

A Collaborative Action Development Approach to Improving Community Disaster Reduction Using the Yonmenkaigi System

Jong-il NA*
Norio OKADA**
Liping FANG***

*Graduate School of Urban Management Engineering, Kyoto University, Japan

**Disaster Prevention Research Institute, Kyoto University, Japan

***Department of Mechanical and Industrial Engineering, Ryerson University, Toronto, Canada

(Received March 25, 2009 accepted June 15, 2009)

ABSTRACT

This paper addresses the need for the use of participatory workshop methods to improve everyday disaster response capacity locally within communities. Most current workshop methods mainly address disaster risk awareness and focus on personal post-disaster actions, despite an increasing need to create an implementable action plan by moving beyond enhancing risk awareness. This type of implementable action plan is required in order to enable participants from a local community to collaborate together. A method called the Yonmenkaigi system, originally developed in a local community in Japan, is presented for this purpose. The Yonmenkaigi system is designed to consist of the following steps: carrying out a SWOT analysis, completing the Yonmenkaigi Chart, debating between groups, and presenting a group action plan. As demonstrated in a case study carried out in the City of Kyoto, this method shows its relevance and effectiveness in developing collaborative action plans for preparedness and mitigation in disaster reduction activities in a community.

Keyword: Action plan, disaster prevention, participatory workshop method,
the Yonmenkaigi system

1. INTRODUCTION

Japan has gained valuable lessons from the 1995 Great Hanshin Earthquake disaster and other large disasters that subsequently occurred one after another across the whole country and in other parts of the globe. Accordingly, Japan's disaster planning and management paradigm was forced to shift. Table 1 compares the conventional 20th-century approach with the new directions that the 21st-century approach is required to take. Notably, one of the challenges is to make a greater shift from a top-down to a bottom-up

approach. A significant lesson about low-frequency/high-impact disasters was learned from the Great Hanshin Earthquake disaster (Okada, 2004). This type of disaster warns us that local residents, victimized by such a huge disaster, may not be able to immediately depend on local government to rapidly set up local headquarters to direct emergency and crisis management, and to engage in relief and rescue activities as quickly as possible. This results in more stress and emphasis being placed on the roles of local communities, or "community self-reliance" (*kyojo* in Japanese), as well as on self-reliance, or "household/individual

Table 1. Conventional disaster planning compared to
21st-century integrated disaster planning and management*

<i>Conventional Disaster Planning</i>	<i>21st-century Integrated Disaster Planning and Management</i>
Reactive	More proactive
Emergency and crisis management	A more risk mitigation and preparedness approach
Manual-based countermeasure approach	A more anticipatory/precautionary approach
Predetermined planning (no-surprise)	A more comprehensive policy-bundle approach
Sectoral countermeasure approach	A more adaptive management approach
Top-down approach	A more bottom-up approach

*Based on Okada (2006)

reliance” (*jijo*) (Government of Japan, 2008).

As a result, governments are now promoting the enhancement of coping capacity and preparedness in local communities instead of trying to guarantee the management of disasters mainly by the governments themselves as responsible administrative bodies that inevitably tend to emphasize the need for top-down command control. For these reasons, local residents who live in disaster-prone areas are now encouraged to develop a disaster-resilient community as soon as possible.

The new challenge for local communities is how to increase awareness of disaster risks, and how to develop an executable action plan with appropriate external support provided from the local, municipal, and/or regional governments as well as from the results of ongoing research endeavors by academia, like the authors’ such efforts. Equally important is the scientific leverage required to support efforts to enhance a community’s self-reliance capacity. The workshop method presented here, developed for participatory community-based disaster reduction, is considered useful. However, it is not yet completely clear whether such commonly used methods adequately serve the purpose and if so, how effective they are and how, specifically, they should be used. This paper emphasizes the point that community-based action plans can only become literally actionable, and therefore executable, if action plans drafted by local residents are collaboratively developed and matched together. If an action plan is collaboratively crafted by local residents, commitment to implement the plan by local residents is significantly improved.

Most participation-oriented workshops currently target rescue and relief activities in post-disaster situations. As currently observed, the general objective of

a participatory workshop for residents is to share risk awareness and to provide a means of communication for participants. However, such workshops have the limitation that risk awareness does not lead to action plans in disaster prevention activities. Risk awareness should be changed to implementation actions to improve the capacity of a local community in disaster situations. Workshop methods need to achieve more effective action plans at the community level that include collaborative decision-making techniques between residents and local communities for proactive disaster management. This paper suggests that the residents’ participatory workshop method be used to develop action plans for disaster prevention activities created by the participants themselves.

In the following sections, we first briefly discuss some of the commonly used workshop methods, which have been applied in community disaster reduction planning and management. It is important to point out that workshop methods for collaborative action development are currently not available. This is a missing area in the development and implementation of participatory workshop methods for disaster prevention and mitigation. Then, we specifically present the Yonmenkaigi system, which has been designed and used for collaborative action development in community-citizen vitalization initiatives called *machizukuri* in a mountainous municipality of Chizu Town, Tottori, Japan (Okada and Teratani, 2005, Tatano and Kanda, 2008).

The paper then introduces the authors’ ongoing efforts to apply this workshop method to community disaster reduction action planning (Na et al., 2008a,b). The method has two main objectives. The first is to obtain knowledge that is linked to action from each participant. The second is to develop a collaborative action plan at the local community level so that

participants are able to achieve more than enhanced risk awareness and to develop communication among themselves. Collaborative activities between residents and their community are an important and necessary element in improving disaster prevention activities in local communities. Specifically, we focus on a particular *jishubosai-soshiki* (self-governed community association for disaster reduction) in the City of Kyoto as the target community group for the implementation of the Yonmenkaigi system.

2. OTHER WORKSHOP METHODS

A number of workshop methods mainly focusing on post-disaster activities have been proposed in Japan. Table 2 shows the main features of four workshop methods for participatory community-based disaster reduction in Japan. These workshop methods are useful in providing a means of communication for participants with respect to disaster prevention and enhancing participants' disaster risk awareness. These workshop methods are also valuable for stimulating participants' interests in disaster reduction activities. The general characteristics of these methods are as follows:

- 1) All of the workshop methods currently focus mainly on the post-disaster situation, rather than on the pre-disaster phase or on mitigation and preventive measures.

- 2) All of the workshops are very dependent on facilitators not only for their facilitation skills, but also for setting up workshop themes and scenarios. For example, a facilitator determines the potential disaster risks to the community as well as the roles and responsibilities of the community members. As a result, most of the workshop methods are unable to accurately reflect the views of the local communities regarding their requirements and needs as well as regarding their capacities.
- 3) Little attention is paid to the local context. Instead, often, a hypothetical situation is considered in a workshop. As a result, the workshop is unable to produce a realistic action plan based on the local context.
- 4) All of the workshops are of short duration and normally take place only once. Therefore, it is not possible to check whether the decisions and plans derived from the workshops have been implemented.
- 5) The workshop methods focus mainly on risk awareness and risk communication from an individual's viewpoint, rather than on risk mitigation and preparedness actions from the local community's viewpoint.

Table 2. Characteristics of other workshop methods*

	<i>Visioning Workshop</i>	<i>DIG</i>	<i>CROSSROAD</i>	<i>Scenario Workshop</i>
<i>Objective</i>	Collecting visions and hopes of residents	Identifying potential hazards and actions following a disaster	Simulating community decision-making scenarios following a disaster	Simulating evacuation actions by stakeholders following a disaster
<i>Who Decides the Theme and Scenario</i>	Set by a facilitator	Set by a facilitator	Set by a facilitator	Set by a facilitator
<i>Participants</i>	Residents	Residents	Residents	Specialists, Residents
<i>Facilitator</i>	Specialists	Specialists	Specialists	Specialists
<i>Typical Size</i>	One team, one group	Multiple teams, small groups (10 people)	Multiple teams, small groups (5 people)	One team, one group (10 people)
<i>Outcomes</i>	Communication about future concerns and visions	Risk communication: Raising awareness	Risk communication: Virtual experience	Risk communication among stakeholders

*Based on Komura and Hirano (1997), Komura (2004), Ichiko et al. (2005), Kikkawa and Yamori (2006), Atsumi and Seki (2008), Seki and Atsumi (2008), and Tsubokawa et al. (2008).

3. THE YONMENKAIGI SYSTEM

3.1 THE CAPD CYCLE IN THE YONMENKAIGI SYSTEM

The Yonmenkaigi approach is based on the check-action-plan-do (CAPD) cycle (Okada and Teratani, 2005, Matsuda and Okada, 2006). The process of a Yonmenkaigi workshop is a reflection of the CAPD management cycle. The Yonmenkaigi workshop process, which will be discussed below, includes four steps as shown in Fig. 1: carrying out a SWOT analysis, completing the Yonmenkaigi Chart, debating, and presenting an action plan chart.

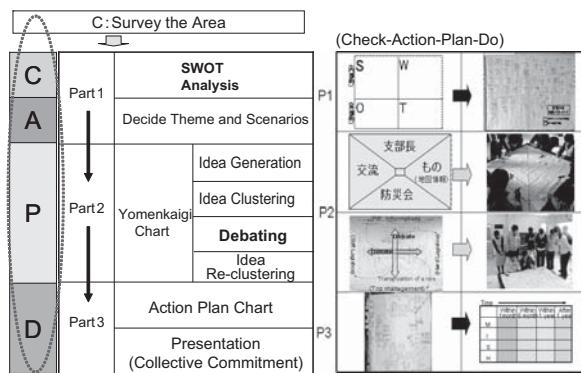


Fig. 1. Process of the Yonmenkaigi system

The first step in the process is to carry out a SWOT analysis (Hill and Westbrook, 1997). SWOT analysis involves identification of the strengths and weaknesses of a local community as well as the opportunities and threats to the community. Analysis and diagnosis of strengths and weaknesses correspond to check (C) from the CAPD cycle. Participants then determine the theme/goal, taking into account the conditions of the community through shared recognition of risks and issues identified in the SWOT analysis. This aspect corresponds to action (A). Once the check and action processes are completed, the participants move to the plan (P) aspect in the workshop by constructing the Yonmenkaigi Chart in which participants set out the vision and action plans. Finally, the workshop includes debating and creation of an action plan chart. During this process, participants debate with each other to improve the action plan and to ensure the implementability of action plan components as well as ultimately draw up a final action plan chart for the future. These two processes correspond to the do phase of the CAPD cycle. In this way, the Yonmenkaigi system follows the process of the CAPD

management cycle.

3.2 OVERVIEW OF THE YONMENKAIGI SYSTEM

The goal of the Yonmenkaigi system is to develop an action plan for a community through a workshop, particularly in a disaster risk context. The aim is to make an action plan to reduce disaster risks. In order to make such an action plan, the method focuses on four broad aspects that are considered required issues for future actions. These four aspects (roles) are management, publication relations (PR) & information, soft logistics, and hard logistics. A group of individuals is assigned to each of the aspects. Each of these role-sharing elements is combined with a time dimension. Figure 2 shows the changing perspectives of the Yonmenkaigi system, which includes both individual and community views through the process of group discussion.

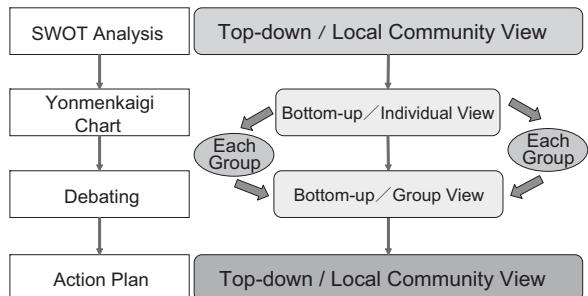


Fig. 2. Integration of individual and local community views through the Yonmenkaigi system

Participants of the Yonmenkaigi system address a problem based on information and knowledge obtained from the community diagnosis and then make decisions. Afterwards, the participants decide for themselves on the theme/goal of the action plan. Finally, they develop an action plan to achieve their goal as well as a plan to implement the action plan.

3.3 PROCESS OF THE YOMENKAIGI SYSTEM

3.3.1 SWOT Analysis

A Yonmenkaigi workshop starts with a SWOT analysis (Hill and Westbrook, 1997). During this phase, a pilot survey of the area is carried out by the participants. Town watching is one of the methods used for conducting this type of pilot survey. Knowledge and information about the present situation of

the community is essential in order to identify its strengths and weaknesses and to develop an action plan for it. Town watching can help participants or members of the local community reevaluate the issues of the local area.

Once the survey is completed, participants get together and identify the strengths and weaknesses of the community through a SWOT analysis. SWOT analysis consists of four components of the community—strengths, weaknesses, opportunities, and threats—as shown in Fig. 3. S and W represent strengths and weaknesses, respectively. These are considered to be the internal factors controlled by the community residents themselves. O and T represent opportunities and threats, respectively. These are considered to be external factors including the natural environment as well as socioeconomic trends and patterns.

internal factors	
S	W
external factors	
O	T

Fig. 3. SWOT analysis in the Yonmenkaigi system

SWOT analysis helps participants to see the present and future risks to a community and therefore helps them to recognize future actions required to cope with such risks. Since each of the participants has a different socioeconomic background, each of them perceives different potential and existing risks to the community. Each of them has different innovative ideas to cope with such problems. SWOT analysis helps all the participants know each other's ideas and views. SWOT analysis provides the participants with an opportunity to share their ideas and views, which eventually leads to a holistic and detailed view of risks and future action plans. In a SWOT analysis, the participants express their views by using various colors of cards. Generally, four color cards are used in this process, corresponding to the four SWOT categories.

3.3.2 Identification of Themes and the Four Groups

Based on the SWOT analysis, the participants propose themes as goals as well as scenarios to

consider. The facilitator collects all of the proposed themes and scenarios and presents them on large sheets of paper (788 mm x 1091 mm), which extend for several pages. Then, the participants themselves decide the theme of the workshop and the scenarios to consider.

After selecting a theme, the participants are divided into four groups. As shown in Fig. 4, each group of individuals is assigned to the particular role-sharing activities in one of the four groups of role sharing—management, PR & information, soft logistics, and hard logistics—as mentioned in Section 3.2. Each individual is assigned to a particular role-sharing group not only according to his/her organizational responsibilities, vocational activities, and socioeconomic status, but also according to his/her talents, abilities, and interests. To achieve a particular theme/goal, actions on the four broad aspects of management, PR & information, soft logistics, and hard logistics are generally required. However, these aspects may be modified/redefined depending on specific circumstances of a workshop.

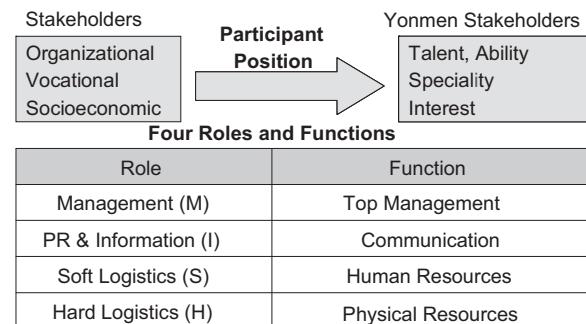


Fig. 4. Four stakeholder roles and functions in the Yonmenkaigi system

3.3.3 Yonmenkaigi Chart

Once role assignment is completed, the participants are asked to express their action components and views according to their assigned role by using color cards in a specially designed chart called the Yonmenkaigi Chart, as shown in Fig. 5. The action components for each of the aspects are divided or compartmentalized in a time frame. For example, the action components of each group can be scaled as within 3 months, within 6 months, within 1 year, and beyond 1 year. Participants discuss within their groups and plan the actions for the assigned aspect accordingly. The implementable collaborative action

plan is a coordinated combination of the action plans developed through these four aspects.

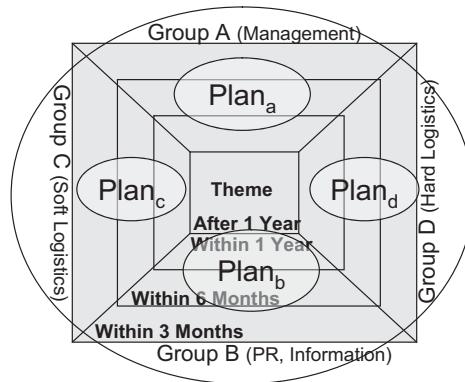


Fig. 5. Typical pattern of the Yonmenkaigi Chart

3.3.4 Debating

The next phase of the Yonmenkaigi system is debating. The Yonmenkaigi system offers two types of debating—general debating and inverse debating. General debating involves inter-group debating, whereas inverse debating involves exchanging the positions and roles of two groups facing each other across the Yonmenkaigi Chart. More specifically, if Group A challenges the ideas of Group B and the two groups debate with each other, then it is called a general debate. On the other hand, if Group A moves from its original position to the position of Group B and Group B moves to the position of Group A and both groups start to debate according to their new roles, such a debate is called inverse debating, as shown in Fig. 6.

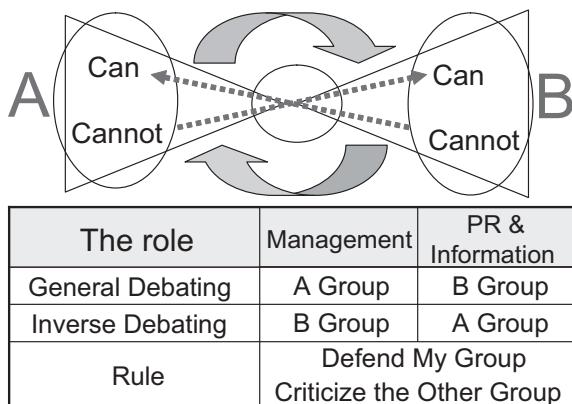


Fig. 6. Inverse debating in the Yonmenkaigi system

Debating provides an effective platform for combining different ideas or views and strategically processing those ideas and knowledge to create new

knowledge. Debating allows each group and each individual to express and defend their views and ideas and to criticize others. Through this process, communication is enriched between groups as well as between participants who observe and listen to each other's ideas and views. Inverse debating forces each group to defend what the opposite group intends to produce as its respective action components. It also requires each group to criticize the previously revised version of what the group has planned. Inverse debating is an important feature of the Yonmenkaigi system. Debating can also enhance the implementability of action components.

After completing all the debating processes, the groups separate and share action plan components as required. Participants work together and own the entire action plan to achieve their goal/theme in common. The entire process of general and inverse debating helps consolidate and upgrade the quality of actions to be implemented in the collaborative action plan.

3.3.5 Action Plan Chart

Participants now determine an implementable collaborative action plan after debating by using the Yonmenkaigi Chart. Action plan components are rearranged by a time frame and the roles of the four groups (management (M), PR & information (I), soft logistics (S), and hard logistics (H)), as shown in Fig. 7. In this phase, the participants decide and prioritize the action plans based on a time scale. Prioritization is conducted on a timeline basis depending on the time scale, for example, within 3 months, within 6 months, within 1 year, and beyond 1 year.

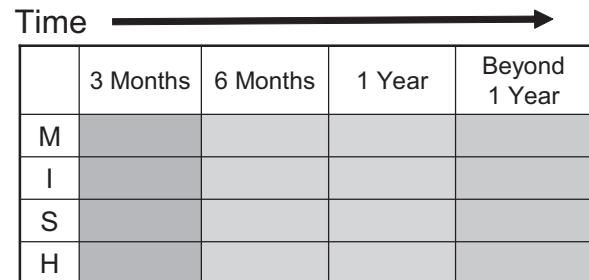


Fig. 7. Action plan chart in the Yonmenkaigi system

Based on the action plan chart, the participants are requested to make a presentation using the roles and timelines of their entire action plan to an audience

who has not been directly involved in making the plan.

3.4 COMPARISONS WITH OTHER METHODS

The basic characteristics of the Yonmenkaigi system are summarized in Table 3. The discussion in Sections 2, 3.1, 3.2, and 3.3 shows to what extent the Yonmenkaigi workshop method differs from other workshop methods. However, for better conceptualization of the uniqueness of the Yonmenkaigi method, the following points can be made:

- 1) Unlike other workshop methods, in a Yonmenkaigi workshop, the participants themselves, instead of the facilitator, decide the theme and scenarios and develop the action plan, on their own, in order to achieve the goal/theme.
- 2) Each action component of the action plan is systematically examined to ensure a continuing (sequential) relationship between the action components of the same group as well as between other groups in order to accomplish the action plans. Debating including general and inverse debating is introduced for this purpose in the Yonmenkaigi workshop method. Unlike other workshop methods, participants learn the collaborative decision-making process using debating.
- 3) The Yonmenkaigi workshop provides a platform for face-to-face communication for participants to become aware of the concerns of others, to discuss the status quo of their community, and to collaboratively develop implementable action plans. In this workshop method, the process of

making collaborative action plans is eventually systematically incorporated. Other workshop methods lack this type of system.

- 4) Unlike the Yonmenkaigi workshop method, other workshop methods focus more on the individual decision-making process and explore personal or individual capacities and resources to create individual actions, rather than focusing on community-based collaborative action planning. The Yonmenkaigi workshop method not only identifies and explores personal capacities and resources as well as individual ideas and views, it also provides a basis for working together by focusing on each other's views. This strengthens the basis of collective and collaborative action planning.
- 5) Unlike other methods, the Yonmenkaigi system focuses more on disaster mitigation and prevention rather than on post-disaster situations.
- 6) In the Yonmenkaigi workshop method, participants take the roles of both planner and executor as the subjects of the action plans.

Table 3. Basic characteristics of the Yonmenkaigi system

Application	Disaster mitigation and prevention
<i>Objective</i>	Collecting visions and hopes of residents for proactive disaster reduction planning
<i>Who Decides the Theme and Scenario</i>	The facilitator suggests guidelines and participants determine the theme and scenarios.
<i>Participants</i>	Self-governed community association for disaster reduction (as representatives of residents)
<i>Facilitator</i>	Specialists
<i>Typical Size</i>	One team (8 to 16 people), four groups (2 to 4 people each)
<i>Outcomes</i>	Development of an action plan for disaster reduction for the local community

3.5 COLLABORATIVE ACTION DEVELOPMENT DURING DEBATING

In the Yonmenkaigi workshop method, cards are an important component or tool for participants to express views and exchange their views and ideas, particularly during the debating phase. There are several basic rules for the movement of cards, and each of the card movements bears a particular meaning in placing and shifting during debating. Card movements reflect the multi-level knowledge development process of the debating practice. Some of the basic rules of card movements, as illustrated in Fig. 8, are:

- 1) Adding a new card: The addition of a new card indicates that a new action plan component has been identified and prepared in order to achieve the group mission.
- 2) Moving a card: Moving a card from one group to another indicates that the action plan component is more suitable or preferable for the shifted group than for the original group.
- 3) Deleting a card: Deleting a card indicates that such an action component is no longer required or desirable. In other words, it indicates that such an action component cannot be carried out.
- 4) Renewal of a card: This movement indicates that reinforcement of an action plan component is needed in order to reduce the weakness of the group.
- 5) Arrangement of cards: Cards are arranged and grouped by taking into consideration the time scale of the action plan component.
- 6) Collaboration of cards: This indicates that the groups concerned or overlapping groups will work together and collaborate on the same action plan component. Because each of the groups has its own limitations, some action plan components require collaboration across the groups to manage the action plan components.

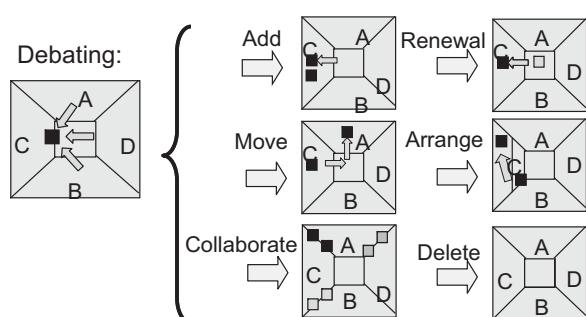


Fig. 8. Card movements during debating

4. SHUHACHI-BOSAIKAI: A CASE STUDY

4.1 SHUHACHI-BOSAIKAI

The Shuhachi Elementary School area (hereafter called the Shuhachi community) is located in Nakagyo Ward in the center of Kyoto City in Japan. It is an urban residential area consisting of traditional houses, apartments for single people or families, and factories. The community has 10,939 people as of 2005 over an area of 1.055 km², divided into 52 smaller community units (*chonai* or *chonai-kai*), or neighborhood associations, which is the smallest collective self-governing unit in Japan (Nitschke, 2003).

The Shuhachi community has a *jishubosaisosiki* (self-governed community association for disaster reduction) comprising a headquarters with 17 people (hereafter called the “Shuhachi-bosaikai”) and one or two representative members from every *chonai-kai* (about 80 people), as illustrated in Fig. 9. The *jishubosaisosiki* in the Shuhachi community is a self-organized group for disaster prevention. It performs self-motivated disaster prevention activities in the Shuhachi community. Members of the *chonai-kai* are changed every one or two years according to *chonai-kai* rules. The Shuhachi-bosaikai has a partnership with the local fire station in the Shuhachi community. These organizations jointly conduct and manage general disaster prevention fire drills and night watch activities in the locality.



Fig. 9. The Shuhachi-bosaikai

4.2 THE SHUHACHI YONMENKAIGI WORKSHOP

A Yonmenkaigi system workshop was conducted in the Shuhachi community in order to create an implementable action plan for the “safety and security mapping of the community.” Eight individuals from the Shuhachi-bosaikai participated in the workshop. The workshop, which lasted three and a half hours,

S	<ul style="list-style-type: none"> • There is a local fire station. • The Shuhachi community has a large open area in the southern part that can serve as a temporary evacuation area. • The local community is active. • Activities of the Shuhachi-bosaikai • We have many schools as evacuation sites. 	W	<ul style="list-style-type: none"> • Narrow roads • Elderly single residents (800 households) • The difference in awareness depends on the <i>chonai-kai</i>. • We do not have a hazard map.
O	<ul style="list-style-type: none"> • The Shuhachi community plans to establish a committee to inventory warehouses for storing supplies after a disaster • Awareness of disasters is growing among residents. 	T	<ul style="list-style-type: none"> • Increase in apartment buildings • Our community covers the largest area in Nakagyo Ward. • Long distance from the north to the south • Traffic jams are terrible in the tourist season.

Fig. 10. Part of the SWOT analysis in the Shuhachi Yonmenkaigi workshop

was held in the Shuhachi community on January 26, 2008. In order to conduct the workshop systematically, the facilitator (the first author) first introduced the rules and method of the workshop to the participants. To evaluate residents' level of understanding and awareness of the present situation of the local community, residents, including members of the Shuhachi-bosaikai, *chonai-kai*, and local fire station, were asked to complete a questionnaire from December 22, 2007, to January 8, 2008. Sixty-five people completed the questionnaire.

The results of the questionnaire helped the participants carry out a SWOT analysis of the Shuhachi community, as illustrated in Fig. 10. From the SWOT

analysis, participants learned that the Shuhachi community did not have a hazard map of their community or a local community housing map.

The participants decided that the theme/goal of the workshop was to make security and safety maps of the community and chose a one-year period as a realistic time frame to implement the plan.

Eight participants were divided into four groups of two participants each to play the roles of management, PR & information, soft logistics, and hard logistics. As shown in Fig. 4, the functions of the four groups are top management, communication, human resources, and physical resources for achieving the theme/goal of the workshop determined earlier. The

Table 4. Timeline of the Shuhachi Yonmenkaigi workshop

	Process	Time allocated	Time actually spent	Contents
1	Guidance	20 min	21 min (13:24 ~)	How to use the Yonmenkaigi system
2	Results of the questionnaire & SWOT analysis	15 min	20 min (13:45 ~)	Reviewing information
		45 min	90 min (14:05 ~)	Determining the theme/goal and assigning role-playing groups
3	Yonmenkaigi Chart	45 min	22 min (15:35 ~)	Generating idea cards Developing an action plan
4	Debating	40 min	40 min (15:57 ~)	Card movements in the Yonmenkaigi Chart
5	Presentation	20 min	13 min (16:37 ~ 16:50)	Reorganizing and presenting the collaborative action plan
6	Questionnaire	10 min	20 min (18:00 ~)	Surveying opinions of participants
	Total time	195 min	216 min (3 hours 36 minutes)	

timeline of the Shuhachi-bosaikai Yonmenkaigi workshop is shown in Table 4. The time frames for the action plan considered are within 3 months, within 6 months, within 1 year, and beyond 1 year.

During the process of generating ideas and developing a collaborative action plan through using the Yonmenkaigi Chart, some of the issues considered were as follows:

- 1) It was first determined that there is a need to make a hazard map in the Shuhachi community.
- 2) The Shuhachi-bosaikai should explain the importance of making a hazard map to the Shuhachi community and ask for the help of representative members of the *chonai-kai*.
- 3) The Shuhachi-bosaikai recognizes that it does not have enough resources to implement the production of a hazard map.
- 4) The Shuhachi-bosaikai should request the collaboration of other organizations in the Shuhachi community to carry out this project at the community level.
- 5) Through this scenario-making process, the Shuhachi-bosaikai recognizes the need for collaborative action in the Shuhachi community.

4.2.1 Debating

The participants created 78 action component cards in the Yonmenkaigi Chart before debating. After debating, the number of action components increased to 99 cards, as shown in Table 5. Notice that the cards for collaborative actions are counted in each of the collaborating groups. Therefore, these cards are counted more than once.

The following examples show changes to the action plan components proposed by the group playing the role of management (the Shuhachi-bosaikai) after debating, as illustrated in Figure 11.

- 1) Arrange—An action component card for thinking about the usefulness of the hazard map was arranged from within 1 year to within 3 months in the same group. The participants observed that the Shuhachi-bosaikai should discuss why it needs the hazard map in the Shuhachi community before actually producing it.
- 2) Add—An action component card for creating education flip boards concerning the need for a hazard map was added as a new action plan component. The participants noted that the Shuhachi-bosaikai should make the education flip boards for members of the *chonai-kai* as necessary in making the hazard map.
- 3) Move—An action component card for who will be the main organization to make the hazard map was moved to the group playing the role of management from the group playing the role of PR & information. The participants noted the Shuhachi-bosaikai should be the main organization to carry out the task of making the hazard map.
- 4) Collaborate—The action component cards for marking fire extinguishers in the Shuhachi community and meeting with the Shuhachi schools for the hazard map as well as seven other cards were shifted to the border areas between the group playing the role of management and other groups. The participants noted that the Shuhachi-

Table 5. Action plan components before and after debating

	Management (M)	PR & Information (I)	Soft logistics (S)	Hard logistics (H)	Total number of cards
Before debating	18	18	18	24	78
Changes to the action plan components after debating					
Arrange	1	0	1	4	6
Add	2	3	0	3	8
Move	1	1	0	0	2
Collaborate	9	8	4	5	26
No change	8	15	16	18	57
Total number of action plan components	21	27	21	30	99

bosaikai must work together with other groups to perform these action components because its own capacities are limited.

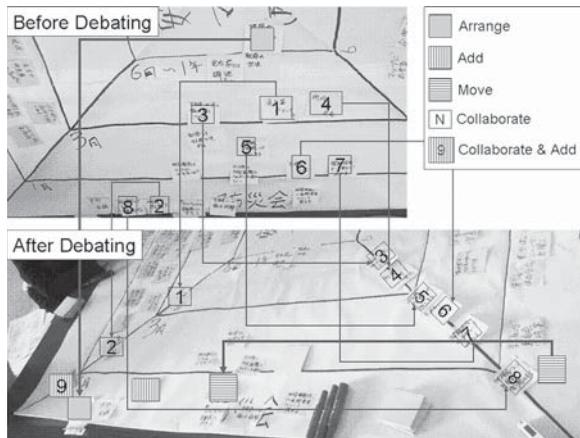


Fig. 11. Changes to action plan components after debating in the Shuhachi Yonmenkaigi workshop

4.2.2 Action Plan Chart

The action plan chart was completed through the participants' debating. Only some representative action components of the action plan chart developed during the Shuhachi Yonmenkaigi workshop are shown in Table 6.

4.2.3 Analysis and Discussion

On completion of the Shuhachi Yonmenkaigi

workshop, the participants were asked to fill out a questionnaire. All eight participants returned the completed questionnaire. The questionnaire included 1) understanding of the Yonmenkaigi system and 2) impact of the participatory workshop method. The questionnaire results are summarized as follows:

- 1) I could understand the position of the other groups through the exchange of roles.
- 2) The Yonmenkaigi system helped me identify delicate matters.
- 3) I now know what we need to do and what we need to consider, because we have discussed this through oral and written communication using the Yonmenkaigi Chart.
- 4) I realize that we have to express our ideas systematically by writing rather than by oral communication only.
- 5) It is basically the same as PDCA, but it is easy to do.
- 6) I found that the different views on S (strengths) and W (weaknesses) depend on different position in the same situations.
- 7) I think that the Yonmenkaigi system provides a means to show that there are many views and many ways to achieve a project.

To support comment number 5), Fig. 12 illustrates how the CAPD cycle method is incorporated into the procedures of the Yonmenkaigi system.

Table 6. Partial action plan chart from the Shuhachi Yonmenkaigi workshop

	Within 3 Months	Within 6 Months	Within 1 Year	Beyond 1 Year
Management (M)	Opening the Shuhachi-bosaikai meetings	Request for cooperation from the Shuhachi community	Opening the Shuhachi-bosaikai and <i>chonai-kai</i> meetings	Checking and distributing the hazard map
PR & Information (I)	Request to the Shuhachi community for help in making the hazard map	Recruiting volunteers	Contacting the mass media	Collecting opinions after distribution
Soft logistics (S)	Cooperating with the survey	Request for contents of the hazard map	Town watching in the Shuhachi community	Joining the Shuhachi-bosaikai
Hard logistics (H)	Benchmarking the hazard map with other communities	Surveying the contents of the hazard map	Deciding on the contents of the hazard map and the company that will produce the map	Examining new education tools for disaster reduction

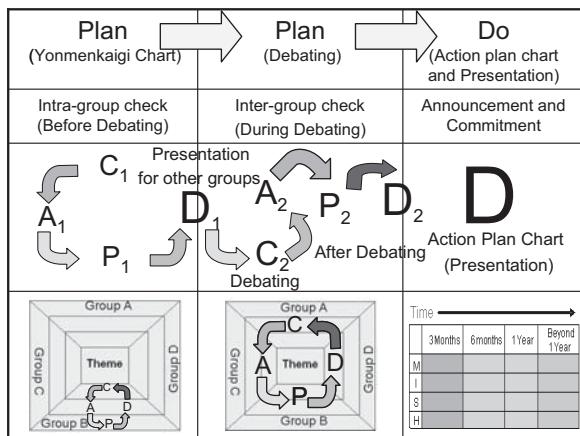


Fig. 12. The CAPD cycle of intra-group and inter-group debating

The Yonmenkaigi system workshop completed at the Shuhachi community demonstrates the following two main ideas:

- 1) The participants have developed a sense of joint ownership and recognized the critical value of role sharing to achieve effective collaborative actions. They learned “on the job” through the interactive communication that is systematically provided by the Yonmenkaigi system.
- 2) The participants constructed an action plan for making the hazard map suitable for the local community through the cooperation of participants, without relying on the detailed advice and knowledge of experts and government for the decision making required to carry out the goal.

As pointed out in Section 3.4, unlike other workshop methods, participants of a Yonmenkaigi workshop themselves determine the theme and scenarios of the workshop, assign roles of four aspects, and develop on their own an action plan to achieve the goal/theme. However, we should note that much of the success (or failure) of this workshop method depends on the facilitation skill of the facilitator who has to clearly apply this workshop method. Participants require the guidance and advice of the facilitator, particularly when participants decide the goal and the role of the four groups through SWOT analysis. The facilitation ability of the facilitator affects the results and the processes during the phases of the Yonmenkaigi workshop method. We discovered that the participants did not have clear definitions for the scope of work of each role through the questionnaire and interviews after the Shuhachi Yonmenkaigi workshop.

After this Yonmenkaigi workshop, implemen-

tation of activities by the Shuhachi-bosaikai has changed. They planned and implemented a town-watching event for disaster prevention in the local community for Indonesian officials of disaster prevention partly at the request of Kyoto University in May 2008. The Shuhachi-bosaikai carried out the town-watching event based on the action plan chart developed in the Shuhachi Yonmenkaigi workshop, as shown in Table 6.

The Shuhachi-bosaikai opened its meetings and then asked other organizations in the Shuhachi community to collaboratively participate in the town-watching event because it recognized the need for collaborative actions through the Yonmenkaigi system. The Shuhachi-bosaikai rehearsed the town-watching event with the local fire station, Shuhachi Elementary School, and Kyoto University and recorded an English version of the presentation on education flip boards for disaster reduction for the Indonesian officials. The Shuhachi-bosaikai also contacted the mass media. As a result, the town-watching event was actually carried out through the collaboration of the Shuhachi-bosaikai, the local fire station, Shuhachi Elementary School, and the Shuhachi community. The event was reported by a newspaper, *Kyoto Shimbun*.

5. CONCLUSIONS

A participatory workshop method called the Yonmenkaigi system has been presented as a method to develop collaborative action plans at the community level. A summary of several other workshop methods is presented, and the current problem of participants not going beyond the awareness stage in disaster prevention is identified. The Yonmenkaigi system and its application to activities of self-governed community associations for disaster reduction (*jishubosai-soshiki*) are presented. Implementable action plans are developed by participants working in collaborative partnerships through the Yonmenkaigi workshop method. The Yonmenkaigi system serves as a means to move from risk awareness to action plan development for disaster reduction. Through this method, participants have been shown to expand their capacities and to learn the importance of collaborative action in disaster prevention.

The Yonmenkaigi system can enhance the understanding of participants. As a future research theme, it

would be interesting to observe the actual actions and implementation of disaster prevention activities in a community. For this purpose, research on how to systematically measure the effects of the Yonmenkaigi workshop and how to analyze the changes is required.

REFERENCES

- Atsumi, T. and Seki, Y., 2008. "Village Revitalization Process in a Mountainous Area after the Mid Niigata Prefecture Earthquake: (3) Communication in the Revitalization Process." *Book of Extended Abstracts*, 27th Annual Conference of the Japan Society for Natural Disaster Science, Fukuoka, Japan, September 25-26, pp. 179-180 (in Japanese).
- Government of Japan, 2008. The 2008 Disaster Prevention White Paper, Tokyo, Japan (in Japanese).
- Hill, T. and Westbrook, R., 1997. "SWOT Analysis: It's Time for a Product Recall." *Long Range Planning*, Vol. 30, No.1, pp. 46-52.
- Ichiko, T., Aiba, S., Yoshikawa, J., Nakabayashi, I., and Takamizawa, K., 2005. "The Neighborhood Community-training Program for Post-disaster Recovery: Towards Preparing Community-based Recovery Management." *Journal of Natural Disaster Science*, Vol. 27, pp. 25-39.
- Kikkawa T. and Yamori, K., 2006. "Development and Implementation of CROSSROAD: A Training Tool for Disaster Preparedness and Response." *Japanese Journal of Risk Analysis*, Vol.16, No. 2, pp. 39-45 (in Japanese).
- Komura, T. and Hirano, A., 1997. "DIG (Disaster Imagination Game)." *Proceedings of the Annual Conference of the Institute of Social Safety Science*, pp. 136-139 (in Japanese).
- Komura, T., 2004. "DIG (Disaster Imagination Game) - The Guidance for DIG Workshop in a Local Community." *Syobo-bosai [Firefighting and Disaster Prevention]*, Vol. 10, pp. 92-102 (in Japanese).
- Matsuda, Y. and Okada, N., 2006. "Community Diagnosis for Sustainable Disaster Preparedness." *Journal of Natural Disaster Science*, Vol. 28, No. 1, pp. 25-33.
- Na, J., Okada, N., and Takeuchi, Y., 2008a. "Preparation Study on the Strategic Risk Communication Method for Disaster Reduction Oriented Community." *Annals of the Disaster Prevention Research Institute, Kyoto University*, No. 51B, pp. 179-188 (in Japanese).
- Na, J., Okada, N., and Fang, L., 2008b. "A Collaborative Action Development Approach to Improving Local Community Disaster Prevention Planning." *Book of Extended Abstracts*, 27th Annual Conference of the Japan Society for Natural Disaster Science, Fukuoka, Japan, September 25-26, 2008, pp. 95-96 (in Japanese).
- Nitschke, G., 2003. "Street or Neighbourhood: Street-Perspectives on Asia." *Kyoto Journal*, September, 55.
- Okada, N., 2004. "Urban Diagnosis and Integrated Disaster Risk Management." *Journal of Natural Disaster Science*, Vol. 26, No. 2, pp. 49-54.
- Okada, N. and Teratani, A., 2005. "The Yonmenkaigi System, RIIM Report No. 5." Research Institute of Infrastructure Management, Japan Civil Engineering Consultants Association (JCCA), pp. 35-38 (in Japanese).
- Okada, N., 2006. "Perspective on Integrated Disaster Risk Management." In Y. Hagihara, N. Okada, and H. Tatano (Eds.), *Introduction to Integrated Disaster Risk Management*, Kyoto University Academic Press, pp. 9-54 (in Japanese).
- Seki, Y. and Atsumi, T., 2008. "Village Revitalization Process in a Mountainous Area after the Mid Niigata Prefecture Earthquake: (4) 'Participation' by Residents in a Local Community." *Book of Extended Abstracts*, 27th Annual Conference of the Japan Society for Natural Disaster Science, Fukuoka, Japan, September 25-26, pp. 181-182 (in Japanese).
- Tatano, H. and Kanda, M., 2008. "An Introduction to the Yonmenkaigi System, RIIM Report No. 6." Research Institute of Infrastructure Management, Japan Civil Engineering Consultants Association (JCCA), pp. 35-52 (in Japanese).
- Tsubokawa, H., Tanaka, M., Hanashima, M., Nagasaka, T., and Ikeda S., 2008. "Study of Risk Communication using Disaster Risk Scenarios - Case Study of an Earthquake Disaster Risk Scenario Making Conducted with the Participation of Fujisawa City Residents." *Report of the National Research Institute for Earth Science and Disaster Prevention*, No. 72 (in Japanese).

