peer-to-peer demonstration of sound practices in DRR that have been successfully implemented by them. In this manner, demonstrating or sharing cities have an opportunity to showcase, share and validate their knowledge and experiences in DRR with other cities in the region. At the same time, cities are learning from their peers first hand and become encouraged and empowered as a result of the sharing process.

Process and Outcome

The Share Fair followed a two-step process: an open and a closed-door session. During the open session, all visitors (local participants from various government agencies in Jakarta, participants from other cities in Indonesia, media, etc.) were free to visit the booths they wanted and engage the exhibitors in informal

Table 2. Participating Cities and Organizations.

Participating City / Organization	Representative	Exhibit / Knowledge Shared
Jakarta Provincial Government	Ms. Tuty Kusmawati	Program on flood disaster risk management in the Jakarta Metropolitan Area
Los Angeles/SCEC	Mr. Mark Benthien	CERT Disaster Readiness Training brochure and other SCEC promotional materials Educational materials from the 16 th Annual Emergency Preparedness Fair Sound practice in promoting disaster preparedness using practical souvenir materials such as fans, two-year calendars, etc. in several languages (Spanish, Filipino and English)
Makati City, Philippines	Atty. Violeta Seva	Sound practice in fire safety and prevention and in emergency search and rescue, including strategies, challenges, and outcomes of the program
Mumbai, India	Dr. S.S. Kudalkar and Dr. Ravi Sinha	Mumbai Disaster Management Plan Risk profile of Mumbai Sound practice of using scientific information such as hazard maps and vulnerability assessment as solid basis for the development of the disaster management plan
Quezon City, Philippines	Dr. Noel Lansang	Sound practice in community-based disaster risk management through the Barangay Flood Warning System Program of the city government Sound practice in converting an open dumpsite into a controlled sanitary garbage facility, including slope stabilization, leachate prevention, and water ponding
Shanghai/Tianjin/Beijing - CEA	Ms. Yin Ping Hong	Disaster preparedness and disaster awareness information materials. Souvenir brochures and educational materials
Tehran, Iran	Dr. Maziar Hosseini, and Dr. Kambod Amini Hosseini	Probabilistic seismic hazard maps of Iran and Tehran as basis for the Tehran Disaster Risk Management Master Plan Microzonation project in Tehran Methodology in developing the Disaster Risk Management Master Plan
ITB, Indonesia	Dr. Syahril	Program and project posters on microzonation, etc. Simulation of the tsunami drill
RISTEK and BMG, Indonesia		Program on tsunami including tsunami drills and lessons learned Sound practice in seismic retrofitting of traditional housing
PDC, Hawaii, USA	Dr. Allen Clark	Natural hazards of Asia and the Pacific
PHIVOLCS, Philippines	Ms. Lynn Melosantos	Nationwide program on earthquake drills Sound practice in developing information and communication materials and promoting disaster preparedness in schools and for the general public through the use of simple posters
EMI	Dr. Marqueza Reyes, Dr. Bijan, Khazai	Program activities of EMI including the 3 rd Program Disaster Risk Management Master Plan process Tools and training packages for DRR specifically designed for cities Risk profiles of partner cities in the Asia Cluster

discussions. Also during this open session, Gov. Fauzi Bowo and his group visited the exhibits one by one. The participating cities and organizations provided all visitors information and distributed publications, educational materials, and useful souvenirs related to their disaster risk reduction programs.



Dr. Kudalkar, Mumbai's Municipal Corporation Deputy Commissioner, explains their DRR programs to Gov. Bowo of Jakarta and Dr. Bendimerad of EMI.

The second part of the Share Fair was a closed door session in which only the participating cities and organizations with exhibits remained in the room. The group was divided into two in order for all participants to have their turn to present their sound practices, projects and programs and also the chance to listen to their peers and learn from them. The first group of visiting participants rotated from one booth to another, while the presenting cities/organizations made their presentations. Afterwards, the roles were reversed—the presenting cities/organizations took their turns in visiting the booths of the first group. Visits were timed so that each group would have the chance to visit the booths of the other group, given the time constraint.

The Share Fair afforded a kind of city-to-city learning among member cities that was interactive, participatory and less formal. It also contributed to the overall goal of sharing and validating knowledge and empowering the member cities by learning from each other's strengths and weaknesses, success and failures. Lastly, it facilitated peer-to-peer demonstrations and exchanges, which is an innovative method of empowering cities by learning from one another.

Appendices

- ☑ Joint EMI-Jakarta Declaration
- ☑ Forum Agenda
- ☑ Presentation Abstracts
- ☑ Opening Speech
- ☑ List of Participants



Joint EMI-Jakarta Declaration of Cooperation



Jakarta Provincial Government

Fauzi Bowo
Governor of Jakarta



Fouad Bendimerad
Chairman of the Board

DECLARATION OF COOPERATION

between the
Jakarta Provincial Government (JPG)
and the
Earthquakes and Megacities Initiative (EMI)

Whereas, the Earthquakes and Megacities Initiative (EMI) and Jakarta Provincial Government (JPG) signed on 14 April 2007 a Letter of Intent that sanctions the partnership between JPG and EMI and the participation of JPG in EMI's projects and programs.

Whereas, on 24-26 October 2007 JPG hosted and jointly organized with EMI, the Asia Megacities Forum 2007 in Jakarta.

Whereas, during the preparations of the Asia Megacities Forum 2007, H.E. Dr. H. Fauzi Bowo expressed the interest of JPG to further engage in EMI's disaster risk reduction programs.

The Jakarta Provincial Government and EMI jointly declare their commitment to pursue disaster

risk management activities aimed at reducing disaster risk to the city of Jakarta, its people, its institutions, and its infrastructure from earthquakes and other natural hazards. These activities will pertain to the following three elements:

Element 1 - Capacity Building

EMI will work with the appropriate governmental institutions to develop and implement a capacity building program to improve the knowledge and the competency of JPG technical staff, managers and other professionals in the practices of hazard and vulnerability assessment, and in disaster risk reduction methods, technologies and practices. The program will include training of urban and land use planners, disaster management professionals, engineers, building officials, social workers and other professionals involved in implementing disaster risk management activities, projects and programs.

Element 2 - Development of a framework for Disaster Risk Management Master Plan

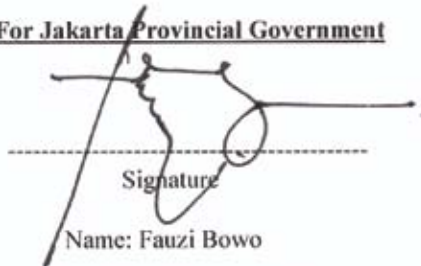
EMI and JPG will work together in the development of a framework for the implementation of EMI's Cross-Cutting Capacity Development (3cd) Program and its related Disaster Risk Management Master Plan (DRMMP) model in Jakarta. This element will establish the overall strategy, approach and action plan for long-term and medium-term disaster risk reduction in Jakarta. In particular, JPG and EMI will work jointly in benefiting from the experience of other cities that have actively participated in EMI 3cd Program, and to seek financial support in the development of the DRMMP and its implementation from EMI's partners and sponsors.

Element 3: Enhancing Knowledge and Practice

EMI and JPG will continue their consultations in order to develop opportunities for enhancing the knowledge and practice of policy makers, managers and technical staff of JPG for the purpose of increasing awareness and enhancing the ability of JPG to successfully tackle the disaster risk management challenges to Jakarta in the most effective manner. In this regard, JPG officials will be invited to participate in relevant international forums, technical visits, workshops and other similar activities undertaken by EMI, its partners and sponsors. The two parties also commit to regularly meet at the highest level to take stake in the implementation in their mutual agreement and enhance its agenda and activities.

This Declaration is hereby endorsed and signed on the 25 October 2007 in Jakarta, Republic of Indonesia.

For Jakarta Provincial Government



Signature

Name: Fauzi Bowo

Position: Governor of Jakarta

For Earthquakes and Megacities Initiative



Name: Fouad Bendimerad

Position: Chairman of the Board, EMI

Forum Agenda

October 24

- 19:30 – 21:30 Reception offered by HE Fauzi Bowo, Governor of Jakarta
(Joint session for EMI & ANMC 21 Delegates;(Venue: National Monument)
Welcome Address
1. Dr. Fauzi Bowo, H.E. Governor of Jakarta
2. Mr. Toshiyuki Shikata, ANMC21 Secretary
3. Dr. Fouad Bendimerad, Chairman of EMI
Performing Arts & Dinner
- 21:30 - finish Share Fair Preparation (Diamond 2 Conference Hall)
Share Fair City Delegates may start to set up the display.

October 25

- 08:00 – 12:00 Field Trip : Joint Session for EMI and ANMC21 Delegates
Commemoration of Disaster Reduction Day
Visit to Jakarta Crisis Center & National Seismic and Tsunami Center
- 12:00 – 13:30 Lunch at Nikko Hotel
- 13:45– 14:30 Opening Ceremony (Venue: Diamond 3)
1. Report from Organizing Committee
Aisa Tobing, Head of Bureau for Inter-Municipal Cooperation, JPG
2. Opening Speech - Dr. Fauzi Bowo, H.E. Governor of Jakarta
3. Keynote Addresses - H.E. State Minister of Research and Technology
and Dr. Fouad Bendimerad, EMI Chairman
Declaration of Jakarta Joining EMI
Press Conference
- 14:30-16:20 **Session 1: Turning Science into Practice** (Venue: Diamond 3)
Moderator: Harkunti P. Rahayu, ITB / Rapporteur: Dr. Ravi Sinha, IIT
- 14:30 Presentation of Jakarta, Dr. Pariatmono, Assistant to Deputy Minister for
Analysis of Science and Technology Needs
- 14:50 Presentation of Mumbai, Dr. S. S. Kudalkar, Deputy Municipal Commissioner,
Municipal Corporation of Greater Mumbai
- 15:10 Presentation of Tehran, Mr. Maziar Hosseini, Director, Tehran Municipal Disaster
Management Center
- 15:30 Presentation of Los Angeles, Mr. Mark Benthien, Director for Outreach, Southern
California Earthquake Center
- 15:50 Discussion and Summary
- 16:20 – 16:30 **Share Fair: City-to-City Knowledge Sharing** (Venue: Diamond 3)
“Objectives and Structure of the Share Fair”

- 16:30 – 17:30 Dr. Marqueza L. Reyes, Urban Disaster Risk Reduction Specialist, EMI
Share Fair Part 1: Open to All Participants (Venue: Diamond 2)
- 17:30 – 19:30 Share Fair Part 2: City-to City (C2C) Sharing; Closed Discussion for City/
Organization Representatives
- 20:00 – 21:30 Working Dinner (for EMI Cluster members only)
- October 26**
- 09:00 – 10:00 **Session 2: Disaster Management Master Planning** (Diamond 3)
Moderator: Tuty Kusumawati, JPG / Rapporteur: Dr. Marqueza L. Reyes, EMI
- 09:00 “Current DRM activities in Jakarta”
Mr. Roch Tauhid, Head of Infrastructure Administration Bureau, JPG
- 09:20 “The Concept of Disaster Risk Management Master Plan”
Dr. Fouad Bendimerad, Chairman, EMI
- 09:40 “The Disaster Risk Management Master Plan of Metro Manila”
Atty. Violeta Seva, Senior Adviser to the Mayor of Makati, Metro Manila
- 10:20 – 11:30
- 10:20 Istanbul Presentation
Dr. Metin Ilkisik, Advisor to the Lord Mayor of Istanbul
- 10:40 “Contribution of earthquake and tsunami risk assessment for the
development of Aceh Disaster Master Planning”
Dr. M. Syahril Badri Kusuma et al, Insitute for Research, ITB
- 11:00 Discussion and Summary
- 11:30 – 13:30 Break for Friday prayers (for Muslims) and Lunch (for all) 13:30 – 15:20
- 13:30 – 15:20 **Session 3: Promoting Disaster Risk Reduction in Cities:
Examples of Programs, Projects and Sound Practices**
Moderator: Dr. Pariatmono, RISTEK / Rapporteur: Mr. Tom Haase, U. Pittsburgh
- 13:30 Quezon City’s Barangay Flood Warning System
Dr. Noel Lansang, Head of the Department of Public Order and Safety
- 13:50 Seismic Risk Management Practice of Tashkent
Prof. T. Rashidov, Uzbek Academy of Science
- 14:10 Urban Earthquake Preparedness and Disaster Mitigation in China
Mr. Pan Huaiwen, Deputy Director, Department of Personnel Education and
Science and Technology, China Earthquake Administration
- 14:30 “Designing Resilience for Communities At-Risk: Sociotechnical Approaches”
Mr. Tom Haase, Ph.D. Candidate, Graduate School of Public and International
Affairs, Univ. of Pittsburgh
- 14:50 “Cities and Catastrophes: Lessons from Recent Disasters in Indonesia”
Mr. Josef Leitmann, Disaster Management Coordinator, World Bank-Indonesia
- 15:10 “City Disaster Preparedness Plan – Lessons Learned from End-to-End
Tsunami Simulation in Bali 2006 and Banten 2007”
Harkunti P. Rahayu, Center for Disaster Mitigation, ITB
- 15:30 Discussion and Summary
- 16:20 – 17:30 **Session 4: Panel Discussion on Building Networks and Sharing Knowledge**
Moderator: Prof. Dr. Louise Comfort, U. Pitt., USA / Rapporteur: Dr. Bijan
Khazai, U. Karlsruhe, Germany
Panelists include :
- Representatives of Jakarta, Mumbai, Makati, Seoul, Shanghai
 - UNESCO, World Bank, ECHO, IFRC, EMI
- 17:30 – 18:00 Closing Ceremony
Closing Remarks
1. Mr Tuty Kusumawati, Jakarta Prov. Government
 2. Dr. Fouad Bendimerad, EMI
- 18:00 Farewell Dinner (Hotel Nikko)

Presentation Abstracts

A Review of Tehran Disaster Risk Management Master Plan: From Theory to Practice

Dr. Maziar Hosseini, President of Tehran Disaster Management Organization and Assistant Professor of Azad Tehran University, South Branch, Tehran, Iran

Dr. Kambod Amini Hosseini, Advisor, Tehran Disaster Management Organization, and Director of Disaster Risk Management Research Center, International Institute of Earthquake Engineering and Seismology, Tehran, Iran

The city of Tehran, the Capital of Islamic Republic of Iran, is located in a seismic prone area in an active part of Alpine-Himalayan Orogenic belt (Alborz Mountain Range) and is surrounded by several active faults. Moreover this city has experienced destructive earthquakes in its history. Evaluations on the tectonic setting and seismicity of the areas show that a strong earthquake could be expected in this area in the coming years. Moreover, some of the existing old urban areas, lifelines and infrastructures are vulnerable to a strong earthquake and may be impacted considerably by the results of a potential strong earthquake.

These conditions show the importance of mitigation and preparedness planning before the occurrence of such destructive event to reduce its effects to an acceptable level. For this purpose several parameters have been taken into account by Tehran Municipality including applying the seismic standards and codes for new building construction; improvement of old urban areas; development of emergency response infrastructures; preparing the citizens for a potential disaster, etc.

In line with these activities, Tehran Disaster Management Organization (TDMO), with the assistance of international experts, developed a Master Plan for disaster risk reduction in Tehran in the year of 2005 that have been approved by relevant governmental authorities to be implemented in 12 years, started from 2006. This plan will cover the different areas of risk management including mitigation, preparedness, emergency response and reconstruction. In each topic the main

important issues have been studied and necessary measures to be carried out for improving their existing conditions were determined and prioritized. In addition the economic impacts of such developments were evaluated to decide on the best cost-benefit ratio for implementation of risk reduction programs. At the present time this plan is under implementation and some of its achievements will be presented in this paper.

Dare To Prepare: Regional Earthquake Preparedness through Collaboration among Many Partners in Southern California

Mark Benthien, Director for Outreach, Southern California Earthquake Center, Los Angeles, USA

Earthquake professionals, business and community leaders, emergency managers, and others have joined together to organize Dare to Prepare, an earthquake readiness campaign to raise earthquake awareness and encourage earthquake readiness in southern California. The campaign is supported with funding from federal, state, and local partners.

The main message of the Dare to Prepare campaign is “Shift Happens–Secure Your Space.” The overall goal is to reduce the risk of home, school, and business damage and injury during earthquakes. Recommendations include strapping top-heavy furniture and appliances to walls, adding latches to kitchen cabinets, and securing TVs and other heavy objects that can topple and cause serious injuries. Homes and other buildings should be retrofitted if necessary. These and other actions will greatly reduce the risk of damage or injury, and decrease demand on community resources after the next earthquake.

Why Now?

2007 is the 150th anniversary of the last great San Andreas earthquake in Southern California, a magnitude 7.9 earthquake that shook the entire region. Prominent scientists are nervous about the potential for another great earthquake on the San Andreas fault. Their concern is shared by emergency managers and others, who all fear major loss of life and property unless we each take action now to be ready. Hurricane Katrina showed the results of failing to be ready for a regional catastrophe and what can happen when a megadisaster pushes society to the breaking point.

How?

The Dare to Prepare campaign is intended to shift the culture of earthquake readiness, from denial (“it won’t happen to me,” “I’ll just pick up the pieces after,” “there’s nothing I can do”) to proactive action that reduces potential damage or

injury. Detailed “how-to” information and resources is provided to support actual implementation. Components of the Dare to Prepare campaign include:

- www.daretopprepare.org and www.terremotos.org (Spanish) websites with instructions for how to Secure Your Space;
- Development of campaign materials for use by Alliance partners, the news media, and others;
- Movers and Shakers: leadership group of prominent Southern California elected officials, business and community leaders, and others;
- Local activities: public events throughout the region (presentations, preparedness fairs, etc.), including demonstrations of Big Shaker, a large portable earthquake simulator;
- Media campaign: television, radio, and print advertising, PSAs, on-air interviews, etc.
- Putting Down Roots in Earthquake Country: distribution of millions of copies of this comprehensive earthquake science and preparedness handbook;
- Great Southern California Shakeout, a regional public earthquake exercise planned for 2008;

Disaster Risk Management Master Plan Model

Fouad Bendimerad, Ph.D., P.E., EMI Chairman, USA

The Disaster Risk Management Master Plan (DRMMP) process developed by EMI is a rigorous model for mainstreaming disaster risk reduction at the local level, and more specifically to megacities and complex metropolises. This concept was first developed in the context of EMI’s work with the Istanbul Metropolitan Municipality at the aftermath of the 1999 Marmara earthquakes. Following this model, the Municipality was able to put in place an overall strategy, an action plan and a rational process for undertaking specific disaster management activities spanning several sectoral functions such as the creation of AKOM as the municipality-wide disaster management center, the undertaking of several capital investment projects to strengthen infrastructure, and the adoption of urban renovation projects as a strategy for reducing disaster risk at a large scale. EMI has since then implemented the model in Metro Manila, Kathmandu and Amman in cooperation with local and national authorities of these cities/countries.

The DRMMP model consists of three distinct phases as described below:

Phase 1 - Diagnosis and Analysis phase: This investigative step establishes the baseline for building the DRRMP. It provides an understanding of the disaster management practice in the city within the national context, and provides an

understanding of the risk profile for the city. This phase also includes an assessment of hazards, vulnerabilities and risks which could potentially affect the city and an analysis of the socio-economic and ecological impacts of these risks.

Phase 2 - Master Planning Process. In this phase a planning process is undertaken on a participatory process to define pre-planning disaster risk management actions related to response, recovery, preparedness, mitigation, and risk transfer. Capacity building needs are also defined at this stage. A second round of consultation is undertaken to build a "Strategic Plan" out of the process of master planning. The strategic plan is formulated in terms of specific "Implementation Work Outputs" (IWOs) that represent a consensus of the most practical and achievable initiatives to be undertaken for reducing disaster risk in the city in a reasonably short time, say 2 to 3 years.

Phase 3 - Implementation Phase: This phase consists of the implementation process for the IWO's. The various agencies are guided through the process of implementation through feasibility studies, pilot studies, and technical and managerial assistance. Further, capacity building is undertaken at the same time to build institutional competency. Sustainability is ensured through the creation of "Focus Groups" which represent concerned institutions in the implementing process, including national and local institutions, academia and the private sector.

Note that the DRMMP emphasize a process rather than a rigid plan. The process is based on four fundamental principles: Assess, Empower, Implement, Sustain. The process for developing a DRMMP takes about 18 months to two years depending on the initial stage of disaster management practice in the city.

A Consensus-Based Approach to Disaster Risk Management: The Metro Manila Experience

Atty. Violeta S. Seva, General Secretary, EMI, and Senior Adviser to the Mayor of Makati City, Metro Manila, Philippines

Metropolitan Manila, with a population of 12 million and a land area of 636 square kilometers, is the economic, financial and political center of the Philippines. This complex urban region is hazardous, intensely vulnerable and highly at risk, especially with seismic and meteorological hazards posing as constant threats to its dense population. A total of 11 out of the 17 local governments face medium-high to very high urban seismic risk, according to the Megacity Indicators System. The Metro Manila Earthquake Impact Reduction Study (MMEIRS), a study conducted by JICA in 1994 on the region's geologic setting, reveals that if a 7.2 earthquake brought by the West Valley Fault were to hit the region, this will yield 35,000 people dead and 168,300 heavily damaged residential buildings.

Acknowledging the high risk faced by Metro Manila, various organizations, local stakeholders and government agencies, initiated the pilot implementation of a consensus-based Disaster Risk Management Master Plan in 2005. Formulated and mobilized through a participatory process of risk assessment, empowerment, implementation and sustainability, the DRMMP stresses that the involvement of local governments, civil society and non-government organizations is a must to ensure the formulation of a “comprehensive and highly inclusive” master plan that addresses both the needs and the risks of all stakeholders in the region.

Based on several hazard and vulnerability assessments carried out in partnership with national and local organizations such as MMDA, PHIVOLCS and Makati City, the DRMMP aims to establish legal and institutional structures for an effective disaster risk management system and to integrate DRM into the day-to-day government and business operations in cities through regular focus groups, field trips and other participatory means.

Istanbul Earthquake Risk and Mitigation Studies

Mr. O. Metin Ilkisik, Disaster Coordination Center, Istanbul Metropolitan Municipality, Istanbul, Turkey

As a result of the growth of the cities in number and population, which led to increase in the number and complexity of the buildings, services and infrastructure, their vulnerability to disasters has much more aggravated today than in the past.

The city of İstanbul has been a major population center with a prominent role in commercial and cultural activities for at least two millenia. Although İstanbul is a very old city of 2500-3000 years, it grew very rapidly especially after the 1950s. Accordingly its population increased from 1 million (in '50s) to 12 million today. As an important social, economical and geopolitical centre, Istanbul has been the destination of people emigrating from rural areas. This increased the need for housing and other infrastructural facilities. There are about 1,200,000 buildings in Istanbul as of 2006.

According to historical records on earthquake, 120 destructive earthquakes occurred in Istanbul and its surroundings during the last 2000 years. These are aggravated by the local features of the ground of Istanbul where the buildings are situated, construction quality of the buildings, and the deterioration and corrosion problems related to the age of the buildings.

In order to assess the risks, the Japan International Cooperation Agency had prepared a “Study on Disaster Mitigation/Prevention in Istanbul Including Seismic Microzonation”. To follow up studies on the “Assessment of Earthquake Risk in

Istanbul” and to find proper solutions for complex “risk mitigation” issues, the “Earthquake Master Plan for Istanbul (EMPI)” has been commissioned by Istanbul Metropolitan Municipality (IMM) to a consortium involving four leading Turkish Universities. The implementation of EMPI was done in Zeytinburnu which was determined in JICA study and EMPI as one of the risky district in Istanbul. Similar pilot projects in Fatih and Kucukcekmece Districts are still on going.

Barangay Flood Warning System in Quezon City

Dr. Noel Lansang, Head, Department of Public Order and Safety, Quezon City, Metro Manila, Philippines

Quezon City, the richest and second biggest city in the Philippines is not spared from natural hazards, particularly floods. It has a total land area of 16 hectares encompassing 142 barangays (village), 38 of which are considered flood prone. The Barangay Flood Warning System is a non-structural and community-based project that encourages local level participation using real-time data and information. This community-based program was formed through a collaborative effort between the Quezon City Government and the Philippine Atmospheric Geophysical and Astronomical Services (PAGASA). It uses pertinent, real-time information from rain gauges, river gauges and flood markers as basis for the immediate evacuation of the residents through predetermined safe routes leading to evacuation areas.

The flood warning system enabled these communities to monitor riverbanks overflow, using river gauges situated under bridges and along ripraps. Also, with the installation of rain gauges in strategic locations, the amount of rainfall can be determined anytime and can be used to predict flash floods. Through the project, community members in the flood-prone zones were able to monitor their situation with the use of flood markers situated on the walls of their houses.

Urban Earthquake Disaster Reduction in China

Mr. Pan Huaiwen, Deputy Director, Department of Personnel & Education and Science & Technology Department of International Cooperation, China Earthquake Administration, Beijing, China

Since urbanization is speeding up throughout China, the densely populated and highly structured settlements in cities face a greater risk of natural disasters, especially earthquake disasters. The presentation focuses on the basic threat of earthquake disaster in China and the leading ways to prevent and reduce the disasters, including seismic safety management, legislation, seismic microzoning, active faults detection, losses estimation, emergency command system establishment and so on. All these measures are being implemented in large- and

medium-sized cities in China.

The government acts as the principal agency in fighting against earthquake disasters and the public and media are the essential partners to disseminate earthquake knowledge. The approaches to the sustainable development of cities against earthquake disaster lie in the economic and technological level, as well as the awareness of disaster preparedness of the population. Dealing with the risks of earthquake disaster in a comprehensive way, can it be mitigated effectively.

Designing Resilience for Communities at Risk: A Socio-Technical Approach

Mr. Tom Haase, Ph.D. Candidate, Graduate School of Public and International Affairs, University of Pittsburgh, USA

The recurring failure of communities to assess, monitor and respond effectively to threats from dynamic environments represents a continuing problem in human and social dynamics. Recent examples of devastation to the city of New Orleans following Hurricane Katrina and the ensuing flood in 2005, and the near complete destruction of the city of Banda Aceh, Indonesia following the 2004 Sumatran Earthquake and Tsunami, illustrate the discrepancy between current forms of organizational planning and the actual capacity of individuals and organizations to act collectively in the face of extreme danger. In both instances, information about the potential threat was well documented among scientists, but the representation of the threat and the timely transmission of that information to the wider community failed to initiate action as the communities confronted the actual events.

This presentation outlines a collaborative project between researchers at the Bandung Institute of Technology, Bandung, Indonesia; the State Ministry of Research and Technology, Jakarta, Indonesia; and the University of Pittsburgh. This project will design, implement, and evaluate a socio-technical model for improving decision making in Padang, Sumatra that is exposed to the recurring risk of tsunami. First, the researchers will explore the extent to which an alternative sensor system could assist with the time-sensitive processes of tsunami detection and warning. Second, the researchers will conduct a simulated operations exercise that models the processes of search, exchange, recognition, interpretation, communication, and action in reference to risk at three levels of information aggregation: individual, organizational, and system-wide.

The scenario will proceed through the temporal phases of an escalating disaster: 1) early stage; 2) emerging risk; 3) onset and response; and 4) rescue and recovery. At each stage, the human and social dynamics of the decision making processes will be captured electronically, which will allow the systematic tracing of processes of cognition, interpretation, communication, and action that are very difficult

to capture through direct observation alone. The benefit of this socio-technical approach lies in linking the technical infrastructure of detection of tsunami risk with the organizational capacity to mobilize action to reduce that risk for the continuing protection of the community.

Cities and Catastrophes: Lessons from Recent Disasters in Indonesia

Mr. Josef Leitmann, Disaster Management Coordinator, World Bank/Indonesia, Jakarta, Indonesia

This presentation examines the post-disaster response to recent urban-centered catastrophes in Indonesia, extracting lessons learned and identifying specific implications for urban risk reduction. Brief background information is provided on the December 2004 tsunami and earthquakes in Aceh and Nias as well as the May 2006 earthquake in Yogyakarta and Central Java provinces. Brief commentary is also provided on the post-disaster response to both events, covering relief as well as recovery efforts. The presentation then assesses lessons that have been learned from the post-disaster response, including:

- Lessons that apply primarily to the relief phase
- Importance and styles of institutional coordination
- Rebuilding homes and communities
- Restoring livelihoods
- Rehabilitating services and infrastructure
- Sustaining the recovery

The implications for urban risk reduction include: a) urban preparedness; b) community-driven approaches; and c) coordination and planning. The presentation concludes with some key “Do’s and Don’ts” in disaster recovery and rehabilitation efforts.

Opening Speech

Dr. Fouad Bendimerad, Ph.D., P.E.
Chairman, EMI

Salam Alaikom wa Rahmatah Allah!

Honorable Hadji Fauzi Bowo Governor of Jakarta Provincial Government
Mr. Idwan Suhardi, Deputy Minister for Technology Application at the Ministry
of Science and Technology
Dignitaries, friends, colleagues, Ladies and Gentlemen

In June of this year, the United Nations organized a major disaster management conference in Geneva, Switzerland, where representatives of more than 180 countries, UN Organizations, inter-governmental organizations such as the World Bank, and many other relevant institutions and organizations participated. The conference concluded that there were two major natural threats to human kind:

1. Climate Change
2. Urban Risk, and principally the risk to megacities and fast growing metropolises such as Jakarta

This recognition of the threat of urban risk by the United Nations is a clear wakeup call of the critical importance of dealing with the risk to cities.

Mexico and other major metropolises such as Jakarta, Beijing, Tehran, Mumbai and others are the hearts and souls of their countries, and in some case their regions. A major earthquake in these cities would cause losses of unimaginable proportions: It would cause enormous human suffering, it would push back progress in development, it would destroy families and communities, reduce

economic potential and increase poverty.

We have to remember that earthquakes by themselves do not kill people. The buildings that collapse are the cause for loss of life and property.

The way we build and develop our cities determines their faith in the face of earthquakes and other hazards. If we build faulty buildings and structures, the earthquake will find their weakest links and will destroy them. Yet, megacities offer the best opportunities to reduce risk and to protect the future.

There are many ways to manage disaster risk in megacities:

We can make sure that the city is built following urban plans that incorporate hazards and vulnerability parameters and have provisions for reducing disaster risk. Urban and land use planning is a first tool to ensure that we stop accumulating risk in our cities through proper zoning bylaws and other planning parameters

We can make sure that our cities have competent building codes, and procedures for implementation and enforcement of these codes so that buildings, bridges, schools and hospitals do not collapse on the children, patients and other occupants

We want to make sure that professionals and practitioners who plan and build cities are trained properly so that they exercise proper professional care in the design and construction of buildings and other structures

We want to make sure that our communities, populations and institutions that serve them are aware of the hazards around them, and can take step to increase their resilience and the protection of their families and communities, so that we can build a culture of prevention in the long term

Ladies and Gentlemen, as we are here to remember major disasters such as the December 24, 2004 Sumatra earthquake and Tsunami, and to reflect on the past, we are also here to ensure that we do not repeat the mistakes of the past; it is important to identify the lessons learned, but it is more important to apply the lessons learned. By applying what we have learned, we will engage in building safe and enjoyable cities for this generation and for future generations.

We have created EMI (the Earthquakes and Megacities Initiative) to be the partner of cities, to be a resource to cities and their advisor on how do deal with the management of disaster risk from earthquakes and other hazards. The creation of EMI came at the realization that knowledge often exists, for example we have knowledge for preventing buildings from collapse, but that knowledge often stay in the hands of a few experts. Buildings, schools and hospitals continue to collapse and kill thousands of people at each strong earthquake.

EMI's only interest is to work with you the ones who manage cities as trusted partners in the quest of protecting your cities and their populations; in building a safer and more prosperous future. Safer cities mean achievable sustainable development, cleaner environment, and protected investments. EMI is not a humanitarian organization; we do not know how to do humanitarian work; but we have knowledge on how to relate disaster risk management to developmental planning and other development functions. We support cities on improving their disaster response capabilities, but mostly, we want to guide them towards engaging in disaster risk reduction. We engage them in an active network where they can learn from other cities, and benefit from the experience of others. We help cities build an understanding of their risk and develop options for disaster risk reduction through strategic planning, awareness, and capacity building. This is the mission of EMI.

Dear guests and hosts, I very much look forward to this 6th meeting of the Asia Cluster, which this year is under the theme of "Sharing Knowledge". We have the knowledge to make our cities safer, but we need to pull our resources together in order to put this knowledge in place. City officials have to work closer with researchers and academics who have the knowledge and build coalitions of concerned stakeholders to develop consensus and create an environment that enable effective public policies.

Finally, I want to again thank our host Dr. Fauzi Bowo, Governor of the Jakarta Provincial Government and his staff for their warm welcome and hospitality. I look forward to a successful 2007 Asia Megacities Forum.

Welcome and thank you to all.

List of Participants

No.	Name and Email	Title and Organization
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About the Cluster Cities Project

The Cluster Cities Project (CCP) is EMI's platform for the establishment of a worldwide network of megacities supporting the paradigm shift from reactive disaster response to proactive risk reduction. Its main activities include awareness raising, capacity strengthening, and coalition building among city governments and academic leaders to develop a culture of increased communication, transparency, and cross-sectoral and multi-disciplinary practices. It is also EMI's mechanism for understanding the gaps and needs within each city, for introducing sound practices and for helping develop strategic approaches that have the support of local stakeholders.

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