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A Study of Workshops That Develop Viable Solutions for Flood Risk Reduction through the Sharing of Concerns

-A case study of the Muraida Community, Maibara City, Shiga Prefecture-

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Synopsis

This study analyzes the process of residents sharing concerns about the flood prone area of the Muraida community in Maibara City, Shiga prefecture. From 2010 to 2012, the Muraida community conducted eight workshops to address the concerns of residents who are facing flood risk. Prior to the workshops, which included community members and local government officials, these concerns had not been shared. This paper critically examines the concerns of the residents and government officials, as revealed in the workshops, and discusses the role that the sharing of concerns plays in supporting the planning and managing of flood reduction.

Keywords: workshops, concern, DIG, flood risk reduction

1. Introduction

In Shiga prefecture, the local government held workshops addressing flood reduction in flood prone areas. From 2010 to 2012, the Muraida community in Maibara City conducted eight workshops, at which stakeholders expressed many of their concerns. The information that stakeholders shared prompted authorities to take quick action in reducing the city's vulnerability to floods.

This paper describes the workshops that were conducted in the Muraida community, who occupy a flood prone area in Shiga Prefecture, and then discusses the results of the workshops. The paper critically examines the concerns of the residents and government officials, as revealed in the workshops, and then discusses the role that the sharing of concerns plays in supporting the planning and managing of flood reduction. Yamori (2011) points out that the implementation science of Disaster Prevention and Reduction Knowledge and Technology is a process to (re-)co-construct knowledge networks in which multiple locally and/or temporarily "viable solutions" co-exist and are mutually interlinked, rather than a process to universally identify "correct solutions" exclusively by scientists. Sanoff (1994) points out that participation means different things to different people and different things to the same people, depending on the issue, its timing, and the political setting in which it takes place. Participation can be addressed effectively if the task is conceptualized in terms of what is to be accomplished when the need to involve citizens is acknowledged.

2. Communication model

According to Pearce (1994), communication is classified according to two types. First is the function of conveying meaning as being one-way,

such as messages and information. Second is the function of constituting/reconstituting social realities through interaction. Pearce defines the former as the transmission model and the latter as the social constructionist model of communication. The workshops provided a "field" for discussion between facilitators and organizers (the authors and the staff from Shiga prefecture) and the residents of Muraida. Using a discussion, debate, negotiation format to present ideas on both sides of the issues, the participants and the authors freely exchanged their concerns about flood disaster preparedness and possible mitigation plans; this format would be considered the social constructionist model of communication. In other words, the workshops did not simply transmit government information about flood risk reduction (top down from disaster experts to the general public) but instead enabled residents and government officials to interact (searching for viable solutions together).

Table 1 Two types of communication models (Refer to Pearce, 1994)

Communication model type	Transmission model	Social constructionist model
Function	One way A→B	Interaction A⇔B
Example	Messages, Information	Discussion, Debate Negotiation, etc.
Feature	Fixed meaning	Multiple layers of meaning

3. Study Area – The Muraida Community

3.1 Brief introduction of Muraida

The Muraida community (hereafter referred to as "Muraida") is located in Maibara City, Shiga prefecture. The population consists of 385 people (111 households, as of December 1, 2011). Muraida is divided into two areas: Kami and Simo. The Ryugahana Meeting Hall is considered the community center. Kami and Simo are made up of eight groups, which are named Kami-Higashi, Kami-Nishi, Kami-Minami, Kami-Kita, Simo-Naka, Simo-Nishi, Simo-Minami, and Simo-Kita. The Kami area is located at a higher elevation than the Simo area.

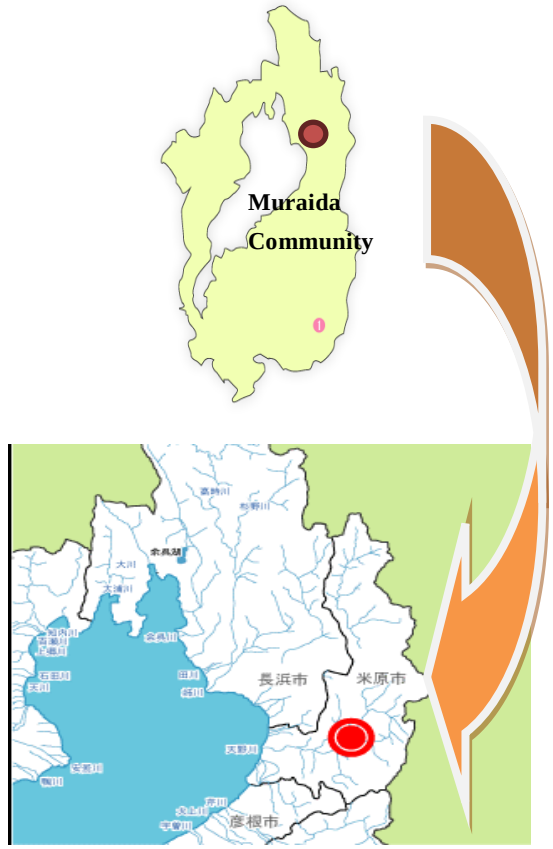

Photo 1 Location of Muraida in Shiga Prefecture

3.2 What flood damage can be expected in Muraida?

Yoko Mountain lies to the west and the Ane River runs along the north side of Muraida. A riverbank located where the Ane River meets Yoko Mountain was destroyed by Typhoon Isewan in 1959. The typhoon, also known as "Vera," hit central Japan and caused record damage to the region, which suffered severe damage as a result of high tides and floods; more than 5,000 people died. Muraida slopes toward the Ane River; there is a 6 m difference between the maximum and minimum height in Muraida. In the Muraida lowlands, serious flood damage is expected if a bank of Ane River destroys.

In addition, the De River runs through Muraida; it flows into the Ane River at the north end of Muraida. Usually, the De River is used an irrigation

channel; however, if heavy rains fall, the amount of inflow from the De River is greater than the amount of drainage out of the Ane River. Then, the water may start to overflow, which may cause inundation. Muraida residents are anxious about the water levels of the Ane and De rivers during times of flooding.

4. Outline of the workshops in Muraida

From 2010 to 2012, Muraida conducted eight workshops, which targeted the entire area of Muraida, with survival of a flood being the first priority. Nearly all the members of the resident associations attended each workshop. Other residents of Muraida attended the sixth workshop in order to participate in the Disaster Imagination Game (DIG).

Photo 2 Workshop image

Photo 3 DIG image

5. Drawing concerns using workshops

5.1 The history of flood damage based on an oral survey

Floods have occurred in Muraida in the past. On October 25, 2010, the authors and facilitators, along with organizers from the Shiga prefecture government, conducted an oral survey concerning the history of flood disasters. The survey participants had extensive experience with floods; they recounted their experiences during Typhoon Isewan. The authors learned about flood prone areas. The results of the oral survey are summarized in Table 2.

Table 2 Flood damage history in Muraida
Since 1926

Date	Situation of damage
August 1959	Typhoon No. 7 resulted in a great deal of flooding; the Simo area in Muraida was inundated with water.
September 1959	-A bank located at the confluence of the Ane and De rivers was destroyed by Typhoon Isewan. Rice fields and other crops were washed away by the flood. -The Ichido Bridge was damaged and inundated with water.

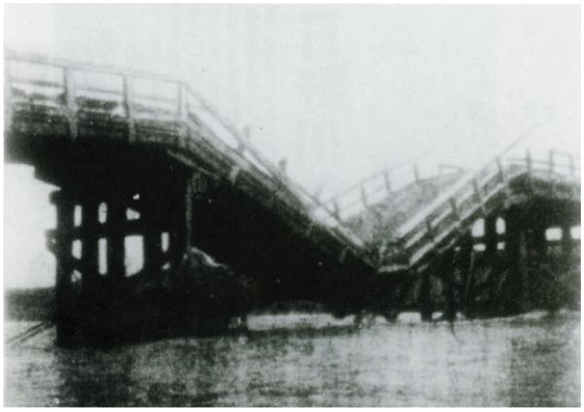

Photo 4 The Ichido Bridge was damaged by Typhoon Isewan (source: Shiga Prefecture homepage)

The first priority of the workshops was the survival of a flood; therefore, the most important question to consider was “How will residents

evacuate to safety?" Regarding this question, we must share concerns related to evacuation safety. There are three main concerns of flood risk: the river, the evacuation centers, and the routes.

5.2 Concerns regarding the river

The Ane River is a typical large river in Shiga prefecture that flows north of Muraida to Lake Biwa. If the river is at flood stage, significant damage can be expected; as a result, Muraida residents are quite concerned about the water level of the Ane River. The De River also runs through Muraida and flows into the Ane River. If there is a lot of rain in Muraida, the water level of the De River rises quickly and inundates Muraida. As a result, residents are quite concerned about the water level of the De River, too. Hence, Muraida residents agreed to a proposal to place Marugoto-Machigoto Hazard maps (a warning sign located at an expected flood site) and the simple graduated staff gauge. The details, such as locations, design, and contents, were discussed at the workshops.

Photo 5 The simple graduated staff gauge at the Ane River

5.3 Concerns regarding the evacuation centers and routes

Although evacuation centers have been chosen, they are not suitable for the Muraida situation. For example, the Ohara Elementary School, which was chosen by Maibara City, is far from Muraida and Muraida Ground, and it is located at a higher elevation. It was chosen by the Muraida resident associations; however, it has nothing to protect it from the wind and rain. The Ryugahana Meeting Hall is a good evacuation center but Kami area residents are safer on the second floor of their home at the beginning of a flood. Additionally, an evacuation route has not been chosen.

Photo 6 Marugoto-Machigoto Hazard map (one of eight Marugoto-Machigoto Hazard maps)

Table 3 The change of flood risk concerns according to the workshop process (from the 2nd to the 5th)

Concern	2nd (10 Dec. 2010)	3rd (3 Mar. 2010)	4th (26 July 2011)	5th (7 Oct. 2011)
De River	Possibility of blockage of the lower part caused by a landslide	Since 1959, structural measures have not been conducted. →The budget does not allow for it. (Local government)	Awareness of Typhoon No. 6 (occurred 19-20 July in Muraida) a. Possibility of blockage of the lower part caused by a landslide b. Superannuated sluice gate at the mouth of the De River c. Water spurt of pipe across national road	
Ane River	The Ichido Bridge damage		Awareness of Typhoon No. 6. Rising water level because of fallen trees in the river	
Evacuation center		a. Ryugahana Meeting Hall: -Located at a higher elevation - Can protect against rain and wind - Not large enough to accommodate the evacuation of all residents b. Ohara Elementary School: -Far from Muraida		a. Muraida Ground: Not suitable as an evacuation center (nothing to protect from the wind and rain) b. Ryugahana Meeting Hall: For Kami area residents, who are safer on the second floor of their homes at the beginning of flood.
Evacuation route			Many irrigation ditches in Muraida are dangerous during a flood.	To choose familiar roads as evacuation routes (A chosen evacuation route is very far from the Ryugahana Meeting Hall)

From the 2nd to 5th workshop, we can notice an awareness and concern offlood risk. For an effective flood risk reduction plan, residents and government officials sharing information, such as the river situation, evacuation centers and routes, is essential. Residents possess knowledge and an understanding of community concerns that might be harder to grasp by outsiders or experts. Although experts possess general knowledge about the various kinds of disaster damage, in many cases, they may learn about more specific concerns (e.g., the range and limit of action due to unique community environments or the extent of the route of damage) through communication with residents (Choi et al., 2012). While the 2nd to 5th workshops were conducted to review existing circumstances, the subsequent workshops, including DIG, were conducted in order to determine viable solutions.

Photo 7 community-based hazard map that reflected the results from the workshops

Table 4 viable solutions to concerns according to the workshop process (from 6th to 8th)

	6th (DIG, 27 Nov. 2011)	7th (20 Dec. 2011)	8th (3 Feb. 2012)
De River	Choosing a suitable location for the simple graduated staff gauge	The sluice gate at the mouth of the De River from reformed coastland: The Ane River District rejected the request to remove the sluice gate.	Community leader presented a community-based hazard map that reflected the results from the workshops. It is recognized by the staff of local government.
Ane River	Local government let operator remove fallen trees from the river		
Evacuation Center	Residents nominated evacuation centers ・Ryugahana Meeting Hall ・Muraida Ground ・Ohara Elementary School ・Second floor at home (It may be that home is the best evacuation center for residents of the Kami area.) ・Kounji	Two places were proposed: Sohokuji for the Kami area and Ryugahana Meeting Hall for the Simo area. -Residents of the Simo area should go to Kounji when the water level is high on the route to the Ryugahana Meeting Hall. - Residents of Kami area should consider moving to the second floors of their homes	

	・High elevation points of road ・A mountain ・Sokuhouji is more suitable than the Ryugajana Meeting Hall for the Kami area. ・It may be that home is the best evacuation center for residents of the Kami area.	according to flood situation.	
Evacuation route	・Middle of the road ・Requiring more streetlights in the event of a nighttime evacuation ・Requiring the building of fences between a water way and a road ・A farm road ・Reflectors on the evacuation road	Residents should use a familiar road. If the road is flooded, residents should detour (perhaps using a farm road).	

6. Conclusions

In Muraida, the workshops helped residents and local officials effectively exchange ideas, knowledge, and opinions.

This paper critically examined the concerns of the residents and government officials, as revealed in the workshop process, and discussed the role that the sharing of concerns plays in supporting the planning and managing of flood reduction.

Finally, as far as the purpose of this paper is concerned, it was not necessary to discuss transmission communication in detail. Of course, that may be important; however, the process of sense making, such as that observed in these workshops, is more important for flood reduction planning.

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ワークショップを用いたコンサーンの共有による洪水被害の軽減のための成解生成に関する研究
―滋賀県米原市村居田地区を対象として―

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要　旨

滋賀県の洪水予想地域である米原市村居田地区は 2010 年から 2012 年まで 8 回のワークショップを行われた。災害リスク管理などの公共リスク管理の場面においては，コミュニティ,若しくは,その構成員のみが行使しうる対策が,リスク管理手段として重要な役割を果たす。コンサーンには専門家など地域外の他者が把握しうるものとそうでないものが含まれる。災害が引き起こす様々な被害のモードなどはむしろ地域外の専門家が指摘しうるものであるが，地域固有の条件に依存して定まる環境や対応の範囲，被害の拡大経路等に関連するコンサーンは多くの場合,地域住民との対話を経て明らかになることが多い。本論文では村居田地区のワークショップで議論されたコンサーンを共有する成解生成の過程に着目した。

キーワード:ワークショップ，コンサーン，水害図上訓練，洪水リスク軽減