

## **5.5 Increasing Community Resilience**

Community members will not be assisted by public service immediately, in case of large disasters, such as a major earthquake. Therefore, it is important to maximize the preparedness and disaster response capacity of the community beforehand, through enhancement of social capital by preparing the community and its members for resilient responses. Top priority activities for community preparations are the identification of evacuation route and place, rescue activities, and initial fire extinguishing.

In order to establish disaster management mechanism through enhancement of social capital, the following frameworks support the objectives.

- 1) Enhancing self reliant and mutual help risk management capacity
- 2) Inculcating disaster culture in future generations

**FRAMEWORK:  
CRI-1**
**ENHANCE SELF RELIANCE AND MUTUAL HELP  
FOR EFFICIENT RISK MANAGEMENT CAPACITY**
**■ Understandings/ Concerns:**

Metro Manila is prone to earthquake hazard, caused by the Valley fault system along its eastern part. In the Philippines, the barangay is the unique system of “Community Governance” and each barangay is supposed to have a disaster preparedness plan. However, most barangays in Metro Manila have not prepared any written plans for disaster management. In case of a catastrophe like earthquakes, in which public help may not function well for the first 72 hours, self reliance and mutual help actions are found to be the most effective ways to save lives and properties.

**■ Basic Policy /Basic Concept of Framework:**

To enhance community resistance and resilience, protecting lives and properties is the primary issue of the framework. To reduce loss of lives and damages to properties, mitigation measures such as strengthening private houses must be taken. However, it requires a long term process. Thus, enhancing emergency response capacities is equally important to prevent or minimize the secondary effects of disasters. Furthermore, it is necessary to enhance capacities for quick recovery to reestablish life and the community.

The attitude of self help and mutual help does not generate itself automatically from individuals or the community, but can be nourished through establishing partnerships with stakeholders such as citizens, the private sector, schools, barangays, and LGUs. After all, the roles and actions for each stakeholder are to be verified. Eventually, in this process, the social capital of the community, which is its asset, is to be increased along with its disaster response capacities.

**1) Knowledge development about earthquake hazards and vulnerabilities**

In order to motivate local people to take actions for disaster risk management, knowledge about earthquake hazards and vulnerabilities is the solid basis for action.

**➤ Enhancement of community's perception of their vulnerability**

In order to initiate a collective understanding by the local community, the first step should be learning the possible hazards and vulnerabilities of their own localities. Possible hazards, their likelihood, and their effects on the community are to be identified. Since an earthquake disaster is a sudden and catastrophic event, people cannot imagine the situation. Disasters can be managed well, if respondents can imagine the possible situation beforehand and train how to face the critical situations. Unlike floods, an earthquake disaster is overwhelming, and with the help of earth scientists and structural engineers, the community will be able to understand the possible scenario, and people will plan out the response measures accordingly. JICA MMEIRS has prepared the results of the earthquake damage estimation and consequent scenario that will assist community people to visualize the possible hazards and vulnerabilities of their localities. Seismologists, geophysicists, geologists, structural engineers and urban planners will assist community people to understand scientific and engineering jargons and professional knowledge in an easy language, utilizing drawings and three dimensional models, so that community people's perception of vulnerability will be enhanced.

**➤ Participatory analysis of local capacities and vulnerabilities**

The local community analyzes its own capacities and vulnerabilities with the support of experts in order to reach a common consensus to reduce its vulnerabilities. Various participatory techniques

such as Participatory Rural Appraisal (PRA), Participatory Learning and Action (PLA), and tools like community watching, and risk and resource mapping wipe out apathy and create a sense of ownership to cope with disaster risk reduction as their own problems. For more concrete discussion, maps are effectively used to verify the size, location, and proximity of the problems and concerns.

## **2) Increase community resistance to earthquake**

Earthquakes do not kill people, but buildings kill people. Without any structural improvement, life loss will not be minimized. Once the structures become resistant enough, the number of secondary disasters such as fire will be reduced, and more personnel allocation among the community will be possible for emergency support.

### ➤ Socializing building safer measures into community practice

The first step is to let local people understand the possible building damages and effectiveness of the strengthening method. To motivate individuals to pay for the extra cost is not an easy task. Effective awareness raising campaigns should be made. Seeing is believing. To make people believe and take actions, direct experience of seeing the difference is essential. Visual presentations, preferably on-site experiments to compare the structural strength of the conventional buildings with the improved ones, are convincing. Common community buildings such as day care centers, barangay halls, and health centers can be a starter for implementation; later on community people will apply structural strengthening to their own houses after monitoring the procedures. The cost and benefits should be clearly explained. Moreover, an indigenous financial supporting system needs to be developed to promote this campaign.

## **3) Enhance the community governance and linkage with LGUs**

Some areas of Metro Manila suffer recurrent floods. Flood disasters are very dependent on emergency response and early warning. While an earthquake is an unpredictable and sudden event, mitigation measures of strengthening buildings and urban infrastructures reduce their impacts. Building and urban infrastructure issues are closely related to upgrading amenities, urban open space, and special planning and development. In the Philippines, barangays are defined as having a function of physical planning and development, where collective views will be crystallized, and the community participatory approach has been added to be encouraged in the new Local Government Code. This is what is called “Community Governance” which is yet to be activated from the current legal form to actual practice. Local communities know the local problems better, and most city government planning departments would like to know more about local needs and develop plans accordingly. A public hearing system exists in some cities, but it is not so accessible for the general public, plus it is done by administrative initiative, not by citizens. A more citizen-friendly community governance system is needed to be established to build closer linkage between community people, barangays, and local governments. Consequently, through practical community governance, earthquake mitigation activities, in the process of enhancing the quality of life, needs to be upgraded.

### ➤ Establishing Community Information and Collaborating Center

Some barangays have recreational place for residents, others have no physical place for local residents to gather. Even a resident-friendly barangay does not have a place where ordinary citizens can access general public information and development plans from the city government and adjacent barangays. The barangay has a defined planning function involving community people, however currently there is no physical place to meet and acquire necessary information. The community information and collaboration center provides local citizens: 1) physical activity place for meeting and activities, 2) assistance in networking of the local groups, 3) necessary information provided in books, publications, visual materials related documents, computer and

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internet facilities, and GIS database for local development plan and disaster risk management. This center can also be enhanced with functions of a warehouse in case of disaster or an earthquake awareness raising museum. LGUs are expected to invest in such kinds of facilities as a part of activating local governance.

➤ Community businesses

Individual preparation is needed for earthquake disasters, but it is always needed to create income generating opportunities. Creating a community business is the effective way of strengthening social ties and revitalizing livelihoods. It creates social networks among the communities, and the community eventually reacts effectively at the time of disaster. It is an indirect way of empowering a community. It is ideal to encourage establishing a community business, which is not only a profit making opportunity but with more noble philosophy and social values in its backbone. To attain a safer physical environment for earthquake, and consequently quality of life, securing economic stability should be attained, in parallel.

➤ Upgrading living standard through community participation

Urban planning and building regulations are primarily regarded to be the business of the public sector. However, the living environment that the community really wishes to realize has to be achieved through the partnership of local government, the barangay, and the people of the community. The direct existing governance system of open forum, public hearing and Barangay assembly will be activated for community development planning and project development. Various participatory tools will be utilized to collect local information. Risk and resource mapping will be utilized to learn about the local potentials to be developed. The system of dispatching professionals such as urban planners and structural engineers for sharing expertise can be established.

#### **4) Enhance potential emergency management capacities**

A basic starting point is to identify the appropriate size of the community unit and decision making and leadership structure. Search and rescue, fire fighting, emergency medical, evacuation, and information management are the key issues especially in the community self-help planning and preparedness.

➤ Legitimate local community unit and strengthening social cohesion

The barangay is the smallest administrative unit, and more autonomous smaller communities are characterized in the form of home owners associations, sitio, purok, compound, and looban in Metro Manila. Some of the areas have distinctive boundaries and community leaders, but some areas do not. For the emergency management, smaller units will be identified and task force members will be assigned. In these units, community festivals can be organized to strengthen social cohesion.

➤ Promoting business sector involvement

For the business sector, disruption and standstill due to the earthquake disaster and/or subsequent secondary disasters like fire spread from nearby communities may result in the loss of regular clients. Private businesses and enterprises are also a part of local communities. Sharing roles and providing resources, both human and physical, in case of disasters and making agreements beforehand is necessary preparation. In the case of the Philippines where donations and solicitation are very popular, private sector involvement and collaborative networks need to be established, and these sectors should be involved from the very beginning of the community level disaster risk management activities.

➤ Developing knowledge through exercises and drills

Community people will gain practical knowledge about disaster risk management and lessons from past earthquake disasters. Plans will be tested through exercises and drills to provide feedback and identify needed revisions to the original plan.

➤ Preparation of community equipment and family emergency kits

The community will prepare necessary equipment for the earthquake disaster. Maintenance of this equipment will be verified among the community members. Community people will be trained to utilize this equipment. Individual families will be encouraged to prepare Family Emergency Kit Bags.

➤ Preparation and familiarization of emergency plans and simple manuals

Emergency plans for each task such as search and rescue, emergency medical, fire fighting, information management, commodity distribution and transportation will be decided through the participatory process among the stakeholders. In the process, images of the earthquake disaster will be presented to visualize the situation, since most citizens in Metro Manila have not experienced a catastrophic disaster like a major earthquake. The decision making process provides training for emergency management, and a long enough time frame should be considered for these activities. Maps and models will be created through the discussion process to share the common thoughts and understandings.

➤ Establishment of information management system

In case of a devastating disaster, information management is the key. Information is the power for leaders to make decisions. It can also control rumors and avoid panic. In the case of earthquakes, because the affected areas are too big and are struck simultaneous, in the initial stage, timely and accurate information cannot be gathered effectively by the public agencies alone. The community information management system will be established to provide input to damage and needs assessment processes.

## **5) Enhance the administrative system supporting community activities**

To promote community activities, support from the local government unit and barangay is essential. In the Philippines, the community based disaster risk management approach is defined in the national policy. An implementation plan to conduct community activities and their necessary budget allocation are vital. To implement these activities, risk management promoters who advocate community based disaster management, workshop facilitators and community workers who will assist barangays and communities to develop disaster risk management plan and actual preparation need to be trained first.

➤ Designing implementation plans and allocating budget

The barangay and community disaster management plan have to have a linkage with the local government unit. In case of an earthquake disaster, multi-disciplinary approaches are needed, which means that there are many concerned agencies to coordinate and collaborate. It entails an official process and high authoritarian power. Some barangays are very positive about conducting disaster management activities, however to do this in a multi-sectoral approach, an administrative supporting system is essential, especially the support from LGU. An implementation plan in the LGU's master plan and a budget allocation will make it easier for barangays and local communities to conduct such activities.

➤ Establishing human resource bank

Through the pilot project, it has become clear that there are many resource persons in different fields, such as emergency medicine, fire fighting, rescue, social welfare, urban planning, and building structure. In most cases, emergency response agencies are very much interested in participating in such kind of activities and willing to be resource persons or even organizing such kind of activities. But for barangays and autonomous communities, networking with these resource persons and agencies is not an easy job. Thus, the establishment of an information center, that can be named Human Resource Bank, preferably in the Special Operations Unit or Disaster Risk Management office in MMDA, through which barangays or communities can contact and receive services of dispatching resource persons from different fields would facilitate the practical process of community based disaster management activities.

➤ Training of human resources who promote community disaster management activities

To promote disaster management activities in all barangays and communities in Metro Manila, human resources need to be trained first. The human resources who will be specially trained can be the disaster action officers of the LGUs, barangay officials, social workers, health workers, advocates of earthquake disaster risk management, facilitators who organize workshops, and trainers of community leaders.

■ **Action Plans**

- Knowledge development about earthquake hazards and vulnerabilities
- Increase community resistance to earthquake
- Enhance the community governance and linkage with LGUs
- Enhance potential emergency management capacities (Fire/ search & rescue, and information management)
- Enhance the administrative system supporting community activities

**FRAMEWORK:  
CRI-2**

**INCULCATE A DISASTER MITIGATION CULTURE IN  
FUTURE GENERATIONS**

■ **Understandings / Concern:**

Schools are one of the largest constituents in a community. Moreover, during disasters and calamities, public schools are designated for evacuation sites as the most familiar place in the community. Schools are expected to accommodate local community people. An integrated plan in coordination with the local community is essential. The DECS (Dep. of Education, Culture and Sports, now Dep. of Education) ORDER No.14, s. 1997 states that a Calamity Disaster and Fire Control Group shall be established in each school. Although conventional fire and evacuation drills are regularly conducted at most schools with the participation of teachers and students, teachers propose knowledge development and skill trainings in disaster management to activate the Group and to better educate the students. In a broader vision, school children are the most significant future generations to inculcate a disaster mitigation culture so that disaster impact reduction begins with individuals and sustainable development is only viable, if disaster impacts are to be reduced.

■ **Basic policy and basic concept of Framework**

**1) Enhance school risk management capacity**

In order to respond effectively to a calamity such as earthquake, capacity building is essential for key persons at Dep. Ed, school superintendents, and eventually school teachers.

➤ Organizing seminars and training in disaster management

In order to enhance disaster management capacity, seminars and training in disaster management shall be conducted initially for the Dep Ed. disaster management group. Eventually, the core group shall extend down to the school teachers at each school in Metro Manila. During the training course, results of the damage estimation shall be disseminated and the earthquake scenario shall be discussed. Based on the damage estimation results, areas characterized by higher vulnerability shall be prioritized.

➤ Reviewing and updating school disaster plans

In order to reconstitute school disaster management structures, appropriate persons with suitable capacities shall be empowered and assigned responsibility for reviewing and updating school disaster plans. Close communication and coordination with the local community and barangay shall be maintained. Regular drills and table top exercises shall be conducted to test the plans and feed back the lessons learned from them.

**2) Inculcate a disaster mitigation culture in future generations**

School children are one of the most vulnerable groups at the time of calamity. At the same time, they are the largest and most influential target group to inculcate a disaster mitigation culture. Those future generations should know that disaster impacts on social, economic, and environmental aspects cannot be ignored for sustainable development.

➤ Including earthquake disaster management in the school curriculum

As part of the school curriculum, disaster management particularly earthquake shall be included. Core curriculum modules shall be developed appropriate to different grade levels. Disaster

management will be included as a basic component of primary education to become a part of culture.

➤ Dissemination of damage estimation results

To know local vulnerability is the initial step for disaster impact reduction. An earthquake disaster is particularly overwhelming and it is not easy for people to imagine the possible situation. The damage estimation will be disseminated to help people become aware about the situation and take necessary actions before the event to cope with it.

➤ Drills

Regular drills will be conducted to practice and encourage awareness about the emergency situation. Evacuation, fire suppression, and first aid drills can be conducted. Drills can be jointly conducted with the local communities. For advanced learners, exercise-type drills can be conducted, in which there are a limited number of controllers and a majority of players who will be told the situation by the controller and react according to each situation as it evolves over time.

■ **Action Plans**

- Enhance school risk management capacity
- Inculcate a disaster mitigation culture in future generations

## **5.6 Formulation of Reconstruction Systems**

Preparation of recovery and reconstruction policies, strategies, and procedures are very important for the facilitation and maximization of the recovery. Prepared policies, strategies and procedures need to be accepted and fully understood by the relevant agencies and organizations. Without appropriate reconstruction system, recovery process will take a long time, and may further affect people. It will also lead to further vulnerable urban structures and environmental degradation. Existence of a reconstruction system is also necessary for Metropolitan Manila for the proper recovery process, rehabilitation and reconstruction.

In order to improve community recovery capability, 5 distinguished frameworks are prepared as follows:

- 1) Temporary refugee housing
- 2) Emergency assistance for everyday life
- 3) Debris clearance and management
- 4) Restoration of public and social services
- 5) Post-disaster reconstruction and mitigation
- 6) Institutional aspect of recovery

**FRAMEWORK:****RSF-1****SUPPLY TEMPORARY REFUGEE HOUSING****■ Understandings / Concerns:**

It is estimated that 40% of the existing houses will be damaged in the event of the scenario earthquake, with 175,600 totally collapsed, 348,000 partially collapsed, and 97,800 burned down. The total number of the unlivable houses would reach 447,400 houses, on the assumption that half of the partially collapsed houses, or 174,000 houses, are unlivable.

Again on the assumption that half of the residents of such unlivable houses would go stay at their relatives or acquaintances, or would return to their hometown, the number of the temporary houses needed is calculated as 223,700 houses.

The number is huge for the Philippine government; thus it is mandatory to formulate a temporary housing plan including construction sites.

**■ Basic Policy /Basic Concept of Framework:****1) Supply temporary houses**

The unlivable houses are distributed by LGU, with the maximum in Manila City (82,900 houses), followed by Quezon (74,900), Pasig (40,750), Kalookan (28,900), Marikina (25,100), and Mutinlupa (25,000).

It is required to study the necessary area for the temporary houses and the possible area used for the temporary houses. According to NDCC, the size of a temporary house is 30 m<sup>2</sup>, thus a 671 hectares of land is required to construct the 223,700 houses. That means 250 hectares in Manila, 225 hectares in Quezon, 122 hectares in Pasig, 84 hectares in Kalookan, and 75 hectares in Marikina.

It is essential to study the procurement of construction materials and its required cost and time required for the temporary house construction, and formulate measures to achieve it.

**2) Supply the public services**

It is necessary to draw up countermeasures for delivery of public services such as water, electricity, gas, sewerage treatment, solid waste treatment, health and medical services, education, telecommunication, transportation services, etc, in relation to temporary housing construction.

**■ Action Plans**

- Formulate temporary refugee housing plan

**Table Estimated Number of Refugees**

City/ Municipality	Heavily Damaged Building Number (×1,000)	Partly Damaged Building Number (×1,000)	Partly Damaged Building Number (×1,000) ×1/2	Maximum Possible Burnt out Building (×1,000) (8m/sec)	Total number of unlivable buildings (×1,000)	Total Number of Refugees (×1,000)
	(1)		(2)	(3)	(4)=(1)+(2)+(3)	(5)=(4)×7people
Manila	26.2	51.4	25.7	31.0	82.8	579.9
Mandaluyong	4.4	9.8	4.9	4.0	13.3	93.4
Marikina	15.3	18.8	9.4	0.4	25.1	175.6
Pasig	23.0	25.5	12.8	5.0	40.7	285.1
Quezon	26.9	71.4	35.7	12.3	74.9	524.1
San Juan	1.2	3.2	1.6	1.3	4.1	28.5
Valenzuela	2.4	7.9	3.9	0.7	7.0	48.8
Kalookan	7.2	25.2	12.6	8.2	28.0	196.2
Malabon	4.7	12.3	6.2	7.3	18.2	127.4
Navotas	5.7	11.3	5.6	8.6	19.9	139.6
Las Pinas	6.4	17.3	8.7	1.7	16.8	117.8
Makati	9.2	16.5	8.3	4.9	22.3	156.4
Muntinlupa	13.5	19.0	9.5	2.0	24.9	174.6
Paranaque	9.2	21.1	10.5	3.5	23.2	162.6
Pasay	7.0	13.0	6.5	5.8	19.3	135.0
Pateros	1.7	2.9	1.5	0.5	3.6	25.4
Taguig	11.6	21.3	10.7	0.8	23.1	161.7
Total	175.6	348.0	174.0	97.8	447.5	3132.2

Source: JICA Study

**FRAMEWORK:  
RSF-2****PREPARE EMERGENCY ASSISTANCE FOR DAILY  
LIFE****■ Understandings / Concerns:**

When attacked by the disaster, people would be faced with losses of family and damage to their assets and properties. The estimated number of the people affected by the scenario earthquake is estimated at more than 3 million. The number is so huge that the government should be prepared to take fundamental measures to alleviate suffering both financially and mentally in order to assist people to feel easier and to return to their normal life quicker.

**■ Basic Policy /Basic Concept of Framework:**

The government should prepare measures for financial and mental relief for people affected by the scenario earthquake. Financial support will include some preferential treatment by the government and distribution of money donations and gifts as a token of sympathy from outside. Mental care is very important including the treatment of PTSD (post-traumatic stress disorder). A counseling system should be organized with experts, and also religious bodies, NGOs, and volunteer groups will be helpful. The government should collaborate with such organizations and groups.

**■ Action Plans**

- Formulate basic policy for emergency assistance for daily life

**FRAMEWORK:  
RSF-3**

**ESTABLISH DEBRIS CLEARANCE AND  
MANAGEMENT SYSTEM**

■ **Understandings / Concerns:**

It is estimated that some 33,555,000 tons of debris will be generated from the 447,400 damaged buildings. The buildings counted consist of 175,600 totally damaged buildings, 97,800 burned buildings, and 174,000 partly damage buildings, or half of the partly damage buildings of 348,000. The total amount of debris is estimated on the assumption that half the partly damaged houses will be removed, 750 kg of debris will be generated per m<sup>2</sup> of housing unit, and the average area of housing unit is 100 m<sup>2</sup>. Moreover, the total debris including both buildings and infrastructure is estimated to weigh some 50 million tons.

It is compulsory to study the method of treatment and the dumping sites for debris, for the smooth recovery and reconstruction of the urban area and infrastructure.

■ **Basic Policy /Basic Concept of Framework:**

In order for the emergency measures at the damaged area and for the smooth implementation of recovery and reconstruction, the debris of concrete and waste materials (created by collapse and fires), and dismantling of buildings are required to be cleared as soon as possible in a proper manner. The debris will be disposed of by the LGUs.

LGUs have to formulate a debris clearance plan based on the estimated amount of the debris. The plan should include: establishment of taskforce, procedure of treatment of debris clearance, temporary debris disposal sites, temporary solid waste treatment plants, necessary equipment, required time, establishment of collaboration with private companies for debris clearance and treatment, etc.

■ **Action Plans**

- Formulate debris clearance plan for LGUs

**FRAMEWORK:****RSF-4****RESTORE PUBLIC AND SOCIAL SERVICES****■ Understandings / Concerns:**

The government agencies will act based on the pre-prepared plan for their tasks to maintain the stability of the society after a disaster as much as possible. However, even so, society will be confused and it will be difficult to maintain the law and order, especially to prevent looting and unnecessary damage.

**■ Basic Policy /Basic Concept of Framework:**

The government should maintain security even after a devastating earthquake attacks Metropolitan Manila with a great number of the people. To this end, the government should make a plan to secure the peace and order for the affected areas. This includes 24-hour surveillance by the uniformed police patrol, community vigilante groups, and other community groups like “barangay tanods.”

**■ Action Plans**

- Formulate basic policy for post-disaster peace and order keeping activities

**FRAMEWORK:  
RSF-5**

**ESTABLISH POST-DISASTER RECONSTRUCTION  
SYSTEM OF THE DAMAGED AREA**

■ **Understandings / Concerns:**

It is estimated that 175,600 houses will be totally collapsed, 348,000 partially collapsed, and 97,800 burned down. The damage caused by the earthquake is in part attributable to the urban structure of Metro Manila, in particular, highly congested residential areas which are often found in slum areas. The damage is huge, but quick post-disaster recovery and reconstruction are mandatory to restore normal life and activities. For prompt recovery and reconstruction, pre-disaster arrangements to cope with post-disaster situation are imperative.

■ **Basic Policy /Basic Concept of Framework:**

After an earthquake disaster, everybody wants a quick recovery and reconstruction for normal living, including daily activities, housing, employment, social and economic activities, etc. Although an earthquake disaster would bring about huge damage, it would be an opportunity to reform the urbanized areas that have been developed in unplanned way. The reconstruction of the damaged areas should aim at building a safer and better urban environment out of the damaged areas. Also, the reconstruction process should be advanced by collaborative efforts of public sector, private sector, and citizens.

**1) Facilitate quick return to the normal: people's living, housing, employment, and economic activities**

To facilitate the smooth and proper recovery and reconstruction of the damaged Metropolitan Manila and to quickly regain people's normal life, education, employment, and social and economic activities, necessary policies and measures for post-disaster urban reconstruction should be discussed and formulated including living, housing, employment, and economic activities.

**2) Make living environment much safer and better than before the disaster**

➤ Draft pre-disaster guideline on the post-disaster reconstruction of the damaged area

For the smooth reconstruction of the damaged areas, pre-disaster reconstruction arrangement for the post-disaster situation is strongly needed. Especially, for the vulnerable areas like slum areas, pre-disaster guidelines should be made by each LGU. Such guideline should be formulated in a participatory approach based on the risk map produced by the JICA's MMEIRS. The guidelines will be made for various areas of detached houses, collective residences, and slum areas. And this would also stipulate some restriction of construction of buildings in a certain period of time after the disaster until the concrete reconstruction plan will be drawn up.

➤ Enhance the planned reconstruction in the slum areas

The slum areas are very vulnerable to earthquakes, but they are very resilient because their houses can be easily constructed with scrap or waste materials. However, reconstruction in such a way should not be allowed, and efforts should be made to create a better urbanized area after the disaster. Before the disaster, rules on control of the reconstruction of the areas must be established with the government, land owners, and slum residents.

If possible, construction of multiple dwelling houses in middle-rise buildings under social housing scheme is preferable from the disaster prevention and urban amenity perspective.

➤ Establish the procedure for post-disaster reconstruction

The procedure of reconstruction of the damaged area should be drafted before disaster. The procedure may cover the period from immediately after the disaster event to the commencement of construction of buildings, and further to the ultimate picture of the reconstructed area.

➤ Establish housing financial scheme

Those who have to reconstruct or repair their houses need funds for that purpose. Subsidies or loans should be discussed for the reconstruction or repair of damaged houses depending on the degree of damage. Also mutual aid may be an option for that purpose.

■ **Action Plans**

- Formulate basic reconstruction policies for living, housing, employment and economic activities
- Formulate guidelines on urban reconstruction and make a scheme of finances and credits

**FRAMEWORK:  
RSF-6**

**ENHANCE INSTITUTIONAL ASPECT OF RECOVERY  
PLANNING**

■ **Understandings/ Concerns:**

When a major disaster occurs, everyone—government, businesses, communities and families--must pull together to recover. Regaining normalcy is much easier and quicker if the policies, partnerships, and organizational structures to guide and facilitate recovery are in place before the disaster.

■ **Basic Policy /Basic Concept of Framework:**

**1) Establish pre-disaster policies and institutional arrangements for post-disaster reconstruction and mitigation**

Typically, pre-disaster planning focuses on preparedness for immediate response and relief, and little effort is expended in planning short- and long-term recovery strategies and policies. However, recovery and reconstruction involves decision-making at every level from family to national government; and it requires developing linkages and addressing complex, difficult issues. A multitude of decisions must be made about demolitions, repairs, temporary facilities, and reconstruction. Recovery deals with indirect as well as direct effects of disasters, including psychological recovery, community services, commerce, and industrial production. Clear delineation of policies as well as responsibilities and authority over certain activities speeds recovery and provides accountability.

Consideration should be given to establishing a reconstruction authority (or redevelopment authority) with powers such as eminent domain, planning, buying and selling property, and receiving and spending public funds. Institutional arrangements for recovery also should:

- ◇ Ensure the ability to promptly restore government functions and facilities
- ◇ Ensure the ability to reallocate government funds and reprogram resources for recovery activities
- ◇ Provide for managing public finance (e.g. emergency contracting and tax collections).
- ◇ Determine types and levels of public assistance to families and businesses that are most in need following the disaster
- ◇ Provide for implementation of building regulations and code enforcement during repairs and rebuilding
- ◇ Review the land use plan and develop solutions to zoning and land use issues to be implemented during reconstruction
- ◇ Identify areas at high risk (e.g. strong earthquake ground motion or liquefaction, high fire or flood risk, etc) and reduce density or require other mitigation actions during reconstruction in those areas
- ◇ Establish partnerships for coordination of public and private recovery-focused actions

**2) Prepare recovery plans and procedures to ease post-disaster human and physical recovery and rehabilitation**

A recovery plan and procedures should be developed before a major disaster to cover the following short- and long-term recovery functions and many others:

- ✧ Establish priorities and coordination systems for restoration of lifelines and other basic services
- ✧ Establish procedures to inspect and restrict entry to unsafe buildings; ensure utilities are turned off in unsafe or damaged structures; provide for the use of volunteer engineers and other professionals
- ✧ Establish plans and sites for temporary housing and/or resettlements following the termination of sheltering operations
- ✧ Establish programs to assist local businesses, especially small businesses, to recover
- ✧ Pre-determine disposal sites for debris generated by the disaster and by demolition of damaged buildings and structures; develop plan for coordination of debris removal from streets and public and private properties
- ✧ Plan assistance programs for needy disaster victims including the very poor, elderly, infirm, homeless, and children

#### ■ **Action Plans**

- Establish pre-disaster policies and institutional arrangements for post-disaster reconstruction and mitigation
- Prepare pre-disaster recovery plans and procedures to ease post-disaster human and physical recovery and rehabilitation

## **5.7 Research and Technology Promotion for Earthquake Impact Reduction Measures**

For the further development of earthquake impact reduction measures, continuous research as well as feeding back of the results to the citizens will be promoted. Further research on earthquake science and engineering situated in Metropolitan Manila will be revealing to the society.

Framework to support the goal for this section is as follows:

- 1) Promotion of sustained research and development on earthquakes

**FRAMEWORK:  
R&D-1**
**PROMOTE SUSTAINED RESEARCH AND  
DEVELOPMENT ON EARTHQUAKE**
**■ Understandings/ Concerns:**

Once huge earthquake occurs in Metropolitan Manila area or at Manila Trench, the extent of damages can be estimated. Earthquake science, earthquake engineering studies are developed in depth to achieve development of earthquake impact resistant national system, improvement to earthquake resistant urban structure, enhancement of effective risk management system.

**■ Basic Policy /Basic Concept of Framework:**
**1) Evaluate activity of the Valley Fault System**

The JICA study estimated earthquake damage based upon an earthquake scenario. The scenario was defined with basic information on historical hazardous earthquakes and also recent records of seismicity. Study on activity of the Valley Fault System, especially on recurrence interval and probability of occurrence, is still limited. This information is the basis for consideration and introduction of earthquake damage mitigation measures. Major study items were: 1) fault location and distribution survey, 2) evaluation of fault segmentation, 3) fault trench excavation survey, 4) micro-earthquake activity monitoring, 5) ground movement monitoring and 6) estimation of magnitude, of recurrence interval, and probability of occurrence for the next event.

**2) Integrate ground information as a unique and comprehensive database**

DPWH and DOTC organized many construction works and there is much ground information such as boring survey log. Survey reports are kept independently and it is difficult to collect these and integrate them as a unique and comprehensive database. This information could greatly help to detail consideration on ground motion estimation and liquefaction analysis. Agreement for data provision from DPWH and DOTC as implementation bodies to PHIVOLCS as research institution is recommended.

**3) Expand basic inventory on buildings and population for detail damage estimation purpose**

The JICA study used population and building census data of year 2000 for damage estimation. This is one and the only reliable information at this moment. The data has basic limitation of its contents. Data on building structural information and data on commercial purpose buildings is missing. Further, more detailed damage estimation is needed for detail consideration of disaster management planning. Therefore building and population inventories need to be improved. National census is taking place regularly; therefore, some additional survey items should be included in the next survey. This will lead to upgrading damage quality estimation greatly. Especially information on number of stories and main structure elements of each building, commercial building inventory, information on daytime and nighttime population are important. Coordination and discussion with NSO, DPWH, PHIVOLCS, ASEP are required.

**4) Promote detail study on comprehensive earthquake disaster estimation.**

The JICA study treated only earthquake damage. In actual damage situation, there are secondary damages that lead to also difficulty in response to emergency activities. Detail disaster condition

estimation is strongly recommended. Administrative response capability, water supply limitation and electric power supply limitation are all together considered in the estimation.

■ **Action Plans**

- Evaluate activity of the Valley Fault System by PHIVOLCS and research institutions
- Promote comprehensive census survey
- Promote detail study on comprehensive earthquake disaster estimation by NDCC