

# Creating a Disaster Prevention System Using New Public Management Methodology

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**ABSTRACT:** Each local government in Kochi prefecture has founded a regional self-defense organization to provide emergency service in time of disasters such as earthquakes.

However, the creation of these disaster prevention systems for the regional organizations is inadequate due to lack of methodology. The main cause of this problem is that the local governments haven't planned detailed measures for assisting the self-defense organizations, and also they have not selected a methodology for carrying out the project.

Therefore, in this research, we propose that a university acts as a third party between regional self-defense organizations and local governments, and subsequently, that the university create a disaster prevention system incorporating new public management methodology.

**KEYWORDS:** management of disaster prevention, new public management

## 1. INTRODUCTION

Now, the region of the Pacific Ocean side of Kochi Prefecture and the Shikoku region are concerned about possibility of a large-scale Nankai earthquake. The probability of a Nankai earthquake in the next 10 years is 10-20% (estimation for starting point January 1, 2006). In September 2003, in the Tokachi area of Hokkai Prefecture, the Tokachi Oki earthquake occurred. The earthquake probability then was 10-20% (estimation for starting point January 1, 2003), but an earthquake did occur. In fact, Nankai earthquake will occur that earthquake took lives and caused great damage anytime.

In addition, the Yasu area in eastern Kochi Prefecture was predicted to experience substantial damage from tsunami over 10 meters high. As a result, the Yasu area should take measures for

tsunami disaster prevention and other usual earthquake related disasters.

In the case of predictable damage, for example typhoon damage, citizens obey directions from the government. The government makes substantial provision and gathers information. However, in the case of unpredictable damage, such as fire disaster or earthquake, citizens tend to evacuate independently. There is a need for similarly evacuation drill and substantial government provision for evacuation drill well in advance.

This research is intended to, create a disaster prevention system for regional self-defense organizations for protection against disasters such as earthquakes. The primary development techniques are development of an optimum investment method and readjustment and enrichment measures.

## 2. ASSIGNMENT OF UNIVERSITY/NPOS, LOCAL GOVERNMENT AND CITIZENS

### Assignment of University/NPOS



Figure 1. Joint of Government and Citizen

Communication is the most important thing for government and citizens in planning for disaster prevention. However, the government cannot be sure of substantial consensus by citizens. In addition, there are no methods for deciding measures priority and no substantial list of measures. Citizens face considerable obstacles, for example, they have no method of submitting their opinions about measures and measures priority to the government. Universities or Non-Profit Organizations (NPOs) should function as a bridge between government and citizens, to establish solutions for deciding a measures system, and soliciting opinions from citizens and reflecting citizen evaluation to the government.



Figure 2. Plan-Do-See

## Assignment of Local Government and Citizens

When an earthquake occurs, it is impossible for the government to perform rescue and assist citizens immediately. Therefore, the government should develop government structures for the collection of information, the provision of information, and decision-making function for rescue and recovery. In the decision-making function, there is a need for simulation of possibilities such as occasions when the mayor or staff are absent, the question of who will substitute for them and what interim structures can be taken. On the other hand, citizens should form regional self-defense organizations with government assist for protection against disaster. In addition, this organization should simulate evacuation drills with the understanding that when earthquakes occur, we cannot help all our neighbors, but only ourselves or maybe a few others. During evacuation drill, people should think of possible situations, for example, how to function at night, how to deal with collapsed buildings and houses, how to aid persons who require nursing care, how to cope with main evacuation road to lockage by fire disaster or damage to property.

## 3. ESTABLISHMENT OF MEASURES BY NEW PUBLIC MANAGEMENT

### Implementation Content of Regional Self-defense Organization

The subject of this research is regional self-defense organization for the Nishi-machi area of Yasu town (This town consolidated around 5 towns as Konan City in March 1, 2006.) This area is projected to experience flood damage from Tsunami up to 10 meters high.



Figure 3. Flood damage map at Nishi-machi area

In Regional self-defense organization of Nishi-machi area, to understand what citizens have inability, inadequacy, ignorance, we surveyed the citizens by questionnaire. These answers resulted in approximately 100 measures by extracted and converted.

Table 1. Answer from questionnaire

<p>Is there enough emergency food and goods?          Who will close the flood gate?          Numbers of times of evacuation drill?          How long does it takes for distress reports to be sent?</p>
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### Measure Matrix

Approximately 100 measures in the needs classification to achieve prevention disaster system.

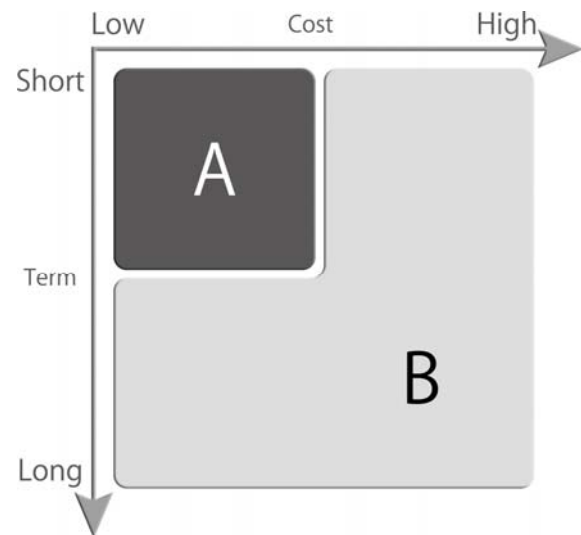


Figure 4. Measure Matrix

A: the area in figure 4, measures of this area were low cost and easily implemented. In fact, these measures were planned, checked or implemented. B: area of figure 4, measures of this area were required for accountability of time or cost. Therefore, these measures needed additional priority setting and execution. Measures for Nishi-machi area were categorized as in figure 5.

### Categorize to Evaluation Index

As can be seen in figure 5,  areas were low cost and needed short or middle term measures, so these were checked, planned, or implemented immediately.

On the other hand,  areas required substantial time and could not be implemented immediately. In addition, under the budget constraint conditions, it was important to meet accountability requirements with high priority. Consequently, these measures need to be divided according to priority. These measures were divided in 3 groups, “Minimize initial damage”, ”Minimize post-earthquake damage” and “Accelerate reestablishment”. In addition, there was a need to consider effect, cost, means of decreasing risk after 1 year and how to minimize total risk after 5 years and 30 years.

Term	Cost		
	Low		High
Short	<p>Improvement of evacuation drill A Deliberation of evacuation method B Check safety and capacity of port of distress Check safety and capacity escape route for evacuees Comprehend: where the senior citizen are living</p>	<p>Deliberation of rescue method Implementation on lecture for rescue and aid Installation person responsible of disaster prevention equipments Provision and calculation of lifeline</p>	<p>Check time limit and acceleration purchase of fire extinguisher Alteration of place of buzzer Adding to holdings: equipment for refugee camps Fastening to walls furniture</p>
Middle	<p>Execution of various manuals C Study of Earthquake and tsunami D Preliminary discussion with fire company Comprehend: where the vulnerable people are living</p>	<p>Comprehend: family member's location Check water pipeline</p>	<p>Preliminary discussion with voluntary body Check well water quality for emergency Alteration, deliberation of display of evacuation routes Implementation of evaluation of seismic capacity Check bridge condition</p>
Long	<p>Daily check of escape route for evacuees and port of distress</p>		<p>Expansion, alteration, installation of evacuation sites Expansion, alteration of escape routes Implementation of anti-seismic reinforcement</p>

Improvement of evacuation drill A	Deliberation of evacuation method B	Execution of various manuals C	Study of Earthquake and tsunami D
<p>Not set destination Deliberatio of variation of evacuation drill Evacuation drill for tsunami Evacuation drill without derivation Deliberatio of the number of evacuation drill Compellation for participant Installation of animation</p>	<p>Derivation method for children Installation of indirect route Decide: role assignment each other Installation of evacuation road</p>	<p>For fire company For teachers (for school) More intimate manual for prevention disaster For tunnel collapse For housewife or husbandband Contact address in emergencies Preunderstanding where is countermeasures headquarters</p>	<p>Resolve a gap of consciousness Understanding of centrality of evacuation drill Have a new understanding about earthquake Understanding map for evacuation Understanding port of distress each family Understanding time to evacuation Understanding each other (neighbors) Manifestation of government support</p>

Figure 5. Measure Matrix for Nishi-machi area

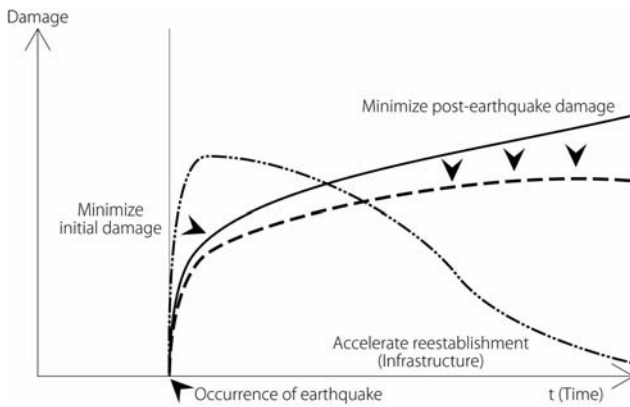


Figure 6. Evaluation Axis of damage and time

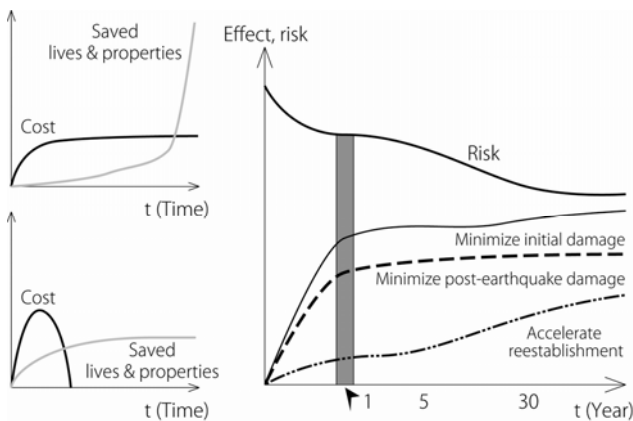


Figure 7. Effect and risk overtime

### Priority After Categorization

The most important thing in disaster prevention is human life. In fact “Minimize initial damage” is the first priority, because initial damage, for example, Tsunami and quake, have the most impact on human life. Include this concept, the second priority is “Minimize after earthquake damage” and the third is “Accelerate reestablishment”. The most important other measures are “measures to minimize damage after 1 year”. These measures are listed in table 3.

Table 2. Choice in 1 year

- 1st priority: save life,
- 2nd priority: reduce damage
- Minimize risk in the immediate future
- Squeeze to achievable measures
- Minimize investment

After that, take a choice of after 5 years and 30 years.

Table 3. Choice in 5 years, 30 years

- Inability in short-term
- Consideration of accelerate infrastructures
- Investment for long-term

From these priorities, we can decide the best measures for citizens needs. After we decide “A” area, there is a need to decide measure priorities for “B” area. This area has 2 elements; high cost and long term to finish. Figure 8 is the 2<sup>nd</sup> measure matrix including these 2 elements. This matrix was rearranged from white color area of figure 5. The gray areas in this matrix overlap measures for other effect.

Effect of Measures	Term		
	Short	Middle	Long
Minimize initial damage	Check time limit and acceleration purchase of fire extinguisher		Daily check of escape route for evacuees and port of distress
	Alteration of place of buzzer	Alteration, deliberation of display of evacuation routes	Installation and proliferation of street lamps
	Fastening to walls furniture		Expansion, alteration, installation of evacuation sites
			Expansion, alteration of escape routes
Minimize post-earthquake damage	Create a stockpile of medical products		Implementation of anti-seismic reinforcement
	Adding to holdings: equipment for refugee camps	Preliminary discussion with voluntary body	Expansion, alteration, installation of evacuation sites
	Fastening to walls furniture	Implementation of evaluation of seismic capacity	
		Check bridge condition	
Accelerate reestablishment		Check well water quality for emergency	
	Purchase: power generators		Implementation of anti-seismic reinforcement
	Fastening to walls furniture		

Figure 8. 2nd Measure Matrix

Figure 9 is sagest priority on 2<sup>nd</sup> measure matrix.

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Effect of Measures	Term		
	Short	Middle	Long
Minimize initial damage	Check time limit and acceleration purchase of fire extinguisher		Daily check of escape route for evacuees and port of distress
	Alteration of place of buzzer	Alteration of collaboration of display of emergency routes	Installation and modification of street lamps
	1	3	5
Minimize post-earthquake damage	Create a stockpile of medical products		Implementation of anti-seismic reinforcement
	Equipment to hold disaster equipment for refugees	Pre-arranged discussion with voluntary body	Expansion, alteration, installation of evacuation sites
	2	4	6
		Implementation and taxation of earthquake load capacity	
	Check bridge condition		
Accelerate reestablishment	Purchase of generators		Implementation of anti-seismic reinforcement
	7	8	9
	Fastening of furniture		

Figure 9. Priority on the 2nd Measure Matrix

#### 4. CONCLUSION

These methods for tsunami and earthquake disaster prevention helped the citizens of Nishi-machi area. They got actual need measures and services that they could not get from the government. On the other hand, the government was got adequate accountability to answer questions such as “why these measures and priority”. In addition, the government could collect information from the citizens and invest with full understanding of the needs of the citizens.

In future research, we should work to enforce the implementation of the disaster prevention system, in fact readjust method of approach and measurement of effect. On another front, the previous disaster prevention map was found to be inadequate. We should improve this map by rechecking hazardous areas and inspecting buildings and houses .

#### REFERENCES

Website: The Headquarters for Earthquake Research