

## Participatory Planning in Developing Earthquake Disaster Reduction Plan in Marikina City, Philippines

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### Synopsis

As a collaborative effort, earthquake disaster experts from Japan joined with a local stakeholder team made up mainly of Marikina City administrators to develop a comprehensive and integrated Marikina Comprehensive Earthquake Disaster Reduction Program (CEDRP). The CEDRP features a systematic structure in which a single goal is elaborated into ten objectives, along with policies/strategies and programs/projects while also taking into account the four phases of the disaster management cycle. The ten objectives can be categorized into three general policies summarizing physical, informational and strategic countermeasures.

**Keywords:** Strategic Plan, Comprehensive Disaster Reduction Plan, Disaster Management Cycle, Participation

### 1. Introduction

Losses from hazards can be reduced if stakeholders in a society take constructive action before the next disaster occurs. There is a real need for disaster reduction planning to maintain and enhance people's quality of life and environmental quality. Disaster reduction planning is the process of determining how to reduce loss of life and property damage resulting from natural and human-caused hazards. Disaster reduction planning can be a tool to achieve this goal and is important to promote sustainable development. Developing the Marikina Comprehensive Earthquake Disaster Reduction Program (CEDRP) is a challenge to strengthen and maximize the function of the Disaster Reduction Plan. The CEDRP was developed by Marikina City administrators using a consensus-

building approach in order to create a sense of ownership so that they will take active roles in Disaster implementing the comprehensive countermeasures to reduce earthquake risk. This paper describes the contents and characteristics of the CEDRP, and examines its effectiveness and superiority. By introducing requirements of the Disaster Mitigation Act of 2000 (U.S) as a set of criteria and a template to assess the CEDRP, we evaluated the quality of the contents and the effectiveness of the planning process. Finally, we will examine the further challenge to implement and improve the quality of CEDRP.

**2. Participatory Planning Process of Marikina Initiative - How were the ten Objectives along with the Policies/Strategies and Program/Projects developed?**

We held five workshops to develop a disaster reduction plan for Marikina City through a stakeholders' participatory process. This section describes participatory planning process through workshops, and its goal and outcome.

#### **Workshop 1: Problem Identification Workshop**

This workshop aims to share information about risks, the present situation, and future visions of Marikina City. Three objectives, to increase public awareness on disasters, collect information on Marikina City, and to map assets, were set to accomplish the workshop goal. The first two tasks were conducted by lecture and third task was accomplished by a small group exercise. In the generated asset map, critical facilities that should continue to be operated at the time of disaster were listed.

#### **Workshop 2: Risk Assessment and Goal Setting Workshop**

The goal of this second workshop is to understand Marikina's earthquake risk and to outline Marikina's disaster reduction goals and objectives. Local stakeholders focused on defining goals and objectives for earthquake disaster reduction in Marikina City. Damage estimation results on critical facilities, which were listed in the asset map, were disseminated at this workshop. The consensus to establish the Earthquake Disaster Reduction Plan of Marikina City was reached and in a small group format, ideas were generated on how to prevent or minimize the damage or social disruption in event of an earthquake. After a round-robin presentation of ideas, 162 statements were categorized into goals and objectives with clarification of each idea.

#### **Workshop 3: Planning Workshop**

Stakeholders work to prepare a conceptual plan framework at third workshop. Before workshop 3, Japanese experts team sort 162 statements, generated at Workshop2, into ten objective categories, each participant was asked to assign the statements to the appropriate category level of the CEDRP three-level strategic planning structure comprised of Objectives, Policies/Strategies, and Programs/Projects

The goal statement was confirmed and then a four-layered planning structure, which was adopted from Marikina Comprehensive Land Use Plan, was introduced. The generated ideas were then classified into categories, 1) Objectives, 2) Policies/Strategies, and 3) Programs/Projects. Idea on the Policies/Strategies and Program/Project categories were fulfilled using a Planning Matrix, which reflects the four phases of disaster reduction and area of expertise on disaster reduction.

#### **Workshop 4: Implementation Workshop**

Fourth workshop was held to develop a list of tentative programs/projects for further evaluation and to review and confirm the generated statement from 1) Objectives, 2) Policies/Strategies, and 3)

Programs/Projects level. Prior to this workshop, the Japanese expert team edited and polished the generated ideas. At the end of this workshop, a Comprehensive Earthquake Disaster Reduction Plan for Marikina City, which consisted of one goal statement, ten objective statements, 54 policy/strategy statements, and 216 program/project statements, was completed.

#### **Workshop 5: Stakeholder Resource Assessment and Priority Evaluation Workshop**

At last workshop, stakeholder developed an Earthquake Disaster Reduction Action Plan for Marikina. The questionnaire surveys on program/projects importance and available resources both internal and external were conducted prior to the workshop. The Action Plan of Marikina Earthquake Disaster Reduction Plan based on a Comprehensive Earthquake Disaster Reduction Plan for Marikina City was established reflecting the results of the resource assessment. Table 1 shows the Goal and Tasks of each workshop.

### **3. Characteristics and Effectiveness of Marikina Earthquake Disaster Reduction Program**

This section of the paper describes the structure of the CEDRP, and points out two of its main characteristics which are 1) comprehensiveness and 2) the disaster management cycle. By providing comparisons with other disaster reduction plans in the U.S and Japan, we show the characteristics and superiority of the CEDRP and examine its effectiveness.

#### **3.1 Structure of the plan and strategic planning**

The CEDRP is a "strategic plan", which sets a goal and develops objectives, policies /strategies and programs/projects, to accomplish its goal. This is one of the characteristics of the CEDRP compared to the Basic Plan for Disaster Prevention, the national level plan in Japan.

Strategic planning usually involves common elements. These elements are usually reflected in planning for both disaster reduction and economic development. They include:

1. Vision - envisioning desired outcomes;
2. Stakeholder identification - involving stakeholders, who might be affected by the plan or whose support will be needed to implement the plan, early enough in the planning process so their ideas can be truly considered;
3. Goals - determining goals and objectives reflecting critical dimensions of desired outcomes, described in complete and, if possible, measurable terms;
4. Options - assessing opportunities, challenges, and alternatives for achieving goals;
5. Structure - creating a coherent plan content

outline and structure;

6. Impacts - assessing potential plan consequences – what could go wrong as well as right;
7. Implementation - formulating actions necessary for implementing the plan;
8. Schedule – determining a sequence for actions needed for timely implementation;
9. Resources – determining human and financial resources needed to implement the plan;
10. Monitoring and feedback – checking results to see if the plan is working as intended, and if not, either revising the goals or the implementation for greater consistency between both.

The Goal, Objectives, Policies/Strategies, and Programs/Projects, which gradually become more focused and specific, comprise the CEDRP. We introduced this structure in order to adopt the same structure as the Marikina Comprehensive Land Use Plan (CLUP, 2000). This can be useful to ensure consistency between CEDRP and CLUP (2000). A Goal can be defined as a long term purpose, which is broad and abstract in a sense. Objectives are more specific and narrower in scope than goals and they elaborate how goals will be achieved. Objectives encompass Policies/Strategies to attain the identified goal. “Policies” and “Strategies” have some differences. We define Policies as a direction to encourage action consistent with an organization’s chosen values and objectives, and Strategies as actions taken to accomplish short-term outcomes or competitive advantage. However, in a broad sense, it is common that Policies/Strategies are actions that help you achieve your goals and objectives. Programs/Projects are specific countermeasures and implementation actions under Policies/Strategies. A program is usually ongoing while a project is focused on a specific result, such as building a bridge. Figure 1 shows the hierarchical structure of the CEDRP. The Goal is on top with Objectives, Policies/Strategies, and Programs/Projects below. Local stakeholders will set the priorities at the bottom level, Programs/Projects. At this level, Programs and Projects represent a more concrete and quantitative element.

### 3.2 Comprehensive and Generic Countermeasures

To accomplish the goal of the CEDRP, we set the following policies to encourage informed and effective disaster mitigation, preparedness, response, and recovery programs and projects. The CEDRP includes three general policies summarizing physical, informational, and strategic countermeasures. Firstly, Physical Countermeasures comprised of Critical Facilities, New Buildings, and Existing Buildings, is a policy of the City of Marikina to protect the lives, property, and activities of the people by ensuring that infrastructure facilities and buildings throughout the

city are disaster-resistant through use of safe construction and strengthening methods.

Critical Facilities are basic infrastructure assets: bridges, fire stations, schools, hospitals, etc. Most of these facilities are vulnerable to earthquake threats and need strengthening, and they are essential for successful earthquake response and recovery.

The Critical Facilities, Objective 1, statement is: Protect and strengthen infrastructure facilities to prevent loss of lives and damage to properties to allow continued use and to restore normalcy quickly following disasters. P/S 1-2 states: Preserve route functionality of roads and bridges for evacuation and logistics under all circumstances, and P/S 1-3: Construction of public and private facilities should take into account potential earthquake threats including liquefaction.

New Buildings represent a prime investment for the future, enabling economic development and housing improvement, and should be strong enough to resist earthquakes to avoid loss of life and property.

The New Buildings, Objective 2, statement is: Improve the quality of building design and standards to encourage and safeguard investment and to protect human lives, properties, and activities. To achieve this objective, there are P/S 2-1: Implement the rules and regulations of the national building code (PD 1096) and its referral code strictly, particularly the structural code. In the Philippines, there is an existing building code; however, it is not consistently implemented because of a lack of rules and regulations to encourage abiding by the code. P/S 2-3 states: Upgrade the standards of the building review process with emphasis on Seismic Design Analysis including evacuation routes and safety considerations.”

Existing Buildings in Marikina City are demonstrated by interactive risk assessment to be vulnerable to earthquake damage or collapse (Hasegawa, 2004). Strengthening these existing buildings is one of the important countermeasures to save human lives. The Existing Buildings, Objective 3, statement is: Identify the condition of existing buildings and take corrective action to prevent loss of lives and properties and to allow continued use. To encourage this, P/S 3-3 states: Invest financial assets in strengthening public and private buildings through retrofitting. And P/S 3-4 states: Provide incentives for retrofitting of existing buildings in accordance with the building code.

Secondly, Informational Countermeasures, comprised of Education, Research and Technology, and Public Information, represents a policy to raise the level of preparedness of all stakeholders through education, timely information, evaluation of hazards, and implementation of mitigation technologies.

Community support for earthquake safety will require education. Education should be community-wide, and school children, citizens, and business

people must all be involved for this to last. The Education, Objective 4, statement is: Raise consciousness and preparedness of all citizens of Marikina through education and training about earthquake disaster issues. In order to achieve this objective, P/S 4-3 states: Conduct seminars/workshops on earthquake disaster issues within the community and schools. P/S 4-5 states: Develop the spirit of volunteerism and community involvement to facilitate disaster awareness and preparedness. The City should structure and develop earthquake safety through research and technology with new computer-based information tools.

The Research and Technology, Objective 5, statement is: Identify and evaluate high-risk areas through research and appropriate technologies. GIS, used for the May Risk Assessment Workshop using local data, is a promising tool and information source.

Public information empowers the community towards self-help on earthquake safety. It is most effective when information generated is locally based. The Public Information, Objective 6, statement is: Formulate, maintain and sustain a continuous public information campaign strategy before, during and after earthquakes. P/S 6-3 states: Establish local emergency information dissemination system. Such a system does not yet exist in Marikina City.

Thirdly, Strategic Countermeasures, comprised of Land Use Planning, Institutional Initiatives, Economic Development, Sources of Finance, represent a policy to combine economic development and disaster management programs through the use of a well-defined comprehensive land use plan and through organizational initiatives to build the capacity of the City to generate financial resources enabling the City to fully implement earthquake disaster reduction programs. For earthquake safety where you build – that’s “land use” - is as important as how strongly you build. The City of Marikina has a Comprehensive Land Use Plan (CLUP), approved in 2000, which should be broadened to include earthquake safety issues. The Land Use Planning, Objective 7, statement is: Realize the vision of Marikina as a little Singapore facing minimal risk of earthquake disaster damage through a well defined land use plan and disaster management program. To achieve this objective, P/S 7-3 states: Control and regulate construction of buildings in identifies risk areas, including areas with fault line, landslide threat, liquefaction threat.

Institutional Initiatives is a strategic countermeasure that encourages all stakeholders, local government, community, business, industry and NGOs to each play a role in achieving earthquake safety. The Institutional Initiatives, Objective 8, statement is: Build Marikina’s capacity to mitigate, prepare, respond and recover from a major earthquake through developing a Disaster Reduction Plan. P/S 8-6 states: Create a coordinating body that will deal

continuously with earthquake disaster reduction issues. We, as disaster reduction specialists, see Marikina City as a self-reliant community with strong human assets.

Economic development is one of the important and typical issues which developing countries have to address. The Economic Development, Objective 9, statement is: Incorporate disaster management into the enhancement of livelihoods and economic development. P/S 9-1 states: Help the private sector increase business opportunities, create new jobs, and raise the level of wealth of the community, while recognizing and reducing earthquake risks. P/S 9-5, a new idea for this field, states: Develop economic and regulatory incentives to enhance seismic performance of existing and new construction. Today, Marikina is seen as a “bedroom community;” however, the local city government is now trying to bring new jobs to Marikina City, and to bring opportunity and balanced development. Job development and earthquake safety must go hand in hand, and the City must reach out to business and industry to protect new and existing investments from unnecessary future earthquake losses.

Finally, when we implement countermeasures to achieve earthquake safety, we need money. Though earthquake safety is cheaper in the long run, it requires an investment of money. Some can come from external sources, such as the Japan International Cooperation Agency or the Asian Development Bank, but most must come from the internal sources. The Sources of Finance, Objective 10, statement is: Identify existing local sources of finance and generate additional funding from other sources to support disaster reduction.

We cannot stress enough how comprehensive the CEDRP is. This might be one of the most comprehensive earthquake disaster reduction plans ever compiled even compared to those in the United States and Japan. In Japan, there is the Basic Plan for Disaster Prevention at the national level, and the Regional Disaster Reduction Plan at the city government level; however, most of the elements of these plans are comprised of “response” level countermeasures, and there is no comprehensive disaster reduction plan. I will deal with this issue in detail in the next section.

In the United States, looking at the California State Earthquake Loss Reduction Plan (2002-2006) as an example, the plan consists of eleven objective categories: 1) Geosciences, 2) Research and Technology, 3) Education and Information, 4) Economics, 5) Land Use, 6) Existing Buildings, 7) New Buildings, 8) Utilities and Transportation, 9) Preparedness, 10) Emergency Response and 11) Recovery. However, CEDRP has the additional objective categories of Institutional Initiatives and Sources of Finance, which the California Plan does not include. These additional elements highlight the

uniqueness and superiority of CEDRP which contains objectives especially useful for developing countries. It is obvious that CEDRP is in no way inferior to the California Plan, which is one of the most advanced Disaster Reduction Plans.

### 3.3 Disaster Management Cycle: Mitigation, Preparedness, Response, and Recovery

Another characteristic of the CEDRP is that we take into account of the disaster management cycle: Mitigation, Preparedness, Response and Recovery.

In Japan the response phase is well planned in great detail; however, mitigation, preparedness and recovery are considered less serious and have no clear goal for each of the phases. For example, when looking at the Basic Plan for Disaster Prevention at the national level plan, the Mitigation and Preparedness/Response/Recovery ratio is 125:232:25 (Kawata, 2003). Kagiya (2003) explains the reason for this as mitigation, preparedness and recovery are not inadequately supported by the coffers of local governments; consequently, they tend to write this part of the plans abstractly and do not set goals for Mitigation, Preparedness and Recovery. Also, Kagiya (2003) points out that recovery would be largely affected by the national level rules and regulation, so that local government cannot set disaster reduction goals in the Regional Disaster Reduction Plan. In Japan, however, some local governments, such as the Tokyo Metropolitan Government as well as Osaka and Kobe have their own programs for disaster reduction although, there is no legal support for them. After the Kobe earthquake in 1995, the City of Kobe proposed “Christmas-tree type”

The disaster management cycle describes the process through which emergency managers prepare for emergencies and disasters, respond to them when they occur, help people and institutions recover from them, mitigate their effects, reduce the risk of loss, and prevent disasters such as fires from occurring. It is crucial to take into account each of the disaster management phases. Integrating all emergency management activities, throughout all phases of an emergency, and across all functions increases accountability, provides continuity of resource application, establishes a clear chain of command and coordination, and identifies responsibilities for critical task performance. To reduce future losses through disasters, it is important to create a well



Figure 1 Disaster Management Cycle

balanced plan for each phase, such as building retrofit for mitigation, organizational capacity building for preparedness, and well-organized disaster response activities for response, and recovery. Although, it has not only financial resource, but also human resources to proceed with projects, local government would not set priorities for projects (Kawata, 2003). This shows that in Japan, generally speaking, it is not common to prepare an Action Plan, which includes prioritization and resource assessment to implement disaster reduction countermeasures. In the United States, the California State Earthquake Loss Reduction Plan (2002-2006) includes all phases. As mentioned in Section 2, Preparedness, Response and Recovery objectives are included in the Plan. In Marikina city, takeholders formulated Policies/Strategies statements intended to realize identified objectives and decided which Policies/Strategies would be part of each of the four phases of Disaster Management planning.

Figure 2 shows the Planning Concept Matrix, a tool we use to fulfill all the elements of disaster reduction planning. It consists of a matrix of ten fields and the four phases of disaster reduction: Mitigation, Preparedness, Response, and Recovery. Stakeholders learned the Disaster Management Cycle and generated ideas on what to include in each phase at the July workshop. All ideas have not born fruit as a completed CEDRP; however, it is extremely important to plan for each disaster phase in order to adequately prepare and recover from disasters. Generate ideas statements which could realize those identified objectives

OBJECTIVE	POLICIES/STRATEGIES	Mitigation	Preparedness	Response	Recovery
Critical Facilities	•	✓			
New Buildings	•	✓			
Existing Buildings	•	✓			
Education	•		✓	✓	
Research & Technology	•	✓	✓	✓	✓
Public Information	•		✓		
Land Use Planning	•		✓	✓	
Institutional Initiatives	•	✓			
Economic Development	•		✓	✓	
Sources of Finance	•				

Figure 2 Planning Concept Matrix

#### 4. Marikina Comprehensive Earthquake Disaster Reduction Plan

##### 4.1. What is the purpose of the Action Plan?

The CEDRP is accompanied by an Action Plan, which prioritizes Programs/Projects by year to be completed, and includes timing for completion as well as projecting the use of internal or external resources and identifying the department to take the lead. Some mitigation actions may be low-cost initiatives that can be readily adopted; others may depend on available funding or would be best implemented following a disaster when additional funding may become available. Local government needs to prioritize the list of possible initiatives to ensure that the projects they consider to be the most important get implemented as funding or resources become available. To accomplish this, the Action Plan identifies the resources and appropriate steps necessary to implement projects. It is tempting to finalize a list of projects that would simply get the job done. However, it is important to take time to evaluate the relative merits of the alternative projects and actions and the local conditions in which these activities would be pursued. Proposed Programs/Projects will be evaluated against the backdrop of what is feasible in terms of the City of Marikina's legal, administrative, fiscal, and technical capacities. Capability assessment should include a description of a range of agencies and their resources, responsibilities, and limitations related to implementing Programs/Projects. After the October workshop, when the Programs/Projects were identified, we sent questionnaires to the stakeholders for in preparation for the Action Plan. In the questionnaires, the City of Marikina administrators

were asked four main questions. 1) Identify the importance of each of the Programs/Projects

(High/Medium/Low) 2) Indicate the Availability of internal and external resources for each of the Programs/Projects (High/Medium/Low) 3) Indicate the urgency of each of the Programs/Projects (within 1-2 years/within 5 years/within 10 years) 4) Indicate the leading department for each of the Programs/Projects.

The questionnaire was used for the November workshop as a basis for workshop discussions, and to share the thoughts of the participants with each other. In a plenary session, we tentatively suggested the Action Plan be limited to the top 60 Programs/Projects, out of the original 216, based on the questionnaire responses. In the group sessions, the participants were to decide which Programs/Projects would be included in the Action Plan, determine internal and external resource availability, and indicate the appropriate lead departments. Participants discussed the results of the plenary session and decided if Programs/Projects initially eliminated in the plenary session should be restored. Stakeholders first decided which Programs/Projects initially eliminated in the plenary session should be restored and then discussed timing of implementation and the appropriate lead department to implement the Programs/Projects.

##### 4.2 Contents of the Action Plan - Results of the November workshop, Resource Assessment and Priority Evaluation Workshop

Table 1 shows that 113 Programs/Projects were selected as the Action Plan out of 216 Programs/Projects, which we developed as a CEDRP. In a plenary session in the November workshop, we tentatively selected top 60 Programs/Projects tentatively, which consists of 28% (60/216), and finally 52% (113/216) were selected to be included in the Action Plan by participants which is almost twice the number suggested in the plenary session.



**Table 1 Programs/Projects implementation timing by objectives (Action Plan)**

#	OBJECTIVE	now (with in 1-2 years)		soon (with in 5 years)		later (with in 10 years)		SUM	% of selected P/P	All Programs /Projects	California selected P/P	California Plan
1	Critical Facilities	8	32%	5	20%	0	0%	13	(52%)	25	2	6
2	New Buildings	4	22%	4	22%	0	0%	8	(44%)	18	0	3
3	Existing Buildings	7	27%	3	12%	0	0%	10	(38%)	26	3	11
4	Education	11	52%	4	19%	0	0%	15	(71%)	21	4	6
5	Research & Technology	2	10%	9	45%	4	20%	15	(75%)	20	6	7
6	Public Information	7	47%	3	20%	0	0%	10	(67%)	15	0	0
7	Land Use Planning	8	32%	1	4%	0	0%	9	(36%)	25	1	7
8	Institutional Initiatives	16	59%	0	0%	0	0%	16	(59%)	27	2	3
9	Economic Development	11	50%	1	5%	0	0%	12	(55%)	22	5	14
10	Sources of Finance	1	6%	3	18%	1	6%	5	(29%)	17	0	3
<b>SUM</b>		75		33		5		<b>113(52%)</b>		<b>216</b>	<b>23(11%)</b>	<b>60(28%)</b>

When looking at the popularity of each objective, especially line “now (within 1-2 years), you find the percentage of the originally proposed Programs/Projects selected was as follows: Institutional Initiatives 59%, Education 52%, and Economic Development 50%. The reason for this popularity can be explained as follows. It is true that stakeholders in Marikina city officer believe education as best way to promote disaster reduction and put high priority. And also, it can be said that Marikina city are very positive to enlarge their capacity to demonstrate their initiatives (institutional initiatives) , and consider economic development is one of the significance objectives to reduce the losses from disasters.

The Programs/Projects as developed are mainly from the stakeholders; however, 60 Programs/Projects, 28% (60/216) were adopted from California State Earthquake Loss Reduction Plan (2002-2006). Finally, the stakeholders selected 23 Programs/Projects out of 216, which consisted of only 11% (23/216). This show the stakeholders did not feel comfortable to adopt many the California requirements as they wanted to create their own countermeasures which they considered to be particularly suitable and appropriate for their local context.

### 5. Objective Evaluation on Marikina Earthquake Disaster Reduction program based on Comparison with the U.S. Disaster Mitigation Act of 2000

In this section, we evaluate the planning process and content of the CEDRP by a third-party measurement, which is the Disaster Mitigation Act of 2000 in the United States. The Disaster Mitigation Act of 2000 (DMA 2000) is an Act that aims to reinforce the importance of pre-disaster mitigation planning to reduce the nation's disaster losses, and is primary intended primarily to control and streamline the administration of federal disaster relief and

mitigation programs. Key features include an emphasis on strong, integrated state and local planning, incentives for state commitment to planning and program management, and sanctions for not meeting requirements at the state and local level.

Table 2 is a worksheet used by local governments when they prepare a Disaster Mitigation Plan in order to meet the requirements defined by DMA 2000. By introducing this requirement sheet under DMA 2000 as a set of criteria and template to evaluate the CEDRP, this section examines the content and quality of the CEDRP.

### 5.1 Planning Process

DMA 2000 requires documentation of the planning process and coordination with other state agencies, appropriate federal agencies, and interested groups during the planning process. This is because the early involvement of other parties provides the opportunity for integration of mitigation measures with other planning efforts. To meet the documentation requirement, we have executive summaries prepared by the experts from Japan to cover the planning accomplished through the workshops. From here on, we are expecting Marikina City itself to take lead to document its own continuing planning process.

The local plan must be integrated to the extent possible with other ongoing state planning efforts as well as other FEMA mitigation programs and initiatives (DMA 2000, Requirement §201.4(b) ). FEMA has learned that mitigation plan implementation is most effective when individual states integrate mitigation planning efforts with those of other state planning programs and initiatives. This will be the next step further by local stakeholder to review existing plans and reports in order to identify opportunity to integrate mitigation measures. However, we have not coordinated the CEDRP with other planning efforts in Marikina City, which are embodied in the Comprehensive Land Use Plan (2000), “Marikina as a Little Singapore.” This is one of the challenges for Marikina City administrators to

work on for the next step.

**5.2 Risk assessment**

DMA 2000 requires local government to develop a mitigation strategy, which is based on local vulnerability analysis and risk assessments. The CEDRP is based on an interactive seismic risk assessment, in which a field survey was conducted to acquire the above mentioned information for those important structures which Marikina City administrators expressed desires to protect in case of an earthquake. Structures were identified in the Problem Identification Workshop, in January 2003, which was part of the series of workshops held for the purpose of developing the Earthquake Disaster Reduction Program (Hasegawa, K., 2004).

monitor mitigation activities. This requirement has not yet been met in Marikina City; however, it will be necessary to meet this requirement in the implementation phase.

**6. Conclusion**

It is our, Marikina City and experts from Japan, new exciting challenge to develop the Comprehensive Earthquake Disaster Reduction Program for Marikina City, in the Philippines with a participatory planning process. We have examined how comprehensive the CEDRP is, and have shown that it was developed through taking into account the disaster management cycle comprised of mitigation, preparedness, response and recovery. It is our belief that in comparison with other disaster reduction strategic plans in the U.S and Japan, this CEDRP is one of the

Table 2 Plan Criteria : Standard Local Mitigation Plan Worksheet

Planning Process	U	N	S	O
Documentation of Planning Process				
Coordination Among Agencies				
Integration with Other Planning Efforts				
Risk Assessment	U	N	S	O
Identifying Hazards				
Profiling Hazard Events				
Assessing Vulnerability by Jurisdiction				
Assessing Vulnerability of State Facilities				
Estimating Potential Losses by Jurisdiction				
Estimating Potential Losses of State Facilities				
Mitigation Strategy	U	N	S	O
Hazard Mitigation Guide				
State Capability Assessment				
Local Capability Assessment				
Mitigation Measures				
Funding Sources				
Plan Maintenance Procedures	U	N	S	O
Monitoring, Evaluating, and Updating the Plan				
Monitoring Process of Mitigation Activities				

U – Unsatisfactory: The plan does not address the criteria.  
 N – Needs Improvement: The plan addresses the criteria, but needs major improvement.  
 S – Satisfactory: The plan meets the minimum criteria. Reviewer’s comments are encouraged, but not required.  
 O – Outstanding: The plan exceeds the minimum criteria. Reviewer’s comments are encouraged, but not required.

**5.3 Mitigation Strategies**

§ 201.6(c)(3) (i) requires that the hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. We set a goal in the CEDRP and developed Objectives, Policies/Strategies, and Programs/Projects to accomplish the goal, which is what we call “Strategic Planning.” Capability assessment was conducted by local stakeholders by questionnaire and discussed at the November workshop in preparing the Action Plan. A resource assessment has been accomplished by an evaluation of internal and external resources in addition to human resources in each department in Marikina city.

most comprehensive earthquake disaster reduction plans ever compiled.

However, we have several further challenges. One is to conduct an external evaluation of the contents of the CEDRP. We employed a participatory planning

**5.4 Plan maintenance procedures**

DMA 2000 requires monitoring, evaluating, and updating the local plan, and identifying a process to

process to develop the CEDRP through workshops with Marikina City administrators. The Goal, along with Objectives, Policies/Strategies, and Programs/Projects were mainly developed by Marikina City stakeholders with assistance by experts from Japan. The quality of the CEDRP has yet to be evaluated thoroughly in terms of effectiveness, merits, and functions of the Policies/Strategies and Programs/Projects in the CEDRP. Another challenge is how to implement the Action Plan. Implementation includes the coordination with other planning efforts, which I



mentioned in Section 4. Also, although we have prepared the Marikina Comprehensive Earthquake Disaster Reduction Action Plan, planning has yet to be done on how to proceed with the Action Plan to implement Programs/Projects indicated in CEDRP. Marikina City has to coordinate among all the agencies in the City government, to carry forward the plans and programs to achieve earthquake safety.

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#### **要 旨**

本稿は、フィリピン・マリキナ市において、現地の自治体職員と日本の防災専門家とのコラボレーションによって策定された総合的な地震防災計画の策定プロセスとその内容について報告するものである。計画の策定は、計5回のワークショップを通して現地の自治体職員らによる合意形成のもとで行われた。Comprehensive Earthquake Disaster Reduction Program (CEDRP)は、参加型のプロセスを通して策定された地震防災計画であり、その総合性・包括性、防災の4段階を考慮に入れた点などで先駆的である。今後は、計画の実現に向けての実行計画をすすめると同時に、CEDRPの有効性、効果などを再び検証して計画の質の向上を図っていくことが求められているといえる。

キーワード: 戦略計画、総合防災計画、トータルリスクマネジメント、参加

参加型の地震防災計画の開発  
- フィリピン・マリキナ市におけるケーススタディ -

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### 1. はじめに

本稿は、フィリピン・マリキナ市において、現地の自治体職員と日本の防災専門家とのコラボレーションによって策定された総合的な地震防災計画の策定プロセスとその内容について報告するものである。計画の策定は、計5回のワークショップを通して現地の自治体職員らによる合意形成のもとで行われ、そのプロセスに特徴がある。参加型で計画を開発することによって、現地自治体の計画に対する愛着(sense of ownership)と実現段階への責任感を持たせることを目指し、総合的な地震防災計画とそのアクション・プランが策定された。

### 2. 地震防災計画の構造と特徴

マリキナ市総合地震防災計画(Marikina Comprehensive Earthquake Disaster Reduction Program: 以下、CEDRP)は、ゴール(goal)、方針(objective)、政策/戦略(policy/strategy)、プログラム/事業(program/project)という構造をもつ。1つのゴールと、10つの方針(objective)、54の政策/戦略(policy/strategy)、そして216のプログラム/事業(program/project)から構成されている。防災計画のゴールを設定し、それを実現するための具体的な方策・事業 - 政策/戦略(policy/strategy)、やプログラム/事業(program/project) - を開発する、といった戦略的計画(strategic planning)という手法が採用されている点が有効であると言える。また、計画内容の特徴は、第1に、その内容が総合的・包括的であること、第2に、防災の4つのフェーズである被害抑止、被害軽減、応急対応、復旧・復興といった各々の段階における対策を考えた点に集約することができる。第1に関して言えば、伝統的なインフラや建築物の耐震化に加えて、“防災教育”、“公共への情報”、“土地利用計画”、“経済開発”、“各主体によるイニシアティブ”などの数々の方針(objective)を導入している。第2に関して説明すると、4つの段階ごとの対策を講じることは、地震対策間の相互の継続性を保ち、それらの関連を明確することに有効である。

### 3. アクション・プランの策定

CEDRPは、地震の被害を抑止・軽減するための総合的な対策のリスト、言うならば寄せ集めである。策定された計画を、実際にマリキナ市で実行に移すには、対策ごとの重要性、実施時期、資源の有無などを考慮して、アクション・プランを策定する必要がある。ワークショップで提案されたCEDRP内の216のプログラム/事業(program/project)のうち、アクション・プランに含めるものは113とされ、それらが1~2年以内、5年以内、10年以内の3段階の時期に振り分けられた。現地職員に対するアンケート調査によって、アクション・プランに含めるべきプログラム/事業(program/project)の選定を行い、適切な実施時期などを尋ねている。この結果をもとに、最終のワークショップを実施してプログラム/事業(program/project)の重要性などを加味した、アクション・プランが策定された。

### 4. 結論

CEDRPは参加型のプロセスを通して策定された地震防災計画であり、その総合性・包括性、防災の4段階を考慮に入れた点などで先駆的である。今後は、計画の実現に向けての実行計画をすすめると同時に、CEDRPの有効性、効果などを再び検証して計画の質の向上を図っていくことが求められているといえる。

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