

Community Capacity Building through the Development of Community Based Hazard Mapping

Hiroyuki Watabe, Etsuko Tsunozaki, and Makoto Ikeda

Asian Disaster Reduction Center, 1-5-2 Wakinohama-Kaigan-dori, Cyuo-ku, Kobe, Hyogo, Japan

Tetsushi Kurita

Tokyo Electric Power Services, 3-3-3 Higashi Ueno, Taito-ku, Tokyo, Japan

Abstract

Recently various community capacity building activities were conducted to reduce natural disaster risk to the community. For many years, the development of “Community Based Hazard Mapping” (“CBHM”) is an effective tool for raising public awareness to the natural hazard as well as same type of map using methodology. After the development of CBHM through the town watching process, participants could identify the problems on disaster risk reduction in their community, share opinions from various viewpoints through the discussion, build the confidence within the local community through face to face discussions, and reach a reasonable social consensus. In this study, we introduced the feature and methodology of “CBHM”, and mentioned the two case study of “CBHM” implementation to the community in Sri Lanka and Japan.

Keywords: *Community, Hazard Map, Natural Disaster, Town Watching*

1. INTRODUCTION

Despite best endeavors, then number of people affected and economic losses caused by natural disasters have been increasing over recent decades. Lack of proper recognition of risks is one of the major factors aggravating this situation. Our society is vulnerable to disasters due to, among other things, “risk perception gaps”, i.e. a disparity between the actual risk and that recognized by people. Therefore, it is vital that se plug this gap in order to lessen the negative impact of disasters.

Many governments distribute hazard maps for the purpose of raising public awareness about risks. A “hazard map” provides graphic information on potential natural hazards (seismic intensity, flood inundation depth, landslide prone areas, etc.), and on evacuation matters. However, mere dissemination of hazard maps by governments to local residents is usually inadequate as a means of raising awareness of actual disaster reduction activities at the community level. Because of the risk perception gap, people tend to pay scant attention to hazard maps, or fail to properly appreciate the information conveyed on such maps. By and large, people do not effectively use the hazard maps as a guide to taking appropriate actions to minimize damage from disasters.

Recently, “Community Based Hazard Mapping”(CBHM) has been used in some countries as a tool for improving disaster preparedness. This approach focuses on the process of developing hazard maps, not just their distribution. The premise is that by working through the process, communities will gain enhanced awareness of risks, thereby bridging the risk perception gap. CBHM has three key objectives:

- 1) To involve local residents in developing the hazard map for their community
- 2) To reflect the options of local residents in policies made by their local government
- 3) To foster common understanding of risks among local residents, government officials and experts.

Fig. 1 shows the risk communication relation between stakeholders and role of each stakeholder to develop the CBHM.

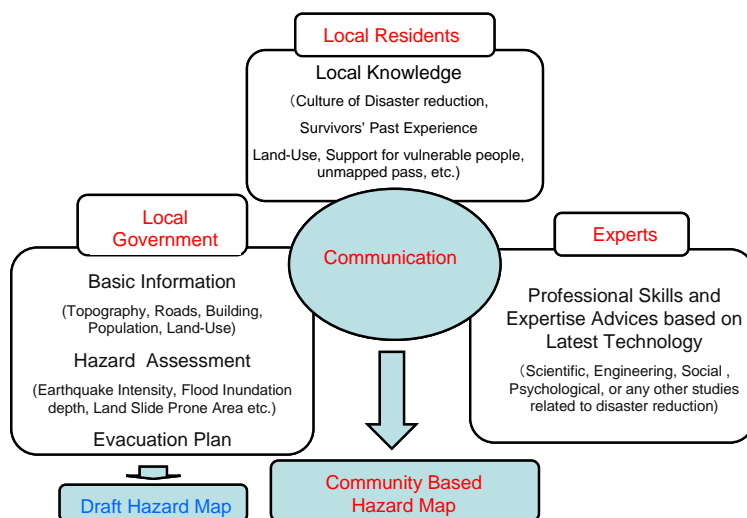


Fig. 1 Risk Communication Stakeholder



Fig. 2 An Example of Community Hazard Mapping

2. FEATURES

To apply this activity to the community, firstly we should be assumed that the knowledge of the participants from the community was very limited for disaster. They have well knowledge on their living community; however they do not have enough knowledge on the specific terms of natural disaster. The easily understandable methodology is important for residents to successfully implement the CBHM to the local community as well as low cost and no special equipment required. Followings are summarized the features of CBHM.

- Simple Procedure: CBHM development procedure is very easy to understand for community residents without special knowledge about natural disaster. Participant positively thinks about a disaster for the subject by oneself
- Nominal Cost: Nominal cost to implement CBHM development without special facility and equipment. Only personal and travel expense for facilitator and experts.
- Short Project: Typical project is 1-2 days long for a single district

(PT 3)

- Effective Early Warning Tool: Developed CBHM is a tool for effective early warning such as a safe evacuation route, hazardous area identification etc.

3. PROCEDURE OF CBHM

The procedure of CBHM is very easy to understand for the residents who do not have well disaster management knowledge. The facilitator is important role on the development of CBHM for the introduction of the lectures and town watching. The procedure is summarized as following 4 steps;

- 1) Learn about disasters: Participants are given lectures on disasters in the local community and an introduction to the Town-Watching concept.
- 2) Know our town/field survey: Each group walks around the streets in the local community, looking to identify both positive and negative features relating to disaster risk management activities. Group members make notes and take photographs.
- 3) Develop Map: Group members create a community based hazard map, manually integrating their observations and findings on a large-scale base map.
- 4) Conduct Group Discussions and Make Presentations: Each group discusses such issues as about, “What are the potential problems?”, “What are the possible countermeasure?”, and, “Who should be responsible for implementing particular countermeasures?”. Then, a representative of each group presents the results of his or her group’s discussions to an audience of all the other groups, so that all may share in each other’s findings and suggestions.

The required facilities and equipments also summarized Fig. 3. As you recognized from the Fig. 3, almost of all the required items on CBHM is very common items to get locally.

Item List for CBHM	
1.	Meeting Space/Tables/Chairs Group with 5-7 participants needs 2 tables with chairs (Maximum number of participants is 30.)
2.	White Board (for presentation)
3.	Large Size Papers: 1 Group needs 2 papers
4.	Color Pens: A set of 12 colors pen for each group
5.	Magnets or Scotch Tape (to attach map onto white board for presentation)
6.	Target Area for Town Watching
7.	Large Scale Map (Base Map) - If available, large scale with ~1/10000 - If no map for target area, necessary to make a map with hand drawing
8.	Instant Camera (Polaroid) with instant film for each group
9.	Stationary (Ruler, Notepad, Pen etc.)

Fig. 3 Required Items for CBHM

4. PROJECT CASE STUDIES

For 10 years after foundation of ADRC, we carried out several project on community risk awareness through the development of CBMH. First case study shows Galle Project in Sri Lanka done by us, and second case shows Japanese case using DIG (Disaster Imaginary Training similar to CBHM) by residents.

4.1 Target for Tsunami Affected Area - Galle Project

After the devastating disasters caused by the earthquake and tsunami on 26 Dec. 2004, at the initiative of UNESCO, various plans/activities are currently under discussion for improving disaster management system including development of tsunami early warning system in the countries surrounding the Indian Ocean. Rising public awareness for disaster reduction is the key to the successful implementation of such plans/activities.

From 1 to 14 March 2005, ADRC conducted a field survey on awareness of disaster risk in Galle districts, southern part of Sri Lanka, in order to identify current situation and characteristics of community’s capacity to respond to natural disasters. The survey was conducted for the purpose of proposing strategy for dissemination of disaster knowledge and raising public awareness for reducing negative impact of natural hazards [1].

In cooperation with the local NGO, the ADRC survey team conducted a questionnaire survey of general public, school children of grade 5 (aged 10) and government officials, each of which received 1321, 1112, 110 responses respectively. Through the survey, the current situation regarding the capabilities and awareness of residents and school children in disaster reduction was illustrated. It was also found out that a

(PT 3)

number of local government officers perceived the lack of coordination body among various organizations in the local government and the need for enhancing capabilities of officers who deal directly with local residents.

Based on above mentioned survey findings, the ADRC has been promoting CBHM to enhance the disaster reduction capacity of the local communities in Galle district in southern Sri Lanka. The devastation caused by the Indian Ocean Tsunami raised public awareness of disaster mitigation in Sri Lanka, but the lack of experience in this field has resulted in a lack of effective and efficient measures for maintaining and improving disaster prevention knowledge. Transferring knowledge and lessons learned from Japan's disaster experience is a very practical approach to enhancing disaster prevention capacity at the community level. The result of the questionnaire survey was summarized on Fig. 4.

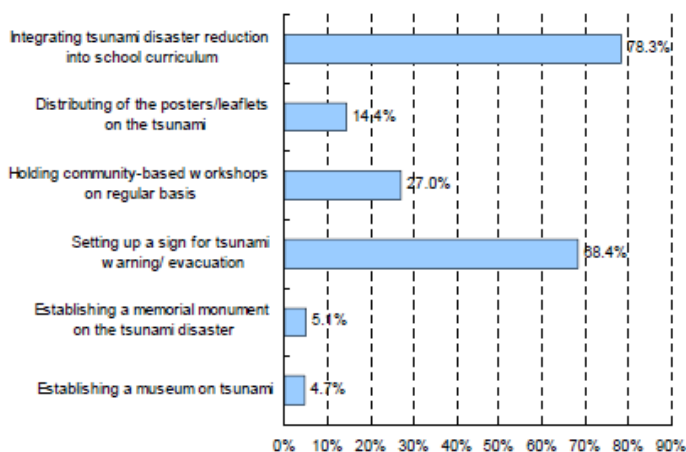


Fig. 4 Questionnaire Study



Fig. 5 Town Watching in Galle

Among the most effective means of transferring knowledge is a method introduced by the ADRC called “town watching” shown on Fig. 5. With the support of the Disaster Management Center in Sri Lanka, which was established in 2005, we are striving to ensure that comprehensive and sustainable disaster prevention activities become firmly established in Sri Lanka [2].

This project mainly consisted of three different types of workshops. The first was the “district workshop”, which was designed to provide opportunities for local government officials to learn the town watching methodology. It was held from 18 to 20 April 2006 and was attended by 100 participants from local government offices in Galle district. The Second type, the “pilot community workshop”, was held from June 2006 to March 2007. The officials who attended the “district workshop” became trainers to those who attended the “community workshop”. Daily project management was conducted by three locally hired staff. ADRC researchers occasionally visited the sites during the project period to track progress and provide advice to meet the needs of the local staff.. This project was supported by a Japan NGO Grant Aid, and was completed on 30 March 2007. As many as 100 community workshops were held in 19 divisions of Galle district and were attended by 3,350 residents.

4.2 Voluntary Disaster Reduction Activities of Omisaki District [3]

Omisaki District of Kushimoto Town is located at the east side of the root area of Cape-Shionomisaki located at the southernmost part of the mainland Japan shown on Figure 6. Most of the district was created by land reclamation in 1968 having population of about 690 people and households of about 330. The entire east side of the district faces the sea and the most part of the land is 3m or less above sea-level, and the district is one of the areas in Kushimoto Town where tsunami damage is most concerned.

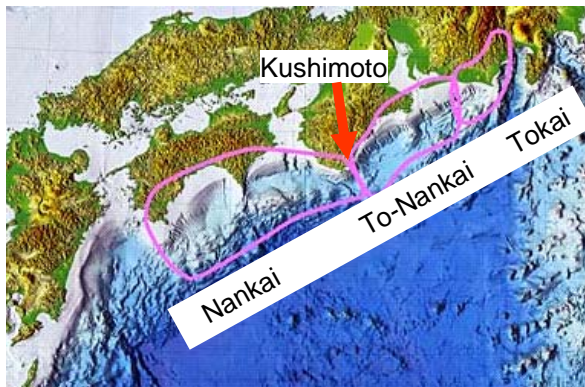


Fig. 6 Tokai/Tonankai/Nankai Seismic Zone

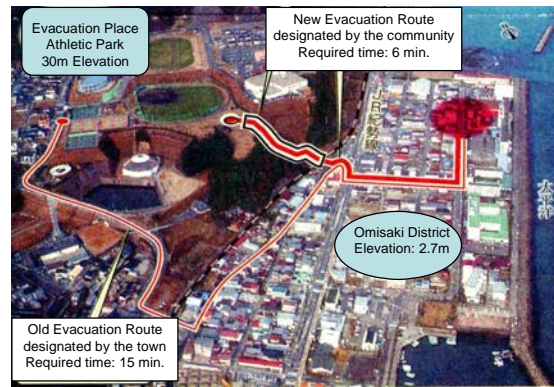


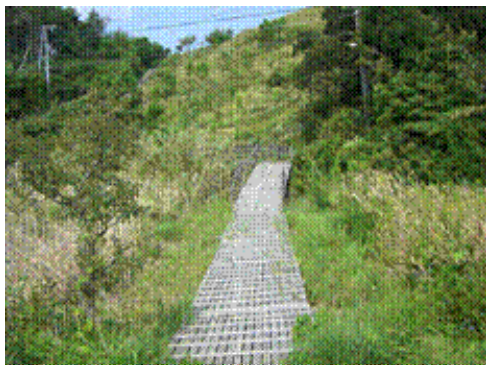
Fig. 7 Old / New Evacuation Route

A lecture presentation by the town mayor of Okushiri Town which had catastrophic tsunami damage in 1993 Hokkaido-Nansei-Oki Earthquake was held in 1994. Residents of Omisaki district who participated in the lecture felt uneasy after hearing the lecture concerning damages of Okushiri Town which is topographically similar to Omisaki. In addition, they heard “Damage came off with a small level since many evacuation routes had been provided.” It took about 15 minutes for taking shelter if they use the evacuation route to the upland so far designated by the town, and they were driven by necessity to build a new evacuation route that enables evacuation in much shorter time shown on Fig. 7. They continued to request the town to construct the evacuation route, and in 1999, they established the Executive Committee for Evacuation Route Construction and made further continued request. However, a JR railway existed on the shortest-distance route connecting the district and the upland, which became a large bottleneck for construction of the evacuation route. The town accepted the request and had discussions with JR many times, but things would hardly advance toward construction. In addition, in 2000, many residents participated in the “Training for Developing Leaders of Voluntary Disaster Reduction Organization” organized by Wakayama Prefecture and they had an opportunity to confirm necessity of evacuation route again by performing Disaster Imagination Game (DIG)[4] similar procedure to CBHM.

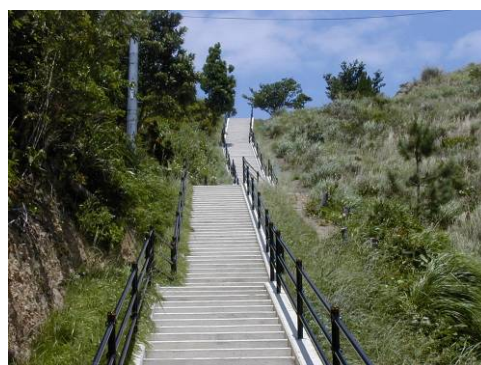


Fig. 8 CBHM Process (Hazard Mapping/Group Discussion/Presentation)

Under such circumstances, residents volunteered to construct a bridge over the marshland spending two years. The town mayor, being affected by passions of residents after making inspection of the bridge, decided to construct the footsteps over the slope and route beyond the bridge at the cost of the town. Thus, respective zones constructed by residents and the town were integrated to complete the new evacuation route. This is a good example showing that improvement in disaster reduction capability of the district through mutual understanding and cooperation between residents and administration.



Old Evacuation Route



New Evacuation Route

Fig. 9 Evacuation Route Condition

In July 1993, Hokkaido-Nansei-Oki Earthquake occurred, and tsunami attacked Okushiri Island and various areas of the Oshima Peninsula causing catastrophic damages. Since Kushimoto Town has the land form similar to the Island, many residents thought as if the disaster was their own, and, in December next year, the Kushimoto Town Junior Chamber held a lecture for reporting the disaster inviting the Okushiri Town Mayor.

Being triggered by this lecture, residents acknowledged that they had no route to the upland allowing them to take shelter within a short period of time, despite that most parts of their habitation area are 3m below the sea level and could be damaged directly by tsunami and they also had strong sense of danger. As a result, due to opinion raising and energy of the residents, it was decided to construct an evacuation route.

5. CONCLUSION

In this study, we explained the “CBHM” as a useful tool to enhance the public awareness to the natural hazard risk. Since the feature of CBHM is very simple, low cost, understandable and acceptable for the residents who do not have special disaster knowledge. Through the development of CBHM, the local residents join to develop the hazard map for their community by themselves, to reflect the options of local residents in policies made by their local government, and to foster common understanding of risks among local residents, government officials and experts.

References

- [1] Asian Disaster Reduction Center, ADRC Highlights, 1st May 2005, Vol.115
- [2] Asian Disaster Reduction Center, ADRC Highlights, 16th May 2007, Vol.162
- [3] Asian Disaster Reduction Center, Total Disaster Risk Management “Good Practices” 2007 Supplement
- [4] DIG “Disaster Imagination Game” Dig Website <http://www.e-dig.net/030501.html>