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MAKING MEGACITIES SAFER FROM EARTHQUAKE IMPACTS A SHARED VISION FOR METRO MANILA AND MAKATI CITY IN THE PHILIPPINES

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Summary

A recently-concluded study on earthquake impact reduction for Metro Manila, initiated and funded by the Japan International Cooperation Agency in cooperation with local experts, points out the increasing vulnerability of the Philippines' premier megacity, to the hazards of a major seismic event. In its pursuit of a vision to make Metro Manila safer from earthquake impacts, the study details six essential goals as well as multiple strategies and action plans to put the necessary safety nets in place. Of these recommendations, the 17 cities and municipalities of Metro Manila, including Makati City, the country's financial and business center, are enhancing their respective risk management systems, institutional capacity and instruments, and community-based disaster management capability to mitigate the impacts of nature's most unpredictable force of destruction. Makati is making its best efforts in the face of funding constraints, limited technological competence and competition from more persistent harbingers of disaster such as typhoons and fire.

Introduction

Metropolitan Manila, composed of 13 cities and 4 municipalities by administrative boundaries, is the political, economic and cultural center of the Philippines. Its population of 10 million inhabitants is expected to grow to 25 million by 2015, based on a population study by the Japan International Cooperation Agency.

Geographically, Metro Manila is located in Luzon Island, the main and largest island in a country of 7,107 islands. Earthquakes can strike anytime anywhere and the Philippines, being situated along the Circum-Pacific Belt of fire and typhoons, is particularly susceptible to tremors.

With its 13 cities and 5 municipalities, the system of governance in Metro Manila is characterized by multiple jurisdictional layers and entities, creating special complexities particularly in managing and responding to disasters. The Local Government Code, enacted in 1991, provides a comprehensive

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framework for the decentralization and exercise of power by local governments. In 1994, the Philippine Congress created the Metropolitan Manila Development Authority (MMDA) which has been vested with jurisdiction over services with metro-wide impact, including planning, supervising and coordinating efforts in public safety (e.g., preparedness for preventive and rescue operations during times of disasters).

The MMDA is governed by the Metro Manila Council, composed of the mayors of the 17 cities and municipalities, the president of the Metro Manila Vice-Mayors League and the president of the Metro Manila Councilors League. The Council meets regularly and is empowered to approve metro-wide plans, programs and projects.

The most recent effort at seismic impact mitigation for Metro Manila is the “*Study for Earthquake Impact Reduction for Metro Manila in the Republic of the Philippines (MMEIRS)*.” Implemented and funded by the Japan International Cooperation Agency (JICA) with counterpart resources from the Metro Manila Development Authority (MMDA) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS), the study addressed the following objectives: 1) To formulate a master plan for earthquake impact reduction for Metro Manila; and 2) To carry out technology transfer to Philippine counterpart personnel of MMDA and PHIVOLCS. The research was undertaken from August 2002 to March 2004.

The study was occasioned by the fact that numerous earthquake sources locate in and around the metropolis. Among these faults, the Valley Fault System, which transects the area, is considered to pose a direct threat and could cause a major impact on Metro Manila should it generate a large earthquake. Recent studies show that the active phases of the Valley Faults may be approaching, with an estimated potential magnitude of at least 7 or more.

Among the major sections of the Study are: existing data collection and evaluation, geological survey, social condition survey, building and infrastructure survey, and estimation of earthquake damage. Based on the data analysis, a proposed disaster management plan for Metro Manila and related community-based activities were generated.

Developing a Master Plan

The Master Plan for Earthquake Impact Reduction sets forth basic policy directions in pursuit of a vision: “Safer Metro Manila from earthquake impact.” The vision is encapsulated in six, with ten objectives and the objectives are further broken down into thirty-four frameworks. The frameworks represent main policies and strategies to be crafted to achieve the expressed goals and objectives.

To achieve its vision, the Study presents six goals:

1. Develop national system resistant to earthquake impact

Metro Manila is the only mega urban center in the Philippines that comprises the national functional backbone, including the economic, financial and information network. With the rupture of West Valley Fault, as projected in the earthquake damage scenario, national functions will be paralyzed, and in the worst case, the earthquake will lead to chaos and disruption of the national economy. As such, Metro Manila needs to develop national systems resistant to earthquake impact through the improvement and update of the existing systems, Special attention should be given to updating of regulations for earthquake disaster prevention, promotion of research and development for disaster prevention technology, capacity building for disaster management staff from national to the community level, and installation of modern equipment for disaster

management agencies. Improvement and enhancement of existing systems are to be implemented with detailed plans.

Among the frameworks or strategies to be pursued are the protection of the integrity of national government functions and the stability of the socio-economic system.

2. Improve Metro Manila's urban structure resistant to earthquake.

Recent earthquake damages to urbanized areas around the world illustrate the extreme vulnerability of urban structures including buildings and infrastructures like roads, railways, port facilities, and lifelines such as power, telecommunications and water supply. Based on the damage estimation, some 40% of the total residential buildings in Metro Manila will be affected in the event the West Valley Fault moves. Historically, building collapse causes the greatest number of deaths and injuries. As such, the reinforcement and strengthening of buildings are the priority measures to reduce losses in human lives. Furthermore, building collapse is a major cause of fire breakouts so the presence of ill-maintained structures in highly fire-prone locations should be minimized. Also, existing urban structures in areas estimated to sustain severe damage should be improved through re-development of land use. Buildings should be constructed with highly resistive structures and fireproof materials. Allocation of urban spaces and road widening should be included in urban re-development.

The relevant strategies include the promotion of earthquake-resistant urban development, earthquake-resistant spatial urban development as well as earthquake-resistant buildings, infrastructure and lifelines.

3. Enhance effective risk system management

While the West Fault rupture scenario would entail heavy casualties and injuries, the degree of damage would still vary depending upon the level of preparedness and effectiveness of the established risk management and emergency response systems. Therefore, to reduce the scale of losses, an effective risk management system should be in place. Necessary strategies and actions in this regard include preventing secondary effects and damages, reinforcing disaster management practices and response capacities, and ensuring access to critical information. Robust legal and institutional arrangements, including inter-institutional coordination and clearly defined and practiced roles of national, city and municipal, and barangay or community-level governmental and non-governmental entities, are essential to the management of earthquake risks.

To meet this goal, a number of strategies are being proposed, such as to enhance legal basis for disaster management; strengthen inter-institutional coordination and institutional disaster response capability; establish emergency health and medical response system; search and rescue, information and communication system; and manage emergency public information properly.

4. Enhance community disaster management capability

In the event of large-scale disasters such as a major earthquake, most of the community members may not be accessible through public assistance channels. To protect community members from large earthquake impacts, it is important to maximize the preparedness and disaster response capacity of the community beforehand through enhancement of social capital. Social capital in Metro Manila communities can be developed while recognizing community autonomy, local leadership and community dynamics. This enhancement will be promoted through self-reliance

and mutual help risk management including disaster awareness through education and enlightenment.

To establish capacity in this concern, the proposed frameworks are to establish self-reliant and mutual help risk management capacity, and to inculcate disaster culture in future generations.

5. *Formulate reconstruction systems*

To facilitate recovery and maximize the effectiveness of the reconstruction process of a 'damaged' Metro Manila, the preparation of recovery and construction policies, strategies, and procedures and their acceptance by the relevant agencies are indispensable. Presently, the establishment of a risk management system may not be sufficient to address effective recovery and reconstruction. The absence of a reconstruction system will generate additional losses to society and exacerbate inappropriate and vulnerable urban development. Both rehabilitation and reconstruction will require careful planning and development to prevent further vulnerability of urban structures and magnify urban degradation.

6. *Promote research and technology development on earthquake*

For the promotion of earthquake impact reduction measures, the analysis of present conditions and future projects will play a significant role. Especially important are scientific research on the rupture mechanisms of large earthquake, their return periods and the distribution of the active faults. The current research and technology development system in the Philippines can be enhanced on such areas as earthquake science, earthquake engineering, and geosciences. In-depth study of earthquake occurrence, estimation of earthquake motion and damages, comprehensive disaster assessment, to include secondary conditions, should be pursued.

To propel efforts in this direction, the MMEIRS study proposes the promotion of sustained research and technology development on earthquakes.

The Case for Makati City

Criss-crossed with many faults, Makati City, the business and financial capital of the country, is located. In Metro Manila, The city lies within the Valley Fault where usually large tectonic movements can release seismic energy. It will not be spared from unpredictable seismic phenomenon that could negatively impact specifically its district of high-rise office buildings and condominiums.

Makati City, a fast-growing urban area in a developing country, is characterized by the same predicaments that plague any metropolitan sprawl. Rapid urbanization brings with it such concomitant problems as high population densities, widespread poverty, social inequity, and financial insecurity. Coupled with deteriorating infrastructure and inadequately prepared governing institutions, the already risky situation takes on heightened vulnerability when the earthquake factor comes into play. Urbanization is building up the earthquake disaster potential to unprecedented levels.

Makati City, in cooperation with the other cities and municipalities of Metro Manila, has taken steps in mitigating the risks and even preventing the likelihood of a disastrous earthquake. In response to the seismic threat, it has crafted and continue to develop legal mechanisms, institutional systems, strategic plans, programs and projects as well as related efforts anchored on its communities aimed at a safer Metro Manila from earthquake impact.

The City has done its share and continues to evolve appropriate measures and strategies in light of the MMEIRS Study.

1. *Improve effective risk management system*

a. Enhance legal basis for disaster management

Recently, Makati City has extended support to vital legislation in aid of the vision for a safer Metro Manila from earthquake impact. It has initiated its own city ordinance on disaster management. The ordinance prescribes the programs on pre-disaster mitigation; provides the direction and coordination on disaster preparation, response and recovery; streamlines the distribution of disaster relief and allocation funds to implement the plans, programs and projects to counteract disasters and other emergencies. The ordinance is presently being reviewed by the Legal Department prior to formal dissemination among the local government units.

Makati City fully supports the foremost recommendation of a JICA Study calling for the Manila Declaration on Seismic Safety. It embodies the commitment of LGUs to make Metro Manila seismically safe and to establish mutual aid agreement among the LGUs in the event of disasters. Among the commitments to be made by the individual LGUs are:

- To revitalize their respective Disaster Management Councils and enhance their emergency preparedness and response capacities to reduce earthquake disasters;
- To include earthquake disaster reduction projects and activities in their respective City or Municipal Priority Programs, and provide financial support thereof;
- To institutionalize each Local Government Unit's Emergency Management Office or Unit to provide direction and continuity of disaster management program implementation; and
- To bind the Metro Manila LGUs to mutually assist each other in implementing disaster mitigation preparedness programs and providing resources to LGUs affected by disasters.

Makati City will endorse the Proclamation in the Metro Manila Development Council for adoption by all Metro Manila cities and municipalities.

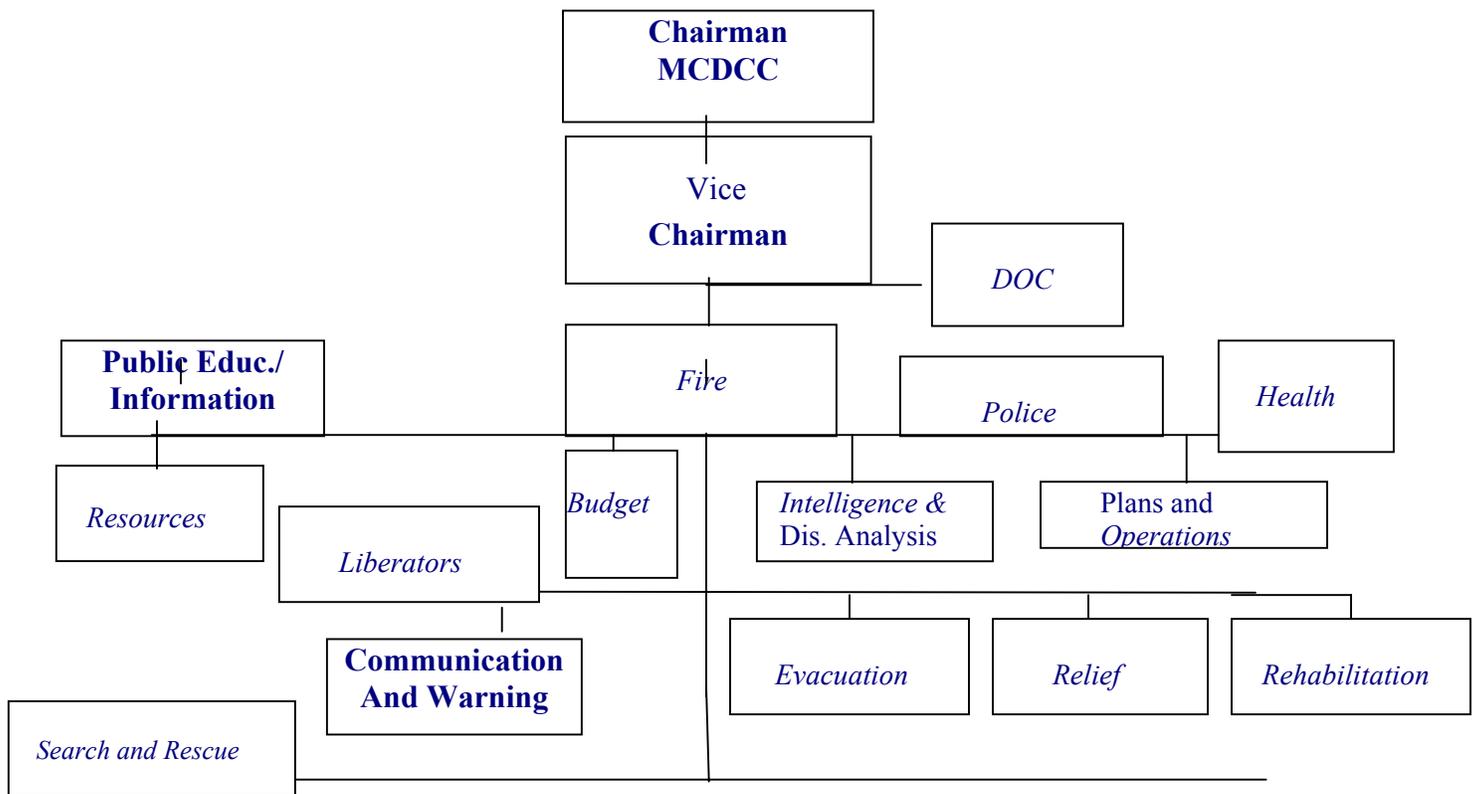
b. Strengthen Institutional capacity for implementing preparedness and mitigation measures

Presidential Decree No. 1566, signed into law on June 11, 1978, provides the basic national framework for disaster management in the country. The Decree establishes national, regional and local disaster coordinating councils nationwide. It sets guidelines for the creation of national, regional and local disaster coordinating councils as well as the functions of these organizations. PD 1566 is complemented by city/municipal ordinances and resolutions legislated by LGUs consistent with the powers vested in them by the Local Government Code.

The Makati City Disaster Coordinating Council provides disaster management services for the city through relevant programs, activities on preparedness, mitigation, operational response and recovery in all types of emergency situations, including those related to earthquakes. It ensures effective coordination of resources and operations prior to, during and after the disaster.

The Council is organized as shown on the following page. Each respective task unit undertakes emergency or disaster activities depending upon the scope of its functional responsibilities. Other

warning on the approach of tropical cyclones, preparation of emergency plans and training and orientation at the grassroots level.



A Technical staff handles the day-to-day operations of the Council. They regularly update their own skills in responding to seismic disaster through training and workshops periodically given by international donor institutions. Among these training courses are:

Seminar Workshop in Disaster Preparedness and Handling Collapsed Structure Incident, which sought to update and galvanize the capabilities of concerned groups and individuals in responding to pre- and post-disaster emergency situations; and

Seminar Workshops on Earthquake Mitigation. A two-part training course, the first seminar-workshop was intended to draw out the actual needs and requirements of city to be a seismic-free urban center. At the end of the sessions, the participants and the trainers gained a clear grasp of Makati City's disaster mitigation preparedness.

The Council staff has developed and adapted to local conditions in cooperation with JICA a model product called Earthquake Mitigation and Response Checklist. It is designed to assist an LGU or institution to evaluate its present capacity for earthquake disaster mitigation and based on the assessment, launch a mitigation planning process. Other LGUs can customize the product to fit their own capacity evaluation and planning requirements.

There are 33 barangays in Makati City, which are provided with radios and hand-held phones for better coordination during emergencies. Essentially, BDCC members are at the frontline first to assess the situation and extend search and rescue, as necessary. They help in the conduct of fire drills and rescue exercises. The Council can tap foreign assistance and use the Calamity Fund, if available, to discharge its functions

They regularly carry out an information and education program to update the community, schools, business establishments and civic organizations on emergency responses before and during a disaster. The BDCC also encourages volunteerism and community-based relief operations. This is its way of imparting capacity to new volunteers and to inculcate a culture of disaster preparedness to the next generation.

3. Improve Metro Manila's urban structure resistant to earthquake

The City Disaster Management Council periodically coordinates with the City Engineering Department in the conduct of building inspections to ensure the earthquake-worthiness of existing structures in the city. At the same time, the periodic inspections should bear out the extent of adherence of the city's high-rise structures to the National Building Code.

Future Prospects

Funding Requirements

Most of the disaster preparedness tools and measures can be put in place so long as the necessary funding and facilities are available. However, a sticky point in the Local Government Code is the legal limitation on the use of disaster funds only in areas, which have been declared in a state of calamity by the President. In relatively normal times, such as now, funding for disaster preparedness may have to be sourced elsewhere. Or, our more forward-looking legislators may be influenced want to take up the cause that being prepared is a lot better than being sorry, and review the restriction.

Emergency Center Proposal

The City's Disaster Coordinating Council has a pending proposal to establish an Emergency Management Center equipped with modern systems and facilities in disaster management in keeping with the technological advances made in disaster and seismic preparedness. It will be the nerve center in dealing with disaster, in the implementation of counter-disaster plans and for the immediate provision of guidance, direction and control to concerned staff and the general public.

Related Concerns

- Assistance on diagnostic survey of existing public buildings in Makati City;
- Clustering of Metro Manila local governments based on the recommended zoning for better coordination and linkages;
- Regular monitoring of the level of preparedness of Metro Manila LGUs.; and
- Conduct of hazard mapping in conjunction with urban development and land zoning initiatives.

A number of these future undertakings demand expertise. By building on current capacities and capabilities, Makati City hopes to keep in step with the aphorism: Always prepared, never outsmarted, against the damaging impacts of unpredictable earthquakes.

Conclusion

To be sure, Metro Manila and Makati City continue to learn the lessons worth learning and understanding the various ramifications of the JICA study on earthquake impact reduction. The Study has managed to renew our collective interest in seismic-related disaster distinct from recurrent calamities wrought by typhoons and fire. It has also allowed us to keep in step with advances in earthquake mitigation being adopted by the global community.

1. The Study offers six goals, 10 objectives and 34 frameworks with 100 action plans.. Metro Manila and Makati are concentrating their efforts on these areas that have direct impact on local governance agencies. Auspiciously, the concepts, principles and even the deliverables under these specific goals dovetail with existing competencies and capabilities in responding to other tropical calamities like typhoons. We need only to redirect and beef up these available capacities to the more special demands of earthquake impact mitigation particularly in predictive mechanisms and post-event reconstruction.
2. The Study was undertaken by international experts and incorporates global experiences in seismic impact reduction. By hewing close to the results of the study, the current initiatives of Metro Manila and Makati City strive to meet the minimum international standards in earthquake disaster mitigation.

References

1. JICA, MMDA, PHIVOLCS, "Earthquake Impact Reduction Study", Draft Final Report 1 -3, Manila, Philippines, January 2004.
2. Pagulayan, Victor, "Proposal for the Establishment of the Makati Emergency Management Center: 2003.
3. Ms. Andrea Haer, PADCO, Inc., Theme Paper: Proceedings of the Asian Regional Conference on Urban Infrastructure Financing and Disaster Mitigation, Sri Lanka, March 12 -15, 2003.
4. Emergency Preparedness and Response Guide, (unpublished), Makati Disaster Coordinating Council. 2003