

Flood Risk Governance Process for Participatory Disaster Risk Reduction

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by

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Abstract

Public participation in flood and disaster risk management operates on several levels. At the lowest level, the community may be targeted with relevant information (e.g., about how risk estimates were made). However, studies show that providing information, while essential, is not enough. Therefore, members of the community may be selected to take part in exercises meant to provide them with a certain degree of decision making authority. Moreover, the community, as a stakeholder, may actually implement countermeasures such as location choices, house mitigation, and evacuation decisions. Implementing disaster risk management often requires wide ranging stakeholder involvement. Various stakeholders with differing sets of alternatives will be asked to help find an implementable community solution, known as a “socially viable solution.” The “risk governance” idea and planning framework have begun to gain popularity among researchers, planners, and practitioners as a way of developing socially viable solutions. However, few risk governance studies have comprehensively tackled flood risk issues in the context of active community participation. Relevant studies have also been limited to the developed and developing regions of Asia. Therefore, developing and empirically examining a comprehensive flood risk governance framework are urgent tasks.

This study first conducts a comprehensive literature review to understand the need for public participation in flood risk management, the gaps in existing practices, and the critical issues that require incorporation into flood risk governance. Based on the literature review, a comprehensive conceptual framework for flood risk governance is proposed. This study then obtains empirical validation of the proposed risk governance framework, particularly for diverse cultural and social settings, by examining three public participation exercises in flood management conducted in a developed country (Japan) and a developing country (India). These exercises represent not only the diverse socio-cultural and economic connotations of risk and its management but also the three levels of public participation: participatory flood risk management for policy formulation at the prefecture level (Shiga, Japan), community based flood risk management for developing a flood mitigation action plan (Muraida, Japan), and community led flood risk management action plan development (Mumbai, India).

Data collected from the three public participation workshop exercises were systematically analyzed by using a ‘concerns table’ and by applying the SWOT issue and strategy analysis and Yonmenkaigi System Method (YSM) tools to examine the methods and components of flood risk governance frameworks such as concern assessments, scoping, and planning.

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Chapter 1

Introduction

1.1 Introduction

International studies on flood risk management point to wide differences among stakeholders regarding risk perceptions as well as views and values concerning countermeasures (Baan and Flijn, 2013; Raaijmakers et al., 2008; Ikeda et al., 2008; Damm et al., 2013; Vari et al., 2003). Conflicting views and interests are common in various aspects of disaster management plan implementation including tool selection, task prioritization, plan execution, and other aspects (Ikeda et al., 2008). In studying perceptions of flood risk, Patt and Schroter (2008) compared the perceptions of residents in a flood plain to those of the policy makers responsible for protecting them. The policy makers rated the flooding risk higher than did the residents but were also less sensitive to the potential costs of the mitigation measures they asked residents to follow than the residents were. In technical risk models, risk is often seen as the product of the magnitude and likelihood of the potential harm, but subjective evaluations of risk differ from the objective results of formal risk analysis (Sjoberg, 2000). Moreover, disaster prevention and reduction are likely to conflict with other social factors (Yamori, 2011). Such differences are often seen to arise from, on the one hand, uncertainties produced by the available facts, and on the other, ambiguities in problem framing (Pahl-Wostl, 2006). Thus, when involving communities and stakeholders in flood risk management decision making or collaborative knowledge generation through social learning, it is essential to know why differing perspectives have emerged and to deal with them constructively.

Collaborative knowledge development is important also because researchers and planners have advocated community and household disaster preparedness in recent decades, as a single focus on engineering based solutions is considered inadequate for disaster resiliency (Paton, 2003); inviting the community to the decision making process is thus crucial to disaster management and planning (Chen et al., 2006). Moreover, applying lessons learned from low frequency/high impact disasters,

researchers often emphasize the roles of the local community, or “community self reliance” (Okada et al., 2013), because those huge disasters demonstrated that residents may not be able to depend on local governments to quickly set up local headquarters through which to direct emergency and crisis management as well as relief and rescue activities (Na et al., 2009; Chen et al., 2006). As a result, governments are enhancing their coping capacities and disaster preparedness in local communities instead of trying to guarantee their own disaster management; when governments act as the responsible administrative bodies, they inevitably tend to emphasize the need for top down command control. Thus, the local residents of disaster prone areas are being encouraged to develop disaster= resilient communities.

Public participation in flood and disaster risk management operates on several levels. At the lowest level, the community may be targeted with relevant information (e.g., about how risk estimates were made). However, studies show that providing information, while essential, is not enough. Therefore, members of the community may be selected to take part in exercises meant to provide them with a certain degree of decision making authority. Moreover, the community, as a stakeholder, may actually implement countermeasures such as location choices, house mitigation, and evacuation decisions.

Implementing disaster risk management often requires wide ranging stakeholder involvement. Various stakeholders with differing sets of alternatives will be asked to help find an implementable community solution, known as a “socially viable solution.”¹

The “risk governance” idea and planning framework have begun to gain popularity among researchers, planners, and practitioners as a way of developing socially viable solutions. However, few risk governance studies have comprehensively tackled flood risk issues in the context of active community participation. Relevant studies have also been limited to the developed and developing regions of Asia. Therefore, developing and empirically examining a comprehensive flood risk governance framework are urgent tasks.

¹ The term “socially viable solution” is a translation of the word “*seikai*” (成解) proposed by Okada (2006).

1.2 Aims and Objectives

Responding to the urgent need to develop socially viable solutions for integrated flood risk management, this study proposes a comprehensive flood risk governance framework that systematically promotes the involvement of important stakeholders, particularly local communities, in the flood management decision making process, and examines the significance of this framework by analyzing the empirical evidence concerning public participation in flood risk management. Addressing three distinct but complementary issues, this study:

- 1) proposes a comprehensive flood risk governance framework for the systematic inclusion of the appropriate stakeholders in decision making,
- 2) proposes scientific methods of implementing the proposed flood risk governance framework consisting of concern assessment, scoping, and planning and implementation, and
- 3) empirically validates the effectiveness of the proposed methodology by examining three public participation exercises in flood risk management being used in both developed and developing countries in Asia.

1.3 Research Methodology

This study first conducts a comprehensive literature review to understand the need for public participation in flood risk management, the gaps in existing practices, and the critical issues that require incorporation into flood risk governance. Based on the literature review, a comprehensive conceptual framework for flood risk governance is proposed. This study then obtains empirical validation of the proposed risk governance framework, particularly for diverse cultural and social settings, by examining three public participation exercises in flood management conducted in a developed country (Japan) and a developing country (India). These exercises represent not only the diverse socio cultural and economic connotations of risk and its management but also the three levels of public participation: participatory flood risk management for policy formulation at the prefecture level (Shiga, Japan), community based flood risk management for developing a flood mitigation action plan (Muraida, Japan), and community led flood risk management action plan development (Mumbai, India).

Data collected from the three public participation workshop exercises were systematically analyzed by using a concerns table and by applying the SWOT issue and strategy analysis and Yonmenkaigi System Method (YSM) tools to examine the methods and components of flood risk governance frameworks such as concern assessments, scoping, and planning. A detailed description of each tool and technique is presented in Chapter 2; the following offers a more concise description.

The “concerns table” visualizes and maps the social consequences likely to follow from a flood risk according to the local flood prone community’s perspective. The table is divided into two parts. The vertical line represents the social and cultural impacts of the risk, derived from the “social impact assessment” approach (Vanclay, 2002). The horizontal line is defined by “Risk” and consists of “Hazard,” “Exposure,” “Vulnerability,” and “Capacity.” The “social impact” and “risk components” items are incorporated to provide a broad perspective on concern assessment as a systemic process of gathering knowledge not only about the concerns, expectations, and perceptions that individuals, groups, or cultures may link to a certain risk but also to identify the wider concerns and implications not directly related to a given risk.

In the SWOT issue analysis, we identify the strengths (S), weaknesses (W), opportunities (O), and threats (T) emerging from the residents’ concerns. We consider (S) and (W) as internal factors, occurring inside or controlled by the community, and (O) and (T) as external factors, happening outside the community and handled by the local government. Therefore, SW is a review of the community’s strengths and weaknesses concerning flood risks, and OT describes the existing and potential opportunities and threats that the local government must consider in order to improve flood risk management.

The participatory disaster management method for action plan formulation employed in this study, the YSM, is a workshop tool designed and crafted primarily to provide a platform by which stakeholders may engage in face to face communication to share and learn each other’s concerns, hopes, and visions, to reduce conflicts and disagreements, and then to develop community action plans. The YSM process consists of four main steps: carrying out a SWOT analysis, completing the Yonmenkaigi Chart, and debating and presenting the action plan chart (Na et al., 2009). Though YSM is a planning tool, researchers also use it as an analytical tool for gaining a systematic understanding of the results of a plan from the community’s perspective.

1.4 Structure of the Thesis

The structure of this thesis is as follows. **Chapter 1** introduces the study's background, research problem, and objectives, and describes the methods employed to solve the problem.

Chapter 2 provides a wide ranging literature review on studies of flood risk management practices and outlines the gap in current approaches to and planning frameworks for developing a socially viable way to improve public participation in flood risk management. A special focus is placed on the risk governance framework developed by the International Risk Governance Council (IRGC) in order to identify the limited scope of the framework and possibilities for improvements. Based on the literature survey, a conceptual framework of flood risk governance is outlined. Then, the chapter describes the tools and techniques that may be useful for analyzing and evaluating the framework, such as concerns tables, SWOT analyses, and the YSM.

Chapter 3 discusses Shiga Prefecture's "public meeting," a participatory flood risk management policy formulation process at the prefectural level. This chapter presents a case study on this flood risk governance framework, examining the community's concerns and using them to increase the scoping options and thus improve flood risk management.

Chapter 4 discusses Japan's Muraida community and its community based flood risk management process for developing flood mitigation action plans. Through a dynamic use of the concerns table, this study investigates the community's changing concerns and the prefectural and city government responses.

Chapter 5 discusses Mumbai's community led flood risk management action plan development, on which we conduct a YSM. This study applies the YSM to the planning phases of the flood risk governance framework to understand the flood risk governance process.

Chapter 6 summarizes the main contributions of the study and discusses future research possibilities.

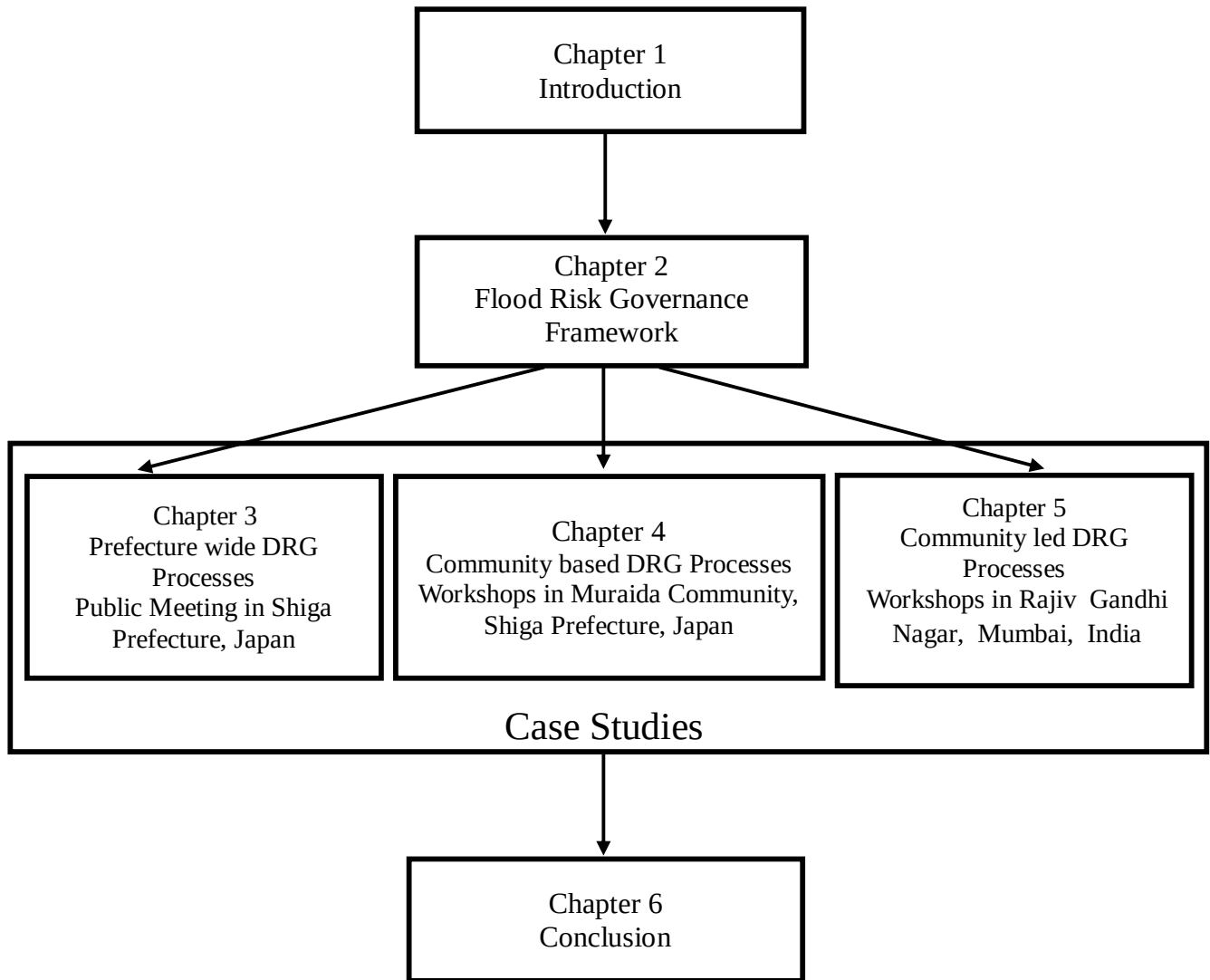


Figure 1.1 Structure of the thesis

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Chapter 2

Flood Risk Governance Framework

2.1 Introduction

This chapter develops a flood risk governance framework based on a review of the literature on disaster risk management. The first section identifies the gaps in disaster risk management studies and the need for a socially viable solution. The second section provides a comprehensive understanding of existing participatory approaches. After these two sections have presented their scientific argument for the need for risk governance, the following section examines the exiting risk governance structure and identifies its gaps. Finally, this chapter proposes a flood risk governance framework and identifies potential methods of executing it to improve disaster management.

2.2 Significance of Socially Viable Solutions Development through Public Participation in Flood and Other Disaster Risk Management Processes

There is a growing consensus among planners and researchers about the need to promote and invigorate socially viable solutions by incorporating citizen concerns into disaster risks management. Advocating socially viable solutions for flood and disaster risk management is crucial for many reasons.

As mentioned in Chapter 1, finding socially viable solutions through collaborative knowledge development has become more important in recent decades because researchers and planners now advocate community and household disaster preparedness, as engineering based solutions alone are considered inadequate for disaster resiliency (Paton, 2003). Therefore, inviting communities to take part in decision making is a necessary task in disaster management and planning (Chen et al., 2006). Moreover, from lessons learned after low frequency/high impact disasters, researchers now advocate

emphasizing the role of local communities, or “community self reliance” (Okada et al., 2013); these disasters have shown that local victims may not be able to depend on local governments to quickly set up local headquarters through which to direct emergency and crisis management as well as relief and rescue activities (Na et al., 2009; Chen et al., 2006). As a result, governments are enhancing their coping capacities and disaster preparedness in local communities instead of trying to guarantee their own disaster management; when governments act as the responsible administrative bodies, they inevitably tend to emphasize the need for top down command control. Thus, the local residents of disaster prone areas are being encouraged to develop disaster resilient communities.

Developing collaborative knowledge and plans through social learning is essential to finding a socially viable solution after understanding all the relevant perspectives and learning how to deal with them constructively (Okada and Matsuda, 2005). Social learning between and among stakeholders and experts enables the community to make collective decisions and attain policy goals because it helps stakeholders understand the rationale behind risk assessment results and management decisions, allowing them to make better informed choices in uncertain and complex situations (Ikeda et al, 2008). Collaboratively generating knowledge and plans through social learning is essential for understanding the bases of diverse perspectives and dealing with them constructively (Okada and Matsuda, 2005). Social learning and social involvement would allow stakeholders to enhance management capacities (Pahl-Wostl, 2006) through an awareness of each other’s goals and perspectives, shared problem identification, an understanding of stakeholders’ interdependency, conflict resolution and learning to work together, building trust, and building formal and informal relationships. Thus, the collaborative generation of knowledge and technology through social learning is essential for disaster prevention.

2.3 Scope and Challenges of Developing Socially Viable Solutions through Public Involvement in Disaster Risk Management

Recent decades have seen an increasing recognition among researchers, planners, and practitioners of the need to foster participatory disaster risk management (Chen et al., 2006; Shaw et al., 2009). However, studies show that it is not always easy to integrate public participation and disaster management, and the involvement of communities in disaster management planning remains elusive (Yamori, 2011; Pelling, 2007). Moreover, questions about the best structure of and procedures for

participation and the public's role in and authority over planning have been controversial (Rowe and Frewer, 2000; Renn et al., 1993). Arnstein (1969) defined "public participation" as the phenomenon in which people who "have a stake" in an issue but no power to influence it should be given a legal opportunity to take an active part in the decision making process. Communities can become involved in decision making in a number of ways (Rowe and Frewer, 2000). At the lowest level of public participation, the public may be targeted with relevant information (e.g., about how the risk estimates were calculated). However, providing communities with information, while essential, is not enough. At higher levels of public participation, the community's views may be solicited through such mechanisms as a consultation exercise, focus groups, or questionnaires. At still higher levels, members of the community may be selected to take part in exercises meant to provide them with some decision making authority. To this end, many techniques have been developed to allow communities to gain knowledge and skills concerning disaster prevention and reduction using participatory, voluntary, and interactive methods such as workshops, disaster games, and disaster preventive maps created through town walking (Yamori, 2011; Na et al., 2010; Bajek et al., 2008; Cronin et al., 2004). Methods have also been developed to obtain public input about the more value laden and policy oriented aspects of disaster management (Chess et al., 1999; Rowe and Frewer, 2000) such as environmental planning and risk management, including public opinion surveys and focus groups (which elicit opinions) and consensus conferences and citizen juries (which elicit judgments from which policies might be derived). In disaster prevention and reduction implementation processes that use these techniques, the characteristics and culture of each community are emphasized, as occurs in community based disaster management, or "CBDM" (e.g., Shaw et al., 2009), and participatory disaster risk management, or "PDRM" (e.g., Bajek et al., 2008).

The CBDM and PDRM are greatly significant because these participatory styles of community disaster management illustrate the weaknesses of conventional disaster management approaches based on a research centered, non reciprocal risk communication mode that is top down, proceeding from disaster experts to the community. In spite of their contributions to sustainable disaster management, they have several limitations (Yamori, 2011; Okada et al., 2013; Na et al., 2009). Most of these interactive learning and knowledge development processes retain the idea that knowledge and plans should be generated solely by disaster prevention and reduction authorities and experts (Yamori, 2009). All such participatory methods assume that the community passively absorbs the knowledge and technology the specialists have prepared in advance (Okada et al, 2013; Cronin et al.,

2004; Miles, 2011). In extreme but common cases, local governments or donors initiate the disaster management program, to which the community is invited to direct its opinions and concerns (Shaw et al., 2009; Pahl-Wostl, 2006). The obvious and serious limitations of such an approach are that it fails to resolve issues and is too time consuming and costly (Pelling, 2007; Chen et al., 2006). As a result, this approach has been criticized for forcing participants to react to agency proposals rather than providing input into their development. The major impediments of such community based disaster management programs are, then, their over dependence on donors and governments and their failure to give the community ownership of the problem and planning authority (Surjan et al., 2009; Tanaka et al., 2004; Pelling, 2007; Pearce, 2003). Chen et al. (2006) reported in their study on CBDM in Taiwan that the government's lack of financial support made the CBDM concept difficult to implement. Moreover, people were more interested in structural projects such as housing retrofitting and embankment buildings than in exploring their own assets and capacity to enhance their disaster preparedness through non structural risk reduction measures. Therefore, the new challenge for local communities seeking self reliance is finding ways of increasing their disaster awareness and developing an executable action plan on their own, with appropriate external support provided by local, municipal, and regional governments and experts. The key goal is putting the community in the driver's seat instead of only inviting them to consult on an existing plan on a predetermined issue identified by outsiders or governments. A socially viable solution becomes a reality only when communities initiate and develop their own plans and raise their own voices, visions, and expectations by maximizing their own capacities and resources.

2.4 IRGC Risk Governance framework

In response to the complexities of risk management and of finding a socially viable solution, a new proposal in professional risk assessment and management communities suggests combining the terms “governance” and “risk” into the compound “risk governance.” The “risk governance” notion has been coined only recently. Its origins and its introduction into the scholarly literature can be traced back to various sources. The term is a translation of the substance and core principles of governance within the context of risk and risk related decision making (IRGC, 2005; Renn, 2008; Renn and Walker, 2008).

The IRGC's risk governance framework (IRGC, 2005) is a comprehensive approach to an understanding, analysis, and management of the important risk issues for which there are deficits in current risk governance structures and processes. The framework comprises five linked phases: 1) pre-assessment; 2) appraisal; 3) characterization and evaluation; 4) management; and 5) communication (see Figure 2.1). Table 2.1 summarizes the broad scope of the IRGC framework's stages. Figure 2.1 details the framework's sequential tasks and programs for improving risk governance.

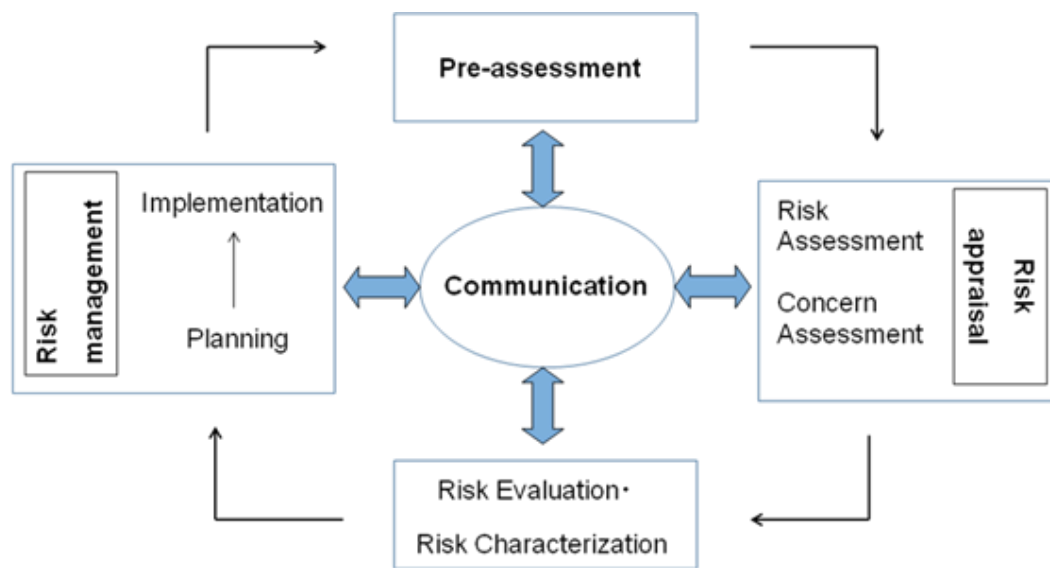


Figure 2.1 IRGC risk governance framework

Table 2.1 A descriptive note on IRGC risk governance stages, components, functions, and scope(IRGC 2005, IRGC 2008)

Stages and Components of Risk Governance	Scope and Functions

Pre-assessment	Objectives: to clarify the various perspectives on a risk (how the risk is assessed and managed); to investigate how different stakeholders frame the same risk. Scope: risks and opportunities to be addressed; dimensions of risk; limit of evaluations; problem indicators; assess established scientific/analytical tools for, and methods of, assessing risks.
Risk Appraisal	Objectives: to develop and synthesize the knowledge base for the decision on whether a risk should be taken; how the risk can be reduced or continued. Risk appraisal comprises i) scientific risk assessment and ii) concern assessment. Scientific risk assessment is a conventional assessment of the risk's factual, physical, and measurable characteristics, including the probability of it happening. Concern assessment is a systematic analysis of the associations and perceived consequences (i.e., benefits and risks) that stakeholders, individuals, groups, or different cultures may associate with a hazard or cause of a hazard. Concern assessment includes socio economic impacts, economic benefits, and public concerns.
Characterization and Evaluation	Objectives: based on risk appraisal (through the scientific risk and concern assessments), this step categorizes and evaluates the risk as "acceptable" (risk reduction steps considered unnecessary), "tolerable" (to be pursued because of its benefits but be subject to appropriate risk reduction measures), or "intolerable" (the risk is to be avoided as much as possible). Scope: to identify the (i) potential social, economic, and environmental benefits and risks; (ii) impacts on quality of life; (iii) possible options for risk compensation and reduction, and (iv) societal values by which to judge tolerability.
Management	Objectives: to design and implement the actions required to avoid, reduce, transfer, or retain the risks.

	Scope: a set of management options should be developed to assess and evaluate the options for reducing the risk. Then, strategies should be developed for implementing the selected measures, monitoring their effectiveness, and reviewing the initial decision if necessary.
Communication	This allows stakeholders to recognize their role in the risk governance process and gives them a voice in it. Once the risk management decision is made, communication should be used to explain the rationale for the decision and allow people to make informed choices about the risk and its management.

2.5 Flood Risk Governance Framework

The IRGC framework is a comprehensive risk governance structure that has limitations from the local level disaster risk governance perspective, particularly in its characterization and evaluation phase: first, it fails to categorize risks by exploring the emerging risk preparedness options and ideas proposed by stakeholders in their initial discussions; secondly, its risk categorization is predetermined and limited to just a few categories such as “tolerable” and “intolerable” whereas a wider platform that accommodates the diverse ideas, values, and perceptions from multiple stakeholders is needed. Therefore, instead of describing this phase as “characterization and evaluation,” this study would describe it as “scoping” (see Figure 2.2), during which participants identify and prioritize risks, explore the capacities, resources, and potential roles and responsibilities of the stakeholders, and explore the emerging options for implementing those tasks. The following are the important tasks of the scoping phase:

- (i) Selection of priority of risks;
- (ii) Identification of internal and external capacities;
- (iii) Identification of actions and priority of actions; and
- (iii) Stakeholder identification and possible roles and responsibilities of stakeholders.

The scoping process is strongly interconnected with the concern assessment. A comprehensive concern assessment may help widen the scoping process, particularly by identifying risks and

al., 2008; Cronin et al., 2004). This paper has introduced three such techniques and tools—the concerns table, the SWOT analysis, and the YSM—for use in systematically describing and analyzing flood risk governance frameworks. The concerns table is used to analyze and evaluate concern assessments, SWOT analysis is used in scoping, and the YSM is used in planning.

2.6.1 Concerns Table: A Proposed Tool of Concern Assessment

The purpose of the concerns table is to visualize and map the social consequences likely to follow from the flood risk according to Shiga prefecture’s local flood prone community. The table is divided into two parts. The vertical line represents the social and cultural impacts of the risk, derived from the “social impact assessment” approach (Vanclay, 2002). The vertical line is defined by “Risk” and consists of “Hazard,” “Exposure,” “Vulnerability,” and “Capacity.” The “social impact” and “risk components” items are incorporated to provide a broad perspective on concern assessment as a systemic process of gathering knowledge not only about the concerns, expectations, and perceptions that individuals, groups, or cultures may link to a certain risk but also to identify the wider concerns and implications not directly related to a given risk.

The concern table includes all the social and cultural consequences to residents of any disaster risk that could alter the way people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of a society. The table provides guidance for systematically conceptualizing and framing the consequences of the disaster risk as it impinges upon the local community. Its ultimate purpose is to not only identify the community’s concerns about the consequences of the risks but also to explore the social and cultural reasons for those concerns. Hence, it provides direction for the understanding, managing, and controlling of change and helps in identifying, developing, and implementing mitigation strategies to minimize the potential social impacts. We discuss below the “risk” and “social impact” components of the concern table in detail.

2.6.1.1 Risk

Risk is defined in terms of hazard, vulnerability, and exposure. Hazard refers to the frequency and severity of a flood event that may cause the loss of life or injury, property damage, social and economic disruptions, or environmental degradation (UNISDR, 2006). Exposure refers to the presence of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets that may be adversely affected by physical events (Lavell, 2012).

Vulnerability refers to the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard; this involves a combination of factors that determine the degree to which someone’s life, livelihood, property and other assets are put at risk by a discrete and identifiable natural or social event (Wisner et al., 2004).

Table 2.2 Concern table: An operational format²

		Risk Factors		
		Hazard	Exposure	Vulnerability
Social and Cultural Impacts	Health and social well being			
	Quality of the living environment (livability)			
	Economic impacts and material well being			
	Cultural			
	Family and community			
	Institutional, legal, political, and equity			
	Gender relations			

2.6.1.2 Social Impact

Notions of social impact in this study are derived from the “social impact assessment” idea developed by Vanclay (2002) to assess the potential social and cultural consequences of any exogenous social development (Vanclay, 2002; Burdge and Vanclay, 1995). A social impact is the social, economic, and cultural impact of an adverse event, as determined not only by the direct physical consequences of the event but also by the interaction of the psychological, cultural, social, and institutional processes that amplify or attenuate the public experience of risk and produce secondary impacts (Dreyer et al., 2009). In this study, social impact refers to interested and affected parties’ concerns about the social consequences or changes produced by flood risks. Many social scientists have tried

² In some cases, the concern table includes “capacity” as a risk factor to deal with countermeasures.

to develop a classification of social impact types, but few have developed lists of specific social impacts and fewer still have provided operational definitions of their variables. In this study, we used the operational variables of social impacts proposed in Vanclay (2002), as depicted in Table 2.3.

Table 2.3 Social impact components and descriptions (Vanclay, 2002)

Components of Social Impacts	Description
Health and social well being impact	Health is understood in a manner similar to the World Health Organization definition: “a state of complete physical, mental, and social well being, not merely the absence of disease or infirmity.”
Living environment (livability) impact	The quality of the air and water that people use; the availability and quality of the food they eat; the level of hazard or risk, dust, and noise they are exposed to; the adequacy of sanitation; their physical safety; and their access to and control over resources.
Economic impacts and material well being impacts	This relates to the wealth and prosperity of individuals and the community. It is about people’s personal and property rights, particularly whether people are economically affected or experience personal disadvantages, including violations of civil liberties.
Cultural impacts	This includes all impacts on (changes in) the culture of an affected region, including loss of language, loss of cultural heritage, or changes in the integrity of the culture. It also includes changes to shared beliefs, customs, and values.
Family and community impacts	This includes impacts related to the family, disruptions to social networks and to community cohesion and stability. A change in family structure is a major impact that can be caused when young people are enticed away from home or by the periodic or long term absence of working adults. Changes in a community can affect perceived and actual community cohesion and the extent to which residents like where they live or feel that they belong there.
Institutional, legal, political and equity impacts	This includes political systems, the extent to which people are able to participate in decisions that affect their lives, the level of democratization that is taking place, and the resources provided for this purpose. It also includes the capacity of formal institution to handle additional workloads, the integrity

	of government and government agencies, loss of tenure, loss of solidarity, violation of human rights, and participation in decision making.
Gender relations impacts	This relates mainly to the effects of gender discrimination, such as the control of resources, in economics, social power, and politics.

2.6.2 SWOT Analysis: Scoping Tool

Scoping establishes goals and identifies their principal obstacles (Tatano, 2007). This study uses SWOT analysis (Hill and Westbrook, 1997) for its scoping. The concern table provides us a broad picture of residents' concerns about the social and cultural impacts of the flood risk. The SWOT analytical perspective has been introduced in this study to integrate those concerns into the risk management and planning process through an improved scoping process. Two types of SWOT analysis have been carried out: the SWOT issue analysis and the SWOT strategy analysis. The first helps us identify the relevant stakeholders as well as the community's internal and external capacities and weaknesses; the SWOT strategy analysis explores how these capacities can be used or transformed into options for reducing the identified vulnerabilities and weaknesses and thus enhance risk preparedness. The SWOT strategy analysis reveals what a community can do by using their own resources and identifies where it needs to collaborate with external agencies to develop and implement an action plan. This chapter also introduces the YSM as a potential scoping tool. Detailed descriptions of all the tools are given below.

2.6.2.1 SWOT Issue Analysis

We carried out a SWOT issue analysis (see Figure 2.3) to identify the strengths (S), weaknesses (W), opportunities (O), and threats (T) apparent in residents' concerns. This study considers (S) and (W) as internal factors—aspects inside, or controlled by, the community; (O) and (T) are considered external factors, happening outside the community and handled by the local government. Therefore, SW provides a scenario for reviewing the community's strengths and weaknesses concerning flood risks, and OT describes the current and potential opportunities and threats the local government must consider in order to improve flood risk management.

2.6.2.2 SWOT Strategy Analysis

This study used the SWOT strategy analysis (Weihrich, 1982) to strengthen the scoping process by converting the emerging strengths, weaknesses, opportunities, and threats into potential strategy items through internal and external organizational collaboration (i.e., between the community and external agencies such as the local government). SWOT strategy analysis consists of four components (see Figure 2.4):

- (i) SO: strategies that use strengths to exploit opportunities;
- (ii) ST: strategies that use strengths to minimize threats;
- (iii) WO: strategies that overcome weaknesses by taking advantage of opportunities; and
- (iv) WT: strategies that minimize weaknesses and avoid threats.

	Internal factors (community level)	External factors (outside the community; controlled by external agencies, like Local govt.
Helpful for achieving the objective	Strengths (S)	Opportunities (O)
Harmful to achieving the objective	Weaknesses (W)	Threats (T)

Figure 2.3

SWOT issue analysis: the community's internal and external capacities and susceptibilities



	Internal factors (community level)	
	Strengths (S)	Weaknesses (W)

External Factors (administrative or local government level)	Opportunities (O)	(SO) Maxi–Maxi strategies: strategies that use strengths to maximize opportunities	(WO) Mini–Maxi strategies: strategies that minimize weaknesses by taking advantage of opportunities
	Threats (T)	(ST) Maxi–Mini strategies: strategies that use strengths to minimize threats	(WT) Mini–Mini strategies: strategies that minimize weaknesses and avoid threats

Figure 2.4 “SWOT Strategy Analysis” (Source : H. Weihrich, ‘The TOWS Matrix, A Tool for Situational Analysis’ pp. 60): Collaborative Strategy Creation by Internal and External Agencies

2.6.2.3 YSM: Collaborative Action Planning Tool

The participatory disaster management method employed in this study is the YSM, developed in a local community in Japan (Na et al., 2009). This workshop tool is intended primarily to provide stakeholders a platform for face to face communication through which they may share and learn each other’s concerns, hopes, and visions, thus reducing conflicts and disagreements and fostering the development of a community action plan.

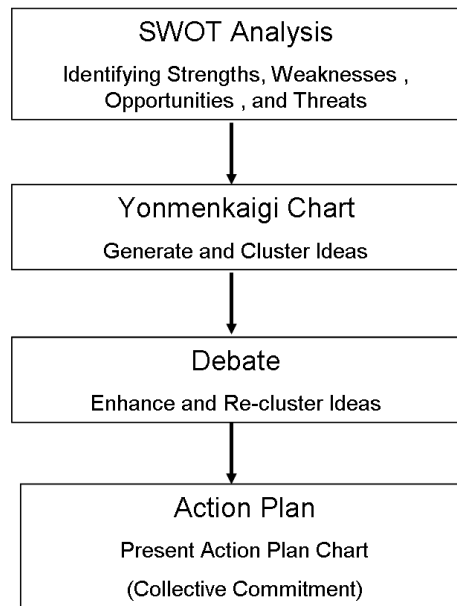


Figure 2.5 Steps in the YSM (extracted from Na et al., 2009)

Generally, the scope of YSM is wide open, and the exercise can be used out to solve a wide range of issues; however, the focus here is on disaster risk. A typical YSM workshop has eight to 16 participants from the community and a facilitator. As shown in Figure 2.5, the YSM process consists of four main steps: carrying out a SWOT analysis, completing the Yonmenkaigi Chart, and debating and presenting the action plan chart (Na et al., 2009). In the first step, the SWOT analysis provides participants with an opportunity to share their views on the current state of the community, leading to a holistic and detailed view of the issues faced by the community and possible responses. The YSM considers (S) and (W) as internal factors—aspects inside, or controlled by, the community; (O) and (T) are considered external factors, happening outside the community and handled by local government. Therefore, SW provides a scenario for

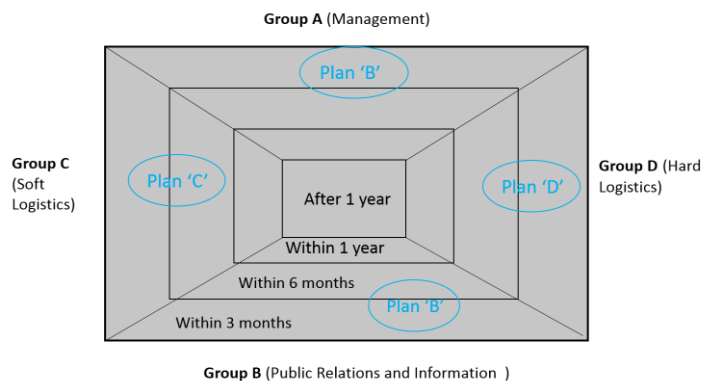


Figure 2.6 Typical pattern of Yonmenkaigi chart

reviewing the community's strengths and weaknesses concerning flood risks, and OT describes the current and potential opportunities and threats the local government must consider in order to improve flood risk management.

By considering the community conditions identified during the SWOT analysis, participants establish the goal of the workshop. Afterwards, the participants are divided into four groups. Each group is assigned one of four roles—management, public relations (PR) and information, soft logistics, and hard logistics—which, together, are normally required to accomplish any goal. Any of these four roles may be redefined as groups representing stakeholders with different concerns and interests.

Once the role assignment is complete, participants express their views and suggest actions in accordance with their assigned role using color cards and the Yonmenkaigi chart, as shown in Figure 2.5. The Yonmenkaigi chart is an illustration of participants' visions and proposed actions, conditioned by the four groups and their roles. The action components for each role are grouped according to their time frame: within three months, within six months, within one year, or beyond one year. Each group discusses and plans the actions for their assigned role. The coordination of all the actions developed by the four groups constitutes the implementable collaborative action plan for the community.

The next step is debating in order to provide an effective platform for processing, developing, and combining all the views. Participants debate what is still missing or inconsistent if a group seeks better collaboration. Two types of debating are possible in the YSM. The first is general debating and the second inverse debating. In general debating, two groups engage in interactive argument; in inverse debating, the position and rules of the groups facing each other across the Yonmenkaigi Chart are exchanged (see Figure 2.5). Thus, if Group A challenges the ideas of Group B and the two groups debate, it is a general debate. On the other hand, if Group A moves from its original position to Group B's position and Group B moves to Group A's, inspiring both groups to start debating according to their new roles, it is an inverse debate. General debating is designed to combine the knowledge of diverse groups of people, whereas the uniqueness and significance of inverse debating is that it naturally motivates each group to become as imaginative as possible while challenging its own action plan. Therefore, this process intends to promote the mutual ownership and commitment of all the groups (Okada et al., 2013).

The Yonmenkaigi Workshop Method uses cards to express participants' ideas. These cards are generally used during the debating phase. The basic rules include those for adding a new card, moving a card, and card collaboration. For example, if an action component is no longer needed or desirable, the card representing this component is deleted from the Yonmenkaigi Chart.

After the general and inverse debates, an implementable collaborative action plan is established and committed to by the participants using the Yonmenkaigi Chart. The action plan components are classified according to the time frame and the four roles. Finally, the participants make a presentation on the plan conditioned by its roles and timelines.

General Debating

- Group A debates Group B's plan and vice versa
- Group C debates Group D's plan and vice versa

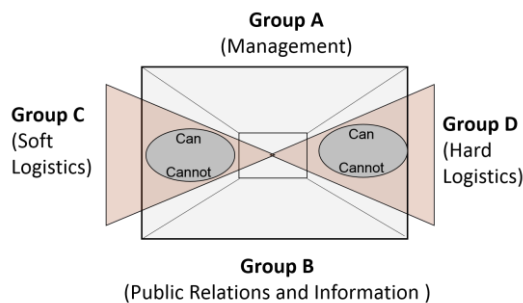


Figure 2.7 Typical general debating pattern in YSM

Inverse Debating (roles exchanged)

- Group C moves to Group D's position and vice versa
- Group C debates Group D's plan (actually, Group C debates its own plan)
- Similarly, Group D moves to Group C's position and criticizes its original plan.
- The same is applicable to Group A and Group B

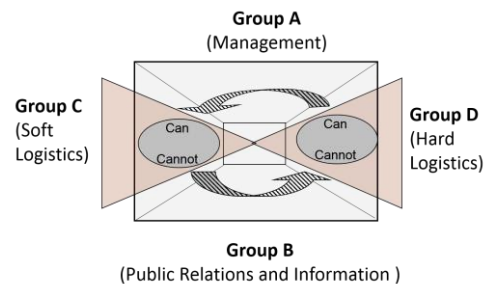


Figure 2.8 Typical inverse debating pattern in YSM

2.7 Conclusion

The literature review shows that the need for socially viable solutions in disaster management is absolute for two critical reasons. First, disaster risk issues are uncertain and complex, and stakeholders hold diverse views concerning disaster management plan implementation. Second, encouraging communities to adopt non structural preventive measures to improve preparedness is critical, and it is important to invite major stakeholders to take part in decision making. The

collaborative generation of knowledge and technology is thus essential. Studies show, however, that it is not always easy to integrate stakeholder participation and disaster management. The CBDM and PDRM are greatly significant because these participatory styles of community disaster management illustrate the weaknesses of conventional disaster management approaches based on a research centered, non reciprocal risk communication mode that is top down, proceeding from disaster experts to the community. In spite of their contributions to sustainable disaster management, they have several limitations. Most of these interactive learning and knowledge development processes retain the idea that knowledge and plans should be generated solely by disaster prevention and reduction authorities and experts. All such participatory methods assume that the community passively absorbs the knowledge and technology the specialists have prepared in advance. The major impediments of such community based disaster management programs are their over dependency on donors and governments and their failure to give the community ownership of the problem and planning authority. Therefore, the key goal is putting the community in the driver's seat instead of only inviting them to consult on an existing plan on a predetermined issue identified by outsiders or governments. To facilitate a socially viable solution to flood risk management, this study would describe this phase of risk governance as "scoping," during which participants identify and prioritize risks, explore the capacities, resources, and potential roles and responsibilities of the stakeholders, and explore the emerging options for implementing those tasks. To this end, communities can become involved in decision making in a number of ways.

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Chapter 3

Prefecture wide Disaster Risk Governance (DRG) Processes: Public meetings in Shiga Prefecture, Japan

3.1 Introduction

Shiga Prefecture in Japan established the basic policy of integrated flood risk management. Consequently, the prefectural congress of Shiga finally approved the basic policy in March 2012. This chapter focuses on the case of public meetings in Shiga Prefecture, which were mainly based on the “enhancing community flood risk reduction capacity” part of the “basic policy of integrated flood risk management.”

The resident representatives at the public meetings comprised 10 people who live in Shiga Prefecture. They expressed and shared the community’s perspectives, opinions, fears, and hopes related to local flood management to formulate a vision plan for Shiga Prefecture. The public meetings had two priority agendas to discuss—first, to determine the prospective role of the individual, household, and community in local flood management in Shiga Prefecture and, second, to identify the issues, concerns, and needs that local residents want the local government to address for improved flood management.

The objective of this chapter is to examine communities’ concerns and to utilize those concerns to increase scoping options for improved flood risk management by applying the case study to the flood risk governance framework. This chapter discusses Shiga Prefecture because it always faces potential flood threats, although there has been little risk of flooding after 1965, based on the pre-assessment. Next, this paper analyzes public meeting synthetically by summarizing the concerns in a table. Participants identified the high vulnerability that exists in the five spheres of community life, which are cultural; community; institutional; and living environment and economic and material wellbeing. After creating the concerns table, we carried out a SWOT analysis in two phases to explore and identify possible capacities and weaknesses derived from community expressed concerns on flood risks. Moreover, the SWOT strategy analysis gave us insight on how communities’ concerns can be

mobilized to identify options and strategies for improved flood risk management. Finally, this study discusses the development of a methodology that can not only visualize the community's concerns, but can also provide us with a direction to develop new knowledge and planning options for improved scoping and flood management.

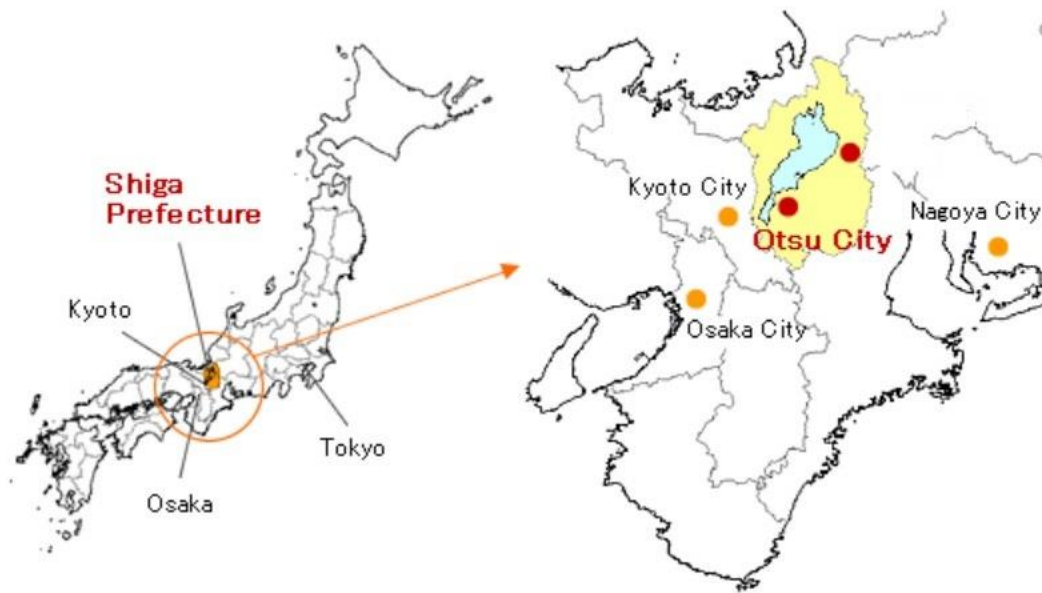


Figure 3.1 Location of Shiga Prefecture in Japan
(Source: Shiga University international Homepage)

3.2 Pre-assessment: Flood History of Shiga Prefecture

According to river improvement policy of Shiga Prefecture(2010), this prefecture is located on Honshu Island in Japan. It has an area of 4017.4 square kilometers, which encompasses 13 cities and 7 towns. It is surrounded by many mountains such as the Ibuki, Suzuka, Hira, and Hiei Mountains. The largest lake of Japan, Lake Biwa, is located in this prefecture. There are 118 Class A rivers flowing into Lake Biwa (Shiga Prefecture occupies 94.3% of the basin area of Lake Biwa). Each river has small tributaries that are distributed over the prefecture. There are 509 Class A rivers in Shiga Prefecture All these rivers are part of the Yodogawa River System (i.e., water supply area) except four rivers, i.e., the Fujikogawa River (Kisogawa River System) of Gifu Prefecture's boundary, Amasugawa River, Kanpugawa River, and Mukugawa River (Kitagawa river System) of Fukui

Prefecture boundary. Due to the unique geographical settings, especially the presence of many mountains and rivers, the prefecture is prone to floods. National highways and railroads were constructed within a range of five kilometers of Lake Biwa. As with the development of roads and railways, settlements have developed over time in nearby areas close to Lake Biwa. Therefore, due to their proximity to Lake Biwa, a large number of these settlements are high susceptible to floods.

Thus, Shiga Prefecture is prone to flood. From 1950 until now, Shiga Prefecture has been struck by minor or major floods at least six times. During the 1950s and 60s, the prefecture experienced many floods (see table 3.1) that were catastrophic in nature. Disasters in Shiga are mainly attributable to heavy rain and typhoon induced flooding. Table 3.1 provides detailed descriptions of the floods and their impacts in Shiga prefecture between 1950 and 2013.

Table 3.1 Flood history, Shiga Prefecture

(Source: Flood management office Homepage, Shiga Prefecture, Japan)

Flood event	Death (people)	Complete destruction (house)	Partial destruction (house)	Inundation above floor level (house)	Inundation below floor level (house)
Typhoon No. 13 in 1953	43	-	-	9,390	29,284
Typhoon No. 7 in 1959	4	-	-	2,434	17,081
Typhoon Isewan in 1959	16	-	-	5,920	19,816
Typhoon No. 24 and heavy rain in 1965	3	-	-	1,662	12,282
Heavy rain in 2001	-	1	9	4	387
Typhoon No. 18 in 2013	1	7	81	212	713

3.3 Methods Including Outlines of Public Meetings

This study examines the public meetings that were organized by the Flood Management Office under the River Basin Policy Bureau of Shiga Prefecture, to incorporate public opinion into the integrated flood risk management policy of the prefecture. The body holding these public meetings, officially called the “Residents Committee for Shiga Prefecture Flood Management (Public Meeting),” consists of representatives of local residents, local administrators in Shiga Prefecture, and an expert group appointed by Shiga Prefecture’s governors. Its objective was to conduct a series of meetings to know and share the community’s perspectives, opinions, fears, and hopes related to local flood management to formulate a vision plan for Shiga Prefecture. These public meetings were held with the hope that emerging concerns and the draft regional plans would further guide the city level local government and citizens to execute flood preparedness plans and actions. The public meetings had two priority agendas to discuss:

- 1) The determination of the prospective role of individuals, households, and communities in local flood management in Shiga Prefecture, and
- 2) The identification of the issues, concerns, and needs that local residents want their local government to address for improved flood management.

The participants of these meetings were representatives of different communities in Shiga Prefecture. At first, the local prefectural government circulated the public meeting notices and invited applications from individuals and representatives to participate in the meetings. The applicants were requested to write notes on their opinions in response to the question, “what kind of things can the community and I do for flood risk preparedness in Shiga Prefecture?” There were 32 applicants, of which 10 members were finally selected based on their reply to the question, their residential location, community work experience, age, gender, etc. The age of the participants ranged from 20 to 70 and there were seven male and three female participants. The tenure of public meeting members extended from March 9, 2008 to March 31, 2009. Members of the public meetings had received cash rewards and travel allowances.



Picture 3.1 Public meeting

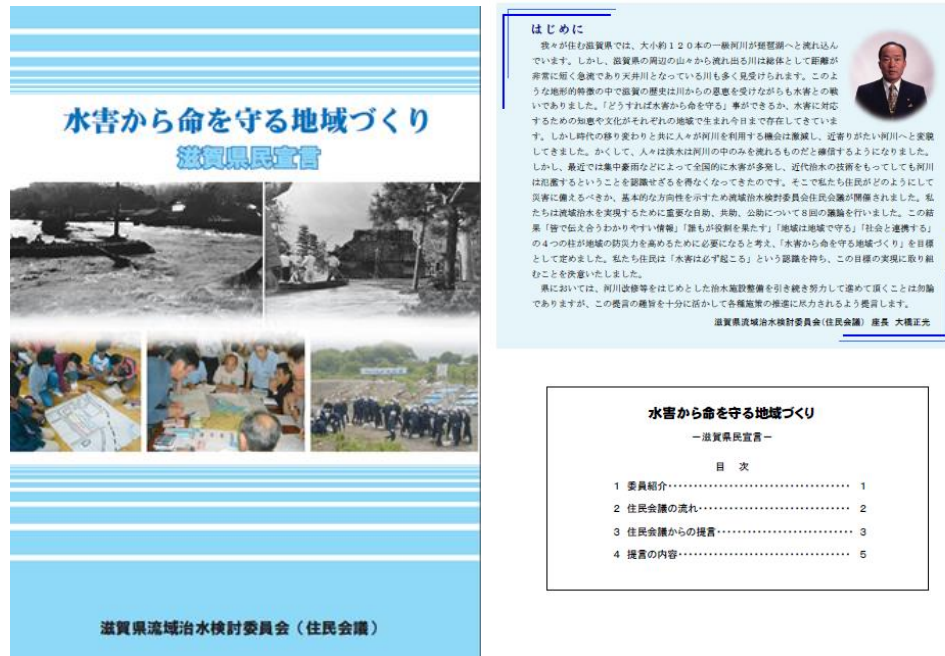
(Source: Flood management office Homepage, Shiga Prefecture, Japan)

The public meetings were “open” meetings, where the participants discussed their views and opinions in an open ended manner. Based on participants’ voting, a chairman from among the participants was selected to call for, and preside over, the public meetings.

There were nine public meetings organized between March 2008 and March 2009 (see Table 3.2). In the first two workshops, a representative of the River Basin Policy Bureau of the prefectural government initially introduced the major theme and contents of the particular meeting. Subsequently, the participants of the workshops conducted discussions amongst themselves based on the guidelines and structure of the public meeting as set out in the first two workshops. The discussions, in their entirety, were recorded and documented by the local government representatives. Each workshop was driven by its specific agenda, as described in Table 3.2. At the end of this series of workshops, the proceedings of the workshops were summarized and presented in a declaration (see Table 3.2).

Table 3.2 Dates and main business of the public meetings

List of Public Meetings	Date	Agenda of the Meeting
Public Meeting 1	March 9, 2008	(i) Introduction of the “public meeting” by the governor. (ii) Self introduction by the 10 residents’ representatives. (iii) Reporting the present condition of flood risk management by the River and Port Management Office, Shiga Prefecture. (iv) Discussion about the necessity, importance, and vision of flood risk management in Shiga Prefecture.
Public Meeting 2	May 2, 2008	(i) Election of the chairman of the “public meeting” by the 10 residents’ representatives. (ii) Discussion about the state and condition of local disaster prevention in Shiga Prefecture.
Public Meeting 3	June 1, 2008	(i) Field survey of Hino River. (ii) Discussion on enhancing local disaster prevention in Shiga Prefecture.
Public Meeting 4	June 28, 2008	(i) Preparing a draft document on “self help” and “mutual help” for the “resident declaration,” and its discussion.
Public Meeting 5	July 28, 2008	(i) Preparing a draft document on why disaster prevention activity is needed at the community level, for the “resident declaration” and its discussion.
Public Meeting 6	September 11, 2008	(i) Preparing a draft document on the “requirements” for the prefectural and city governments regarding rescue and assistance against flood risk, for the “resident declaration” and its discussion.
Public Meeting 7	October 29, 2008	(ii) Preparing a draft document on the “requirements” for the prefectural and city governments regarding rescue and assistance against flood risk, for the “resident declaration” and its discussion.
Public Meeting 8	December 1, 2008	Completing the preparation of the “resident declaration” and its discussion.
Public Meeting 9	March 10, 2009	Discussion about disseminating the contents and information that have been discussed at the public meetings, and enhancing cooperation between residents and the local government in relation to flood management in Shiga Prefecture.



Picture 3.2 A copy of the Residents' Declaration (December 13, 2008)

The concerns of the participants expressed in the public meetings are summarized in Table 3.3. The concerns table indicates that residents' major concerns pertain to flood vulnerability rather than exposure and hazard. The overflow of exiting rivers during the rainy season is considered by the community as the main hazard in this season. Regarding exposure, it was identified that the houses of people living in the new town area, which is close to the river, are exposed to the flood. It is also revealed that there are many settlements situated below the riverbed, which are exposed to the flood.

Participants identified the high vulnerability that exists in the five spheres of community life. The cultural part is identified as the most critical aspect increasing flood vulnerability. Cultural factors such as the gradually disappearing traditional knowledge and values and the lack of flood experience among the young generation and newcomers not only make communities less knowledgeable about flood management but also increase the communities' vulnerabilities in the spheres of the family and institutional sub systems. For example, because of a lack of flood experience and knowledge, young people are ignorant about flood risks and less willing to participate in disaster drills and other voluntary flood management activities. In addition, because of cultural reasons, new migrants are

unaware about the flood risks and, as a result, building constructions along the riverside, which are highly vulnerable to flood risks, are booming.

Institutional vulnerabilities also appeared critical. The existing administrative set up and risk communication system are regarded by the community as unilateral in nature and indifferent to the communities' needs and priorities. Therefore, there has been little initiative taken to improve communities' awareness and cultural orientation on flood risks. The hazard map prepared and distributed by the prefectural government is not very useful or effective because only a few residents can understand the map; therefore, taking such initiatives would help to change the social impact of material wellbeing. The traditional voluntary organization is disappearing and losing its attractiveness to the common people. The existing flood risk management is also an engineering centric approach, like building dams and dikes, embankments, etc. Such an institutional approach affects communities' environments and community life. For example, traditionally, communities were emotionally and physically in a close relationship with the river, and they respected nature because of their traditional attachment, which is now decreasing. Similarly, the local governments' river and flood management plans are unable to comprehend all the social needs of the communities. The governments' institutional approach is also responsible for influencing economic aspects. The governments' over dependence on structural measures is increasing the financial cost of flood management, and is fostering a belief among the community that it has no responsibility in flood risk management. Existing voluntary organizations are disappearing due to a lack of intuitional initiatives and cultural support.

Table 3.3 Concerns Table : Summary of the Community's Concerns Expressed in All Public Meetings, Shiga Prefecture

Social impacts	Hazards
Living environment (Livability)	➤ There are many rivers, ditches, and canals, which may overflow because of heavy rains in the rainy season. ➤ Many rivers flowing above the settlement bed can cause floods.
Social impacts	Exposure
Living Environment (Livability)	➤ Settlements below the riverbed are prone to floods. ➤ Properties in the new town area without land use regulation. ➤ Residents in the new town area are susceptible to floods, because they lack the knowledge and experience of floods.
Social impacts	Vulnerability
Cultural	➤ Traditional flood knowledge is disappearing. At present, the young generations and new immigrants had neither experienced flood nor did they inherit the traditional knowledge of floods. It is indispensable to learn about and acquire the traditional techniques and knowledge, particularly for our community that dwells below the riverbed, to cope with future disasters. ➤ The culture of joining voluntary organizations for flood management is declining because new generations do not bother about floods, as they have never experienced them. ➤ In traditional systems, the name of the village or area was decided based on the particular characteristics of the respective place. This helped to easily identify the nature of the settlement and its flood risk possibilities or intensities. However, after the municipal agglomeration, those names were replaced by new formal names. Such incidents may increase vulnerability. ➤ There are no good community leaders at present that could motivate and guide local communities for flood preparedness activities. It is a great challenge to ensure their voluntary participation in local area flood risk communication and awareness programs. ➤ Local residents, in general, are less interested about flood mitigation and preparedness activities because of a lack of awareness.
Family and community	➤ Emigration of young people from villages to urban areas. In many rural areas, the absence of young people is a critical issue during emergencies. ➤ Population aging is increasing. ➤ Community bonding and networking, which are useful resources during disasters, are weakening and are almost absent today. ➤ There are also many foreigners who are at risk and scarcely aware about the risks. City governments or local administrators have been struggling to communicate

	with them to improve their risk awareness. It is a challenge to ensure their voluntary participation in local area flood risk communication and awareness programs. ➤ There is an absence of community platforms, which existed earlier, to share concerns, needs, and propositions to vitalize the community's wellbeing. ➤ Many people do not want to evacuate because they do not know how and because the evacuation area is unsuitable.
Institutional, legal, political and equity	➤ Existing emergency networks and organizational settings are weak. ➤ Hazard maps are provided to the local residents without a proper or adequate description of the map information. Therefore, many local residents cannot understand the precise meaning of the hazard maps. For example, from a hazard map, citizens may be aware of the risks, but scarcely know how, when, and where to evacuate. ➤ The community's thoughts, ideas, and needs are not well received by the local government, for flood management. Communication between the communities and the local government is weak. If the government interacts with local residents, it would develop trust between citizens and the local administrator. ➤ There is a lack of networking among NGOs, local communities, and the local government. ➤ There are few young people in voluntary organizations, because they are not interested in floods. ➤ There is a need to prepare a list of volunteers and their specific roles. ➤ A flood risk management plan for Shiga Prefecture should be prepared. ➤ More emphasis should be placed on land use planning and zoning, and developments along the riverside should be halted. ➤ During emergencies, it should be mandatory for everybody in the community to abstain from personal economic activities and embrace the community's flood fighting activities. ➤ Voluntary organizations are drastically decreasing. No standards are followed for training and operation in voluntary organizations. ➤ Disaster management studies should be introduced in the school curriculum. More lectures and workshops on disaster risk management should be initiated, to improve community flood risk awareness.
Living environment (Livability)	➤ Creating a river friendly environment is important to mitigate flood risk. ➤ Halting new construction work along the riverside, without which the area would be more vulnerable to floods. There are already many unplanned developments close to the riverbank. No residential development should be allowed in flood prone areas. ➤ "River development" should be conducted in a manner compatible with nature. Considering the community's nature is important before conducting "river development."

	➤ Creating a “monitor system” to confirm the water level at several points on the riverside could be a strategic decision to make people aware of the flood risks. ➤ There is a need to improve the internal drainage system.
Economic and Material Well Being	➤ The local government or administrator should try to convince local residents about the river development. The responsibilities and tasks of river development do not end at constructing dams or barrages, but continue thereafter. If the local government does not have enough money for river development, it may be possible to levy a tax on local residents for river development. ➤ Local voluntary organizations for disaster management should be financially supported by the local government for better flood risk management. ➤ The local government should not only think about structural measures to prevent flood, but should also incorporate local knowledge in the disaster management programs and encourage individual flood prevention activities and mutual help. Local residents’ participation would ensure a cost effective disaster management plan. ➤ A budget must be prepared for flood risk management. ➤ Governments are ignorant about small ditches in these regions, which need proper treatment and maintenance.

3.4 Scoping

The concerns table provides a broad perspective of community flood risks in various aspects of social life and the interlinking between all aspects of life. Moreover, it also helped us identify the social and economic factors responsible for flood risks, to initiate pro active intervention. Now, it is an urgent necessity to investigate the resources and capacities as well as the roles and responsibilities of different stakeholders to abridge the scoping exercise and mechanism for improved flood risk planning.

3.4.1 SWOT Issue Analysis

As previously mentioned, SWOT issue analysis is carried out to know the internal (that is, community level) strengths (S) and weaknesses (W) and to identify how external factors such as foreign agencies including governments, NGOs, etc. are responsible for generating opportunities (O) and threats (T).

The SWOT issue analysis, as shown in Table 3.4, depicts that community concerns reveal more weaknesses and threat issues than opportunities and strengths. Internal factors, which comprise the

community's strengths and weaknesses, are mainly based on cultural factors. As the SWOT analysis in Table 3.4 shows, the community is endowed with traditional knowledge, a culture of voluntary work, and a culture of working and living together with other members and neighboring communities. This culture is their strength. The culture, however, is changing over time. The changing culture has a great impact on community flood vulnerability and risk management. For example, new people do not like to participate in voluntary work, traditional flood management knowledge is disappearing, and there is a lack of flood awareness and willingness among new migrants and young people to fight and manage floods. On the other hand, external factors including administrative opportunities and threats are mainly based on institutional, legal, and political factors of the community. The opportunity for the community is that the local government has become inclined to listen to public voices and concerns and, therefore, public meetings are organized. This changing institutional and political set up or motive may be recognized as an opportunity to manage floods. However, there is a threat posed by an inherent tendency of the local government to be indifferent to community voices, opinions, and needs. Therefore, there is an increasing tendency of not evacuating, an unawareness of the flood hazard map (FHM), and a lack of self reliance among the community members or an over dependence on the government. Therefore, it is clear that the community is more concerned about cultural and institutional changes and alterations for improved flood risk management.

**Table 3.4 SWOT Issue Analysis from the Public Meetings for Flood Management
in Shiga Prefecture**

Strengths	Weaknesses
➤ People who are staying there for a long time are well aware about the environment, culture, and society of their community. ➤ There are ardent residents interested in flood risk management, like workshop participants who	➤ Many villages and communities live below the riverbed level (haphazard and uncontrolled housing construction along the riverside, which is vulnerable to flash floods). ➤ The shrinking roles and activities of “voluntary organizations for disaster prevention,” which were proactive earlier.

participated in the “public meetings.” ➤ Traditional ancestors’ wisdom and knowledge on flood risk management.	➤ There are many people who do not like to evacuate during emergencies. ➤ The young generation and migrants in the new town area are not much aware or careful about flood risks (no first hand flood experience, not interested in disaster issues or voluntary work). ➤ There is a lack of motivation among citizens to organize disaster drill workshops. ➤ Communities are over dependent on the local government or administrators for flood risk management. ➤ Ancestor wisdom (traditional ancestors’ wisdom and knowledge on flood risk management). ➤ Traditional culture of voluntary work and organization (that is, mutual help and support among the local communities) is disappearing. ➤ Young people are moving to urban areas and the number of elderly citizens is increasing. ➤ There is poor coordination between local government, NGOs, and citizens.
Opportunities	Threats
➤ The Shiga prefectural government’s willingness to reduce flood problems in the area (Shiga prefectural government’s recent initiatives to know the views and opinions of local residents).	➤ Until now, in the flood management plan of Shiga Prefecture, the community’s needs, opinions, and views are not well reflected. ➤ There is inadequate budget allocation for “river improvement.” ➤ The flood hazard map did not give any detailed information, and most of the citizens could not understand it.

Now, the challenge is to derive or identify potentially effective strategies from these internal and external strengths and weaknesses through collaboration between residents and the local government. For this, as previously mentioned, we have conducted a SWOT strategy analysis to identify how the internal and external merits and demerits of communities can be utilized and substituted to facilitate the formulation of a collaborative flood management plan. Table 3.4 shows how community external and internal strengths and weaknesses, which are based on the community's cultural domains and the government's institutional domains, can be utilized. Table 3.5 shows the collaboration of community and government to foster changes in cultural and institutional structure and function. It is proposed that the existing institutional set up should incorporate the cultural connotations of the risks. Therefore, the strategy would involve revitalizing the community's existing resources including traditional knowledge, power of local leaders, and providing support to the voluntary organization to organize disaster drills and workshops for public awareness. A more bottom up approach is identified as a pre requisite, which requires institutional and political changes, and a knowledge of the communities' views while preparing the hazard map, determining the evacuation shelters, or other tasks. The government as an institution would also try to induce a culture of self reliance and mutual help, which traditionally existed. Therefore, emerging strategies involve enhancing and restructuring the traditional cultural system and the local administrative and institutional systems.

3.4.2 SWOT Strategy Analysis to Identify the Subject, Purpose, and Method

Rauch (2007) indicated that the formulation of strategies starts with identifying the combinations of strengths or weaknesses. In other words, which strength or weakness is suitable for which opportunity or threat? As previously mentioned, SW means residents' internal factors and OT means government factors. Thus, the SO, ST, WO, and WT strategies mean collaboration between the residents and government. A related question is how such collaboration can occur. SO strategies are those that combine residents' advantages with government ones. ST strategies are those that combine residents' advantages to minimize the government's disadvantages. WO strategies are those that overcome residents' weaknesses by leveraging government resources. WT strategies are those that minimize residents' advantages and avoid any disadvantage to the government.

Table 3.5 shows how the community's external and internal strengths and weaknesses, which are primarily based on the community's cultural and government's institutional domains, can be utilized.

Table 3.5 shows the collaboration of the community and government to foster changes in cultural and institutional structure and function. It is proposed that the existing institutional set up should comprehend the cultural connotations of the risks. Therefore, the strategy would be to revitalize the community's existing resources including traditional knowledge, power of local leaders, and the provision of support to voluntary organizations to help organize disaster drills and workshops for public awareness. A more bottom up approach is identified as a pre requisite, which requires institutional and political changes such as knowing the communities' views while preparing the hazard map or determining the evacuation shelters, etc. The government as an institution should also try to induce a culture of self reliance and mutual help, which traditionally existed. Therefore, the emerging strategies are to enhance and restructure the traditional cultural system and the local administrative and institutional systems.

Table 3.5 SWOT Strategy Analysis in Shiga Prefecture

	Opportunities	Threats
Strengths	SO strategy ➤ The River Basin Policy Bureau of Shiga prefectural government should hold more discussions with local residents to know their opinions, needs, and views for improved flood preparedness. ➤ Therefore, more reciprocal interaction should be encouraged. People having flood experience and firsthand experience of flood fighting should be encouraged to be at the forefront of disaster management activities and planning. It is necessary to prepare a comprehensive flood management plan for Shiga Prefecture with mutual support and	ST strategy ➤ The River Basin Policy Bureau of Shiga Prefecture must communicate with, and convince, local people before any river development. The community's priorities and needs should be heeded before conducting the river development. ➤ If Shiga's prefectural government does not have enough money for the "river development," it should explore alternatives by involving community residents. ➤ The River Basin Policy Bureau of Shiga's prefectural government should explain what they can and cannot do about flood risk prevention, because the local

	help between the local government and local residents.	government cannot prevent flood risk all by itself.
Weaknesses	WO strategy ➤ There is an urgent need for land use control. No new construction should be allowed along the riverbed. ➤ The Shiga prefectural government should support voluntary organizations. ➤ The Shiga prefectural government should gain trust from the local residents to disseminate disaster information. Further, evacuation counsel for disasters should incorporate more urgency.	WT strategy ➤ Residents do not understand the “hazard map” by merely reading it or glancing at it. Residents may not be sufficiently aware of the actual flood risk by merely seeing the hazard map. Therefore, the River Basin Policy Bureau of Shiga Prefecture should help local citizens comprehend this map. More explanations of the map are necessary. It is not sufficient to provide information about evacuation and flood risks; the government should also ensure that local communities understand the message.

3.5 Discussion and Conclusions

This study is an attempt to examine community concerns and to utilize these concerns to increase the scoping options for improved flood risk management. The ultimate purpose of the “Concerns Table” is not limited to knowing the community concerns about the consequences of the flood risks, but also involves exploring the social and cultural reasons behind those consequences. Exiting and overflowing rivers during the rainy season is considered by the community as the main hazard. Exposure concerns the living environment. Communities and individuals that are identified as being exposed to floods include the younger generation, migrants and newcomers, foreigners, and residents in the new town area. There is a long list of concerns regarding flood vulnerability. The community’s concerns about flood vulnerability are primarily about the cultural sphere of life and the institutional and political system of the local area. Cultural aspects have emerged as critical factors responsible

for magnifying other social vulnerabilities. Cultural aspects such as gradually disappearing traditional knowledge and values, and a lack of flood experience among the young generation and newcomers have significant consequences. They not only contribute to making communities less knowledgeable about flood management, but also increase communities' vulnerabilities in the spheres of the family and institutional and organizational sub systems. For example, because of a lack of flood experience and knowledge, young people are ignorant about flood risks and are less willing to participate in disaster drills and other voluntary flood management activities. Institutional vulnerabilities have also appeared critical. The present disaster management practices and administrative set up do not pay much heed to the community's needs, priorities, and concerns. Further, there is no initiative by the local government and local communities to conserve local knowledge and to enhance the capacity of local traditional voluntary organizations. These two factors, cultural and institutional, have indirect impacts on community household, environmental, and economic aspects of flood risks. For example, the local government approach to reduce flood risks by structural measures has increased the cost of flood management. The existing administrative set up and risk communication system are regarded by the community as being unilateral and indifferent to community needs and priorities. Therefore, there have been few initiatives taken to improve communities' awareness and their cultural orientation to flood risks.

After the concerns table, we carried out a SWOT analysis in two phases to explore and identify possible strengths and weakness derived from the community's concerns on flood risks. Moreover, the SWOT strategy analysis gave us directions on how communities' concerns can be mobilized to identify options and strategies for improved flood risk management. The SWOT issue analysis revealed that cultural factors influence the community's internal strengths. The local communities are culturally rich in traditional flood management knowledge, have voluntary organizations, and enjoyed mutual support and human network to cope with floods. However, because of the lack of flood experience and the efflux of time, communities are gradually losing their traditional knowledge, and residents are unwilling to participate in flood risk reduction activities. SWOT issue analysis also revealed that external factors (that is, factors outside the community) affecting communities' capacity to fight against floods are primarily institutional in nature. The communities are endowed with voluntary organizations, and the local government has recently shown interest in listening to the community's concerns on floods. However, over the previous decades, the government had not

heeded the community's priorities and needs, and the risk community system was unilateral; this has increased communities' vulnerability to floods.

While identifying the internal and external strengths and weaknesses, the SWOT strategy analysis finally revealed how the strengths can be used to develop new knowledge and plans through collaboration between the local community and government. Therefore, the present study has quite effectively initiated the development of a methodology that can not only visualize the community's concern, but can also provide us with a direction for developing new knowledge and planning options for improved scoping and flood management.

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Chapter 4

Community Based Disaster Risk Governance (DRG) Processes: A Series of Workshops on the Muraida Community in Shiga Prefecture, Japan

4.1 Introduction

This chapter introduces a series of workshops on the Muraida community in Maibara City, Shiga Prefecture, Japan as a case study. Muraida faces potential flood threats because it is located near Ane River that lies just outside the community, while De River flows inside the community. Ten workshops were held in Muraida to cope with the flood risk during the years 2010 through 2013. The participants of the workshops were “the members of the residents’ association (10 people)” who are supported by facilitators including the officials of Shiga Prefecture, organizers from Maibara City, and the author. Many important concerns were expressed by the members of the residents’ association. The valuable information that was shared prompted the authorities to take quick action to reduce the community’s vulnerability to floods.

The objective of this chapter is to present changes in the concerns of Muraida community by dynamically using the concerns table. Through this process, we can foster a prompt response from the prefectural and city government.

4.2 Pre-assessment

4.2.1 Geographical Features

Muraida is a settlement located in Maibara City in Shiga Prefecture. The settlement has 111 households with a combined population of 385 people. The settlement is divided into two parts—“Kami” means the upper land and “Simo” means the lower land. The entire settlement is comprised

of eight clusters that include four each in Kami and Simo. The names of the clusters are : Kami Higashi, Kami Nishi, Kami Minami, Kami Kita, Simo Naka, Simo Nishi, Simo Minami, and Simo Kita (in English, Higashi, Nishi, Minami, Kita and Naka mean East, West, South, North, and Center, respectively).



Figure 4.1 Location of Muraida community, Shiga Prefecture in Japan
(Source: Shiga University international Homepage; Shiga Prefecture Homepage)

Yoko Mountain lies to the west of the settlement, and the Ane River, one of the largest rivers of Shiga Prefecture, runs along the north side of Muraida settlement. In 1959, a riverbank where the Ane River meets Yoko Mountain was destroyed by Typhoon Isewan. The difference between most of the high land (located in Kami) and most of the low lying land (located in Simo) is 6 meters. Another river called De River, which is active during the rainy season, flows into Ane River at the north end of Muraida. Usually, De River is used as an irrigation channel; however, if heavy rains fall, the amount of inflow from De River is greater than the amount of drainage out of Ane River. Consequently, the water may start to overflow, which may cause inundation. According to the report of the River Basin Policy Bureau of the Shiga Prefectural Government (2013), both Ane and De rivers are potential flood threats for the Muraida community.



Picture 4.1 Map of Muraida (Source: Google Earth)

4.2.2 Flood History

There were two major floods observed in Muradia in recent times, as shown in Table 4.1. According to the report of the River Basin Policy Bureau of the Shiga Prefectural Government (2013), both floods took place in 1959. In both cases, floods took place due to typhoons, and damage to crops and buildings was observed (see more details in Table 4.1). Notably, no human loss was reported.

Table 4.1 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 Ichimichi Bridge was damaged and inundated with water.



Picture 4.2 Ichimichi Bridge was damaged by Typhoon Isewan (1959)

(Source: Report of ‘regional reconstruction’ against flood risk at Muraida community, Maibara City, River Basin Policy Bureau of the Shiga Prefectural Government, Japan, 2013)

4.3 Outline of Workshops in Muraida Community

In Muraida community, 10 workshops were conducted from October 2010 through March 2013, focusing on the “basic policy of integrated flood risk management” in Shiga Prefecture. The participants of the workshops were the “the members of the resident associations (10 people),” who are supported by facilitators including officials of Shiga Prefecture and organizers from Maibara City. The author of the paper also participated as an audience member in the workshop conducted from 2011 onwards. During the workshop, the participants representing the citizen groups were encouraged to express their concerns, opinions about the possible hazards, and the potential role of the government and citizens to mitigate the risks. The local government attempted to assure the participants that all their concerns would be considered seriously to formulate the flood mitigation plan of the area. During the workshops, “the members of the resident associations” expressed many of their concerns. The information that “the members of the resident associations” shared prompted authorities to take quick action in reducing the city’s vulnerability to floods. The focus is on the residents and their opinions on their (potential) role in flood risk management, their prior experience with floods, and their trust in the government, as well as concerns over issues such as “integrated

flood risk management.” There were 10 workshops conducted between December 2010 and November 2012. However, the last workshop had the primary objective of summarizing the results.



Picture 4.3 Format of a Workshop

Table 4.2 Workshop schedule

Year	Date	Contents
2010	December 10	Confirm flood prone areas by simulation
2011	March 3	Field survey
	July 26	1. Need for evacuation information 2. Decision made to participate in the Disaster Imagination Game (DIG)
	October 7	Need for information about facilities and routes for evacuation
	November 27	The DIG process
	December 20	1. Need for information about rules for evacuation 2. Information gained through reflection on the DIG

		results
2012	February 3	1. Presentation of a community based hazard map 2. Plans for the future
	September 21	Discussion for report meeting
	November 23	Report meeting to community residents
2013	March 7	Summarization of all workshop meetings

4.4 Concerns Assessment Based on the Concerns Table

By using the concerns table, let us visualize and identify the residents' concerns. The author explains the concerns in detail as necessary.

4.4.1 The Workshop Concerns held on December 10, 2010

A local government member provided the “inundation map” (see Picture 4.3) and the “land height map” (see Picture 4.4) made by the Flood Control Office, Shiga Prefecture.

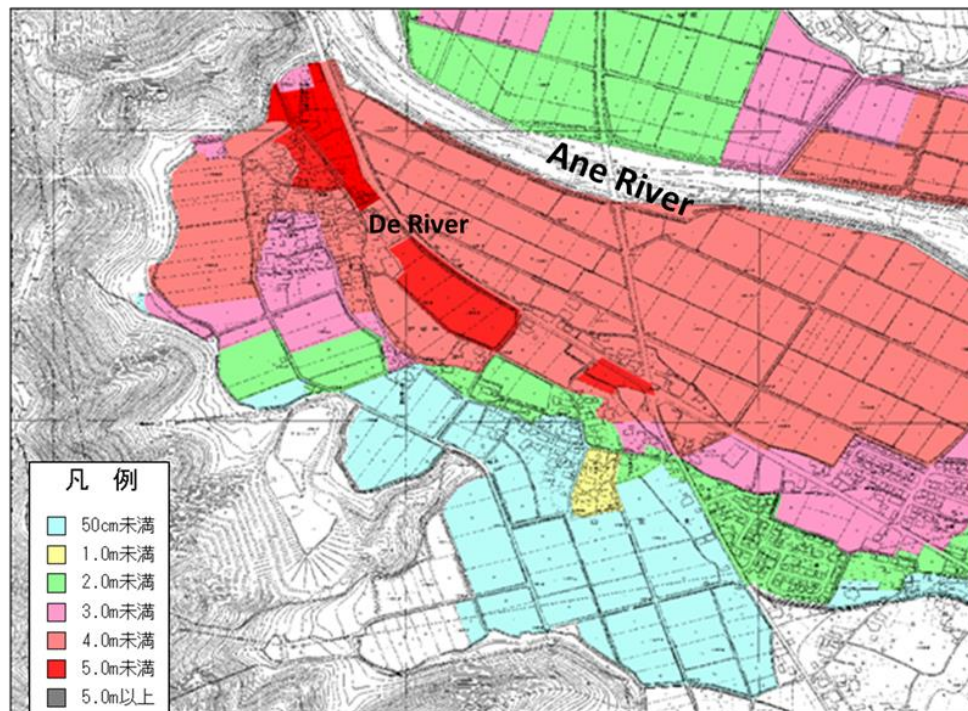


Figure 4.1 Inundation Map (Rain of once in 100 Years) of Muraida

(Source: Flood Management Office in Shiga Prefecture)

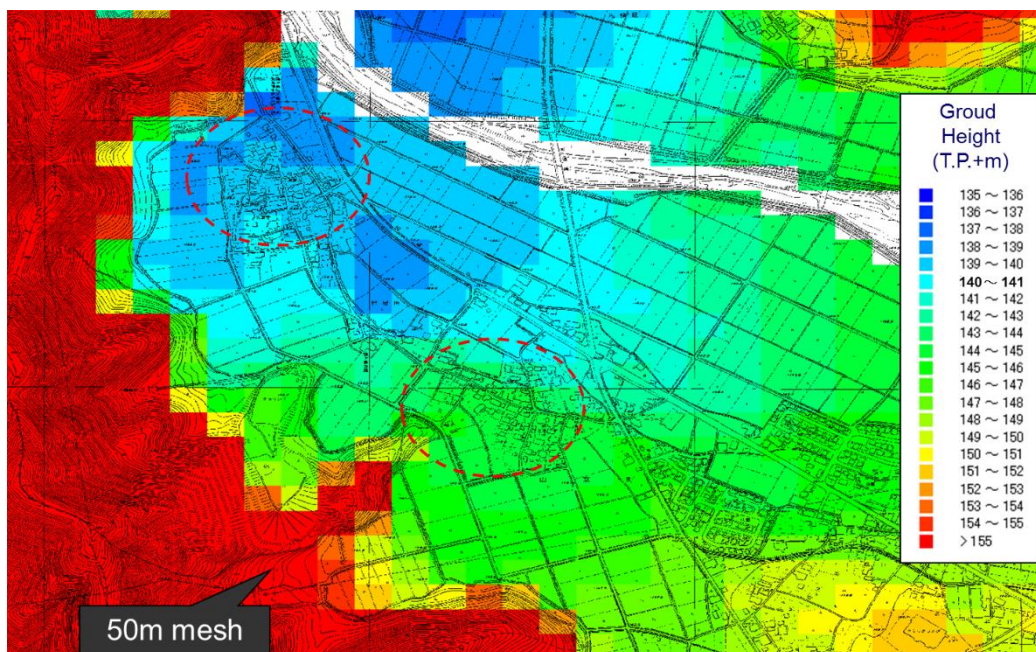


Figure 4.2 Ground height map (Source: Flood Management Office in Shiga Prefecture)

Table 4.3 Concerns table (Dec. 10, 2010)

Social Impacts	Hazards
Living environment (Livability)	➤ De and Ane Rivers can be inundated during the rainy season.
Social Impacts	Exposure
Living environment (Livability)	➤ Kami area is identified as a hazardous district and the level of water could be four meters high during inundation.
Social Impacts	Vulnerability
Living environment (Livability)	➤ There is a need to mark the “ground height” and “inundation height” on the street to decide the evacuation route.
Family and Community	➤ The members of the resident associations wanted a “resident to resident” information delivery system.

Institutional, legal, political, and equity impacts	➤ Community residents cannot trust the local government because of a lack of communication. There is a need for further intensive communication between local residents and the local government (the Shiga Prefectural Government).
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De and Ane Rivers can be inundated during the rainy season.

The Ane River is a “Class A river”³ that flows north of Muraida, to Lake Biwa. If the river is at the 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.

Kami area is identified as a hazardous district, and the water level could be four meters high during inundation.

Kami area is higher than Simo area. However, there are some “inundation hazardous districts” in Kami area as well as Simo, according to the Inundation Map (see Picture 4.3) that simulates “rain of once in 100 Years” sourced from the Flood Control Office of Shiga Prefecture.

There is a need to mark the “ground height” and “inundation height” on the street to decide the evacuation route.

Resident wanted an “indicator board” showing the directions to the “evacuation center” and an

³ River systems deemed important for the national economy and people's lives are designated as Class A river systems and administered by the Construction Ministry. The others are designated as Class B river systems and administered by the prefectural governors. Class A river systems are further sub classified as "Trunk rivers" and "Others"; the "Others" are administered, except for the approval of certain specified water rights, by the prefectural governors. Some sections of small tributaries of both class A and class B rivers, where part of the River Law is applied, are identified. The others are administered by the mayors of cities, towns, and villages. Other smaller rivers not mentioned above, to which the River Law is not applied at all, are administered by mayors. The River Law stipulates that any utilization of land and river water within the sections defined by the River Law must be approved by the designated river administrator. The total length of class A rivers, which include 109 river systems, is approximately 87,150 km; the length of class B rivers, which include 2,691 river systems, totals approximately 35,720 km; and the total length of rivers to which the River Law is applied was approximately 132,870 km as of June 1993. Class A rivers are under the direct control of the Construction Ministry. The major portion of funds for national projects comes from the national budget, and the remainder comes from local budgets. (homepage of the Ministry of Land, Infrastructure, Transport, and Tourism)

indication of the “ground height” and the “inundation height” in a manner that was easy to understand. These concerns led to the introduction of the “Marugoro machigoto” hazard map⁴.

Residents wanted a “resident to resident” information delivery system.

Local governments also provide “water level” information by terrestrial digital broadcasting, “flood forecast” information (three hours before) on the “disaster prevention information homepage” of Shiga Prefecture, and cell phone information. However, residents wanted a “resident to resident information delivery system” to operate autonomously. An important reason to create this system is that the “wireless station for disaster prevention” does not operate on days with heavy rainfall.

Residents cannot trust the local government because of a lack of communication. There is a need for further intensive communication between local residents and the local government.

Residents believed that the local government would quit the “river improvement (structural measure)” because the local government emphasized only “non structural measures” by residents in this workshop. Naturally, the local government did not quit the “river improvement.” Before starting the workshop, local government members should communicate the following message.

“River improvement is now in progress. However, it takes 20-30 years to complete. Further, while conducting the “river improvement,” the probability of additional floods always exists. Hence, residents would need ‘non structural measures.’ The local government can help in this respect. What are the residents’ concerns? ”

4.4.2 The Workshop Concerns on March 3, 2010

Muraïda workshop members conducted the “field survey of Muraïda” to check “topography features,” “flood prone areas” which residents know and consider, and the “evacuation site.” Further, Muraïda workshop members reviewed the “ground height measure” to check the “low ground areas” with engineers.

⁴ In English, this translates as a warning sign located at an expected flood site.

Table 4.4 Concerns table (Mar. 3, 2010)

Social Impacts	Hazards
Living environment (Livability)	De and Ane Rivers can be inundated during the rainy season.
Social Impacts	Vulnerability
Living environment (Livability)	➤ There is a need to mark the “ground height” and “inundation height” on the street to decide the evacuation route. ➤ The grounds of Garyu Park are not suitable for shelter against the flood risk.
Family and Community	➤ Citizens of Kami think that they are not at risk.

De and Ane Rivers can be inundated during the rainy season.

To check the “water level” of Ane river on days of heavy rains, workshop members decided to set “a water gauge” and “a water level sign board,” and to distribute “a water level sign poster” (see Picture 4.5). A water level signboard indicates the water level by calculating the water level of an observation post. The closest observation post is Ibuki Bridge (almost 3 Km from Ichimichi Bridge). If floods were expected, residents could check the water level of Ibuki Bridge from the Internet or from digital broadcasting sources (see picture 4.6), and then prepare for, or decide on, evacuation.

Significantly, the members of the resident associations requested for the setting up of a “water gauge” at some places on the De River even if the water level signboard cannot be provided because of the difficulty of calculating the water level from the observation post (Ibuki Bridge). To set the “water gauge” at well known places on De River, it is helpful to prepare and decide on the “evacuation” by easily determining the “water level.” Because the inundation information regarding De River is difficult for the local government to acquire at an early stage of heavy rainfall, evacuation areas could not be decided.



Picture 4.4 A water level board at the Ichimichi bridge

(Source: Report on “regional reconstruction” against flood risk at Muraida community, Maibara City, River Basin Policy Bureau of the Shiga Prefectural Government, JAPAN, 2013)

The grounds of Garyu Park are not suitable for shelter against flood risk.

The members of the resident associations conveyed that many community residents regarded the grounds of Garyu Park as a “shelter” because the park is located on high ground. Further, community residents conduct the “fire disaster drill” every year at Garyu Park. The members of the resident associations highlighted two problems concerning the grounds of Garyu Park. First, there is no place to take shelter from the rain and wind. Second, evacuees cannot use electricity and general telephones. Therefore, the grounds of Garyu Park are not suitable as shelter.

Citizens of Kami think that they are not at risk.

As discussed, during the workshop on December 10, 2010, residents expressed a concern on the four meter “inundation hazardous districts” in Kami area. An important concern is that many residents who live in Kami area think that their area is not prone to floods because Kami area is higher than Simo area. It is necessary to inform them that Kami area is not safe for residents.



Picture 4.5 Digital broadcasting image

(Source: Report on “regional reconstruction” against flood risk at Muraida community, Maibara City, River Basin Policy Bureau of the Shiga Prefectural Government, JAPAN, 2013)

4.4.3 The Workshop Concerns on July 26, 2011

Following Typhoon Isewan (1959), few typhoons struck Muraida. However, Typhoon No. 6 (July 19, 2011) struck before this workshop. The members of the resident associations discussed the concerns caused by this typhoon.

Table 4.5 Concerns table (July 26, 2011)

Social Impacts	Hazards
Living environment (Livability)	➤ Typhoon No. 6 had struck just one week before the workshops and people experienced the devastation. Because of this typhoon, trees had fallen in Ane River and the water level had risen.
Social Impacts	Exposure
Living environment (Livability)	➤ The sluice gate of De River is quite old and, therefore, falling trees may damage the sluice gate, thereby causing floods.
Social Impacts	Vulnerability

Living environment (Livability)	➤ ‘Tatsugahana meeting hall’ is more suitable than the Garyu Park grounds but not sufficient.
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Typhoon No. 6 had struck just one week before the workshops and people experienced the devastation

Ane River did not raise the water level; however, it is possible that the water level rose because of the trees that had fallen in Ane River. The water level of De River rose (by almost 15 cm), and water spurted out of the pipe across Route 365. Further, many irrigation dikes in Muraida are dangerous.

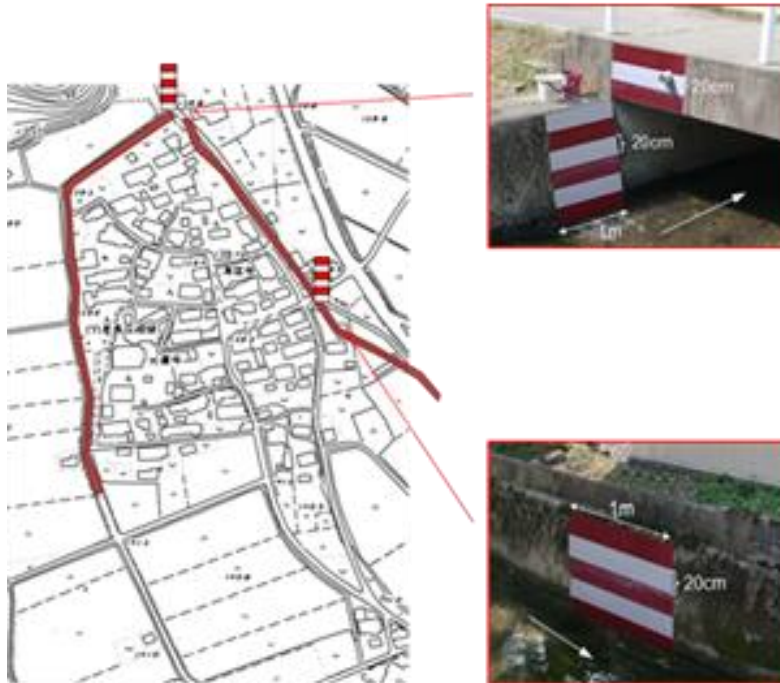
Tatsugahana meeting hall is more suitable than the Garyu Park grounds but not sufficient.

“Tatsugahana meeting hall” is located at a higher elevation and can offer protection from the rain and wind. However, “Tatsugahana meeting hall” is not large enough to accommodate the evacuation of all residents. Further, some roads approaching the meeting hall are at a lower elevation; therefore, the hall cannot be used for shelter.

The members of the resident associations wanted to provide flood risk information and information on the “evacuation site” to community residents. Hence, the workshop members decided to conduct the DIG.

4.4.4 The Workshop Concerns on October 7, 2011

The positions of the “water gauges” on De River were decided. One position was recommended by the local government (midstream of De River) and the other position was decided by the residents (downstream of De river) (see Picture 4.6). Further, they decided to use the 10 Marugoto Machigoto Hazard maps as warning signboards at expected flood sites. This decision was covered by a TV news program on October 20, 2011 (NHK). Further, a newspaper article covering this decision appeared on October 8, 2011, in the Kyoto Shinbun News. The decision was considered newsworthy because this was the first time the maps would be used in Shiga Prefecture.



Picture 4.6 The water gauges on the De River



Picture 4.7 Marugoto Machigoto Hazard Map design sample and News Article, October 8, 2011, Kyoto Shinbun News.

Table 4.6 Concerns table (Oct. 7, 2011)

Social Impacts	Hazards
Living environment (Livability)	➤ A few years earlier, because of heavy rain, one person died at the agriculture irrigation canal. ➤ Many ditches run along the community road.
Social Impacts	Vulnerability
Living environment (Livability)	➤ The writing on the Marugoto Hazard Map is too small and, therefore, old people cannot read it. Moreover, there are English subtitles, which are not required because there are no foreigners in Muraida.
Family and community	➤ The members of the resident associations wanted an evacuation rule for “Persons needing aid in disasters.”

The members of the resident associations wanted an evacuation rule for “Persons needing aid in disasters.”

The members of the resident associations mentioned that there is no evacuation rule for “persons needing aid in disasters” in Muraida. “Community welfare commissioners” can check them every year. Workshop members discussed making a rule for “persons in need of aid in the event of a disaster” including “community welfare council” members.

4.4.5 The Workshop Concerns on November 27, 2011 (DIG)

This workshop was held with 49 community residents. It discussed shelters, routes, and rules for conducting the DIG process. Community residents shared their concerns and information about the shelters, evacuation rule, and routes. The DIG is a method used to help people learn more about disaster prevention. Participants brainstorm to develop ideas that might be used to strengthen local disaster planning. The objectives of the DIG are to identify the potential hazards in the area and to identify and recognize the actions that should be taken in the post disaster phase (Na, 2010). Komura (2004) and Na (2010) explain the steps in the DIG process as follows:

“a) The DIG methods and procedures are introduced by a facilitator or group of facilitators to the community members. b) The DIG process begins with risk mapping and risk identification. In order to perform risk mapping, a base map of the local area is provided to the participants. The map is

covered with a transparent overlay. The participants, mostly the local residents, are asked to identify and mark the areas of potential strength and weakness on the transparent overlay. Participants generally identify and mark public buildings, roads, and natural resources. They also note the geographical nature of each site. c) Once the participatory mapping is completed, the facilitator introduces a theoretical disaster situation and asks the participants to consider possible actions that could reduce risks and help residents cope with the situation. d) As a culminating activity, results of the discussions are summarized and a presentation of the findings is made to the participants.”



Picture 4.8. The DIG process (clockwise from left top: guidance, map making, field survey, and presentation of results).

This workshop focused specifically on the personal views and perceptions of individual attendees. Prior to the actual exercise, members of the resident associations performed three important activities to improve resident participation:

- a) They distributed a community newspaper to provide information about the DIG process and to inform residents about when the DIG would occur.
- b) Group leaders called each household to encourage participation in the DIG.
- c) The members announced the start of the DIG over the community wireless system on the morning of the event.

At a group meeting, a representative from each household was designated to participate in the DIG. A total of 49 residents, each representing a household, participated in the DIG. Their participation is equivalent to approximately 13% of the total population. Alternatively, if the figures are viewed as representative of households, their participation is equivalent to approximately 44% of total households.

Table 4.7 Concerns table (November 27, 2011)

Social Impacts	Capacity
Living environment (Livability)	➤ Tatsugahana Meeting Hall is located in the center of Muraida, and includes a house that can protect against rain and wind. Therefore, Tatsugahana Meeting Hall is designated as the evacuation center for both Kami and Simo regions. However, there is a problem in that this site is not big enough to accommodate the anticipated number of evacuees. Some districts are too far to evacuate to this site. In addition, the road leading to Tatsugahana Meeting Hall is at a lower elevation. ➤ Sohou temple for the Kami area and Tatsugahana Meeting Hall for the Simo area. They also determined the following: a) If the water level is high on the route to Tatsugahana Meeting Hall, evacuees should go to Koun temple; b) At the onset of a flood, Kami residents should consider moving to the second floors of their homes. ➤ Residents use the Nakamichi road for evacuation. If the Nakamichi road is flooded, residents should detour to the farm road.

Family and community	➤ Proposing an evacuation rule based on DIG result: Upon receipt of information from the local government, the community leader will contact each group leader to provide information and updates. Each group leader will then contact the residents in their group and relay information. Flood warnings will be broadcast over the community wireless system
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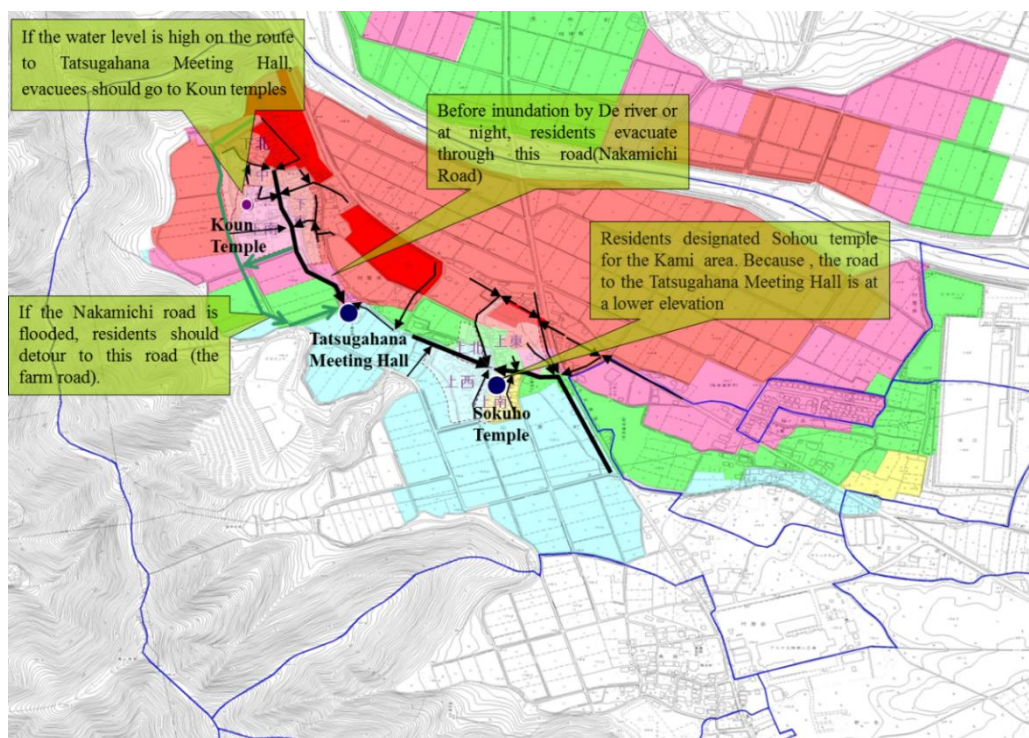


Figure 4.3 Evacuation plan reflecting the DIG results

4.4.6 The Workshop Concerns on Dec. 20, 2011

The members of the resident associations designated eight Marugoto Machigoto Hazard maps. Initially, they wanted to designate 10 areas. However, the flood simulation revealed that 2 of the 10 areas had a 0.0 m inundation. Hence, they were removed from the list.

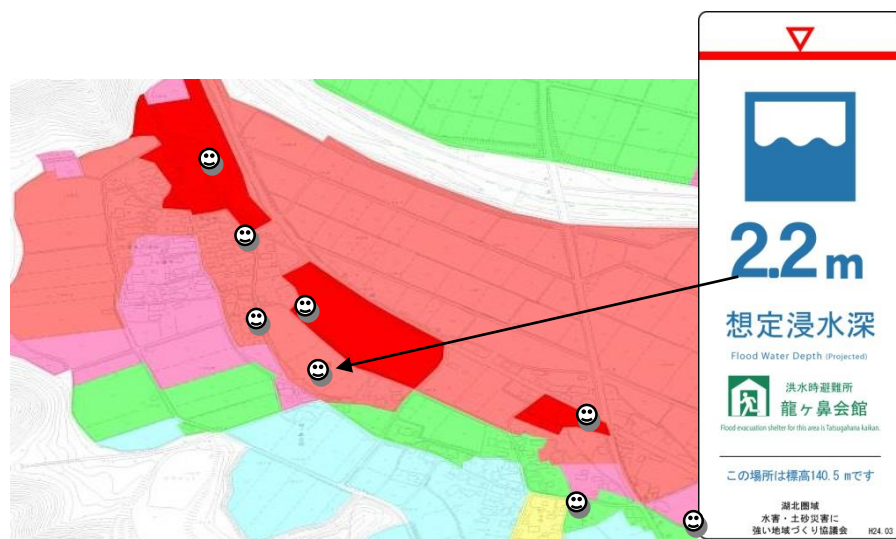


Figure 4.4 Eight Marugoto Machigoto Hazard map locations and sample

Table 4.8 Concerns table (Dec. 20, 2011)

Social Impacts	Exposure
Living environment (Livability)	➤ Muraida community does not hold any management and ownership rights to the sluice gate located at the mouth of De River; it belongs to Anekawa Engan Tochi Kairyoku (reformed shore district at the Ane River). Therefore, Muraida community depends on Anekawa Engan Tochi Kairyoku for the maintenance of the sluice gate that is too old and can cause flooding because of falling trees.
Social Impacts	Capacity

Living environment (Livability)	➤ Consequent upon the DIG exercise, the community wants to put the Marugoto Machigoto Hazard map in eight flood prone areas and wanted to exclude the other two places as per the previous plan, because the results of the recently conducted simulation show that the chance of flood inundation would be 0.0 m in those two places. ➤ During the DIG workshop, evacuation routes and shelters were finalized. However, after the DIG workshop, the participants have realized that it is not wise to insist on fixed evacuation shelters and evacuation, because the proposed road could be unapproachable, blocked, or submerged during an emergency. Therefore, instead of insisting on fixed evacuation routes and shelters, it would be wise to leave it to people's discretion as to which routes or shelters they would prefer based on their present situation and opportunity.
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4.4.7 The Workshop Concerns on Feb. 3, 2012

The Muraida community leader presented a community based hazard map that reflected both the DIG results and the findings from the workshops. The salient points of the hazard map are as follows.

- a. The only hazard shown on the map is flood risk. Other hazards were omitted to make the map easy to understand.
- b. The map includes the eight Marugoto Machigoto Hazard map areas as well as the name and location of each household in each area.
- c. An asterisk marks the location of possible areas along the evacuation route that may become inundated during a flood.
- d. A "Risk" symbol marks a location with relatively low elevation. This symbol warns residents of potential danger if they reside in that area.
- e. The map indicates that Sohoku temple and Koun temple are designated as evacuation sites. Tatsugahana Meeting Hall is designated as a shelter.
- f. "→" means "route to the evacuation site."

g. The map includes a suggested emergency supply list.



Picture 4.9 Muraida community based hazard map that reflects the DIG results

Table 4.9 Concerns table (Feb. 3, 2012)

Social Impacts	Capacity
Living environment (Livability)	➤ Members of the resident associations decided that they would explain the Marugoto Machigoto Hazard map and the use of the simple water gauge at a general meeting of residents. Workshop members decided to hold a workshop for this, which may help to disseminate flood related information.
Institutional, legal, political, and equity impacts	➤ The Social Welfare Department of the city office has already registered vulnerable people as the “Persons needing aid in disasters” to provide special care and support to them during an emergency. However, there are many individuals or households who may come under this category, but who have not yet been registered by the city office. As a result, they cannot enjoy the information and special support offered by the social welfare department. The community faces many difficulties over the issue of “Persons needing aid in disasters” because of these unregistered persons. Therefore, it is decided that the existing list of “persons needing aid in disasters” would be revised and updated by the local community through the involvement of the same group members. Once the list of members is revised, their house location would be marked on the community based hazard map. Moreover, as the support from the local government takes time to reach such victims during emergencies, the ability to help such people will be enhanced by capitalizing community resources before other outside support becomes available.

The Social Welfare Department of the city office has already registered vulnerable people as “Persons needing aid in disasters” to provide special care and support to them during emergencies.

However, there are many individuals or households who may come under this category, but who have not yet been registered by the city office. As a result, they cannot enjoy the information and special

support offered by the social welfare department. The community faces many difficulties over the issue of “Persons needing aid in disasters” because of such unregistered persons. Therefore, it is decided that the existing list of “persons needing aid in disasters” would be revised and updated by the local community with the involvement of the same group members. Once the list of members is revised, their house location would be marked on the community based hazard map. Moreover, as the support from the local government takes time to reach such victims during emergencies, the ability to help such people will be enhanced by capitalizing community resources before other outside support becomes available.

4.4.8 The Workshop Concerns on September 21, 2012

There was heavy rain (50 mm/hr) in Muraida on September 18, that is, before this workshop. The members of the resident associations discussed their concerns arising because of this heavy rain. Further, the purpose of this workshop was to create a plan for the “report meeting” for the community residents. The date was decided as the annual “disaster drill day” in December. The places and methods of organizing the meeting were supposed to be the same as the DIG in 2011.

The community based hazard map was enhanced (see Picture 4.10) by incorporating the residents’ opinions. Although most features remained unchanged, the following new features were included.

- 1) The pictures of nine risky areas were included. Among the nine areas, two are areas where residents actually died because of the inundation.
- 2) The “isolated lands” of Muraida were included. Residents’ names and house locations were included. Information about flood risks and emergency goods were printed on the other side (see Picture 4.11).

Table 4.10 Concerns table (March 7, 2013)

Social Impacts	Hazard
Living environment (Livability)	➤ Heavy rain in September raised the water levels of the Ane and De Rivers, which look very dangerous (see pictures 4.8 and 4.9). The water level increased rapidly within an hour. If the rain had continued,

	flooding might have taken place. Further, the flow of the river could have breached the “river walls” at the bends of Ane River.
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Picture 4.10 The De River on September 18 (left) and September 19 (right)
(Source: Muraida community resident)



Picture 4.11 Ane River on September 18 (Source: Muraida community resident)

4.4.9 The Workshop Concerns on November 23, 2013

On November 23, 2013, the “report meeting” was held with Muraida community residents (48 residents in total) and workshop members. The agenda included: first, reporting on how the flood risks were handled during two years and, second, sharing concerns about coping with flood risks by using the community based hazard map.

Table 4.11 Concerns table (November 23, 2013)

Social Impacts	Vulnerability
Living environment (Livability)	➤ Syoren Temple and Kita Mountain are not recommended as evacuation sites because they are vulnerable to landslides. ➤ It is desired that “proposing shelters” is preferable to “deciding these.” ➤ The Muraida community based map should be enhanced continually (with information including, but not limited to, all residents’ names and house locations, the evacuation shelter’s telephone number, and manhole locations)
Family and Community	➤ Evacuation is not encouraged by foot or by car. Some residents wanted to use cars for evacuation. However, this might cause traffic.
Institutional, legal, political, and equity impacts	➤ Collaboration is needed with “community welfare commissioners” for “Persons Needing Aid in Disasters.”

4.5 Scoping

4.5.1 SWOT Issue Analysis

We can visualize and map Muraida residents’ concerns using the concerns table. The “concerns table” would provide us with a broad picture of the residents’ concerns on the social and cultural impacts of flood risks. To utilize and integrate those concerns into the risk management and planning process through an improved scoping process, the SWOT analysis perspective has been introduced in this

study. Two types of SWOT analyses have been carried out, “SWOT issue” analysis and “SWOT strategy” analysis.

Table 4.11 SWOT issue analysis

Strength	Weakness
➤ “The members of the resident associations” are very interested in flood risks (the workshops were held seven or eight times at first, but the members requested more workshops to solve their problems regarding flood risks). ➤ The community started initiatives on flood risk management. ➤ Residents’ risk awareness is growing because of the workshops.	➤ De River is often inundated. ➤ Ane River is seldom flooded, but once flooded, it becomes swollen. ➤ The Kami area is the most potentially hazardous zone but the community believes it is a safe place. Many ditches and agricultural irrigation canals run along the community road. ➤ Non participants in the workshops do not have proper knowledge and awareness of the existing risks. ➤ There is a lack of proper criteria and parameters to identify the “persons needing aid in a disaster.” ➤ The Muraida community wants to remove or repair the sluice gate of De River.
Opportunity	Threat
➤ The local government is willing to reduce flood problems in the area as promptly as possible (the local government tried to solve the “concerns about De River and Ane River” and assisted on the sharing information with community residents about flood risks by holding the “DIG” and “Report meeting”).	➤ After the workshop, the officials of Shiga Prefecture did not visit the community frequently, and the relation between citizens and the local government city office may have weakened. ➤ The “river improvement” of Ane River has not been completed yet.

4.5.2 SWOT Strategy Analysis

The SWOT strategy analysis gave us directions on how the community's concerns can be mobilized to identify options and strategies for improved flood risk management. The SWOT issue analysis revealed that it is the cultural factors that influence the community's internal capacities. The local communities are culturally rich in traditional flood management knowledge, have voluntary organizations, and used to enjoy mutual support and human networks to cope with the floods. However, because of a lack of flood experience and the efflux of time, these communities are gradually losing their traditional knowledge, and residents are not willing to participate in the flood risk reduction activities. The SWOT issue analysis also revealed that the external factors (that is, factors outside the community) affecting communities' capacity to fight against floods are primarily institutional. While identifying the internal and external strengths and weaknesses, the SWOT strategy analysis finally showed how those strengths can be used to develop new knowledge and plans through collaboration between the local community and government. Therefore, the present study has provided quite an effective impetus to develop a methodology that can not only visualize the community's concern, but can also provide the direction to develop new knowledge and planning options for improved scoping and flood management.

Table 4.11 The SWOT strategy analysis

	Opportunities	Threats
Strengths	SO strategy ➤ The community leader and eight group leaders should share information with all residents regularly through community meetings, and be supported by the "Flood Management Office of the River Basin Policy Bureau" in the Shiga Prefecture government to	ST strategy ➤ The members of the resident associations utilize "regular meetings" and "community events" to execute the flood risk reduction plan with community residents.

	sustainably enhance the capacity against flood risks.	
Weaknesses	WO strategy ➤ “Two water gauges” are set to check the water level of De River because the river is often inundated. ➤ “A water gauge” and “a water level signboard” are set to check the water level of Ane River. ➤ Marugoto Machigoto hazard maps were set at flood prone areas in the community. ➤ A suitable evacuation site and approach roads were recommended. ➤ The community based hazard map that included the above information was prepared and distributed by eight sub group leaders.	WT strategy ➤ The members of the resident associations should adopt non structural measures that are planned by workshops. ➤ “Persons needing aid in disasters” should identify eight sub leaders with a “community welfare commissioner.” Then, the community based hazard map should include their information after obtaining their consent. ➤ The members of the resident associations should provide more details and deliver documents that include the risks of not maintaining the sluice gate to the “reformed shore district at the Ane River”.

SO strategy

The Muraida community conducted a series of workshops during the years 2010 through 2013, where local residents expressed their concerns about flood risks. The Flood Management Office of the River Basin Policy Bureau in the Shiga Prefecture government, which conducted and led this workshop, responded promptly and took action to make the city less vulnerable to floods as much as they possibly could. This is the result of collaboration with the “strength” that Muraida is a vitality community and the “opportunity” that the local government is eager to reduce the flood problem in the area. The community leader and eight group leaders should share information with all residents regularly through community meetings, which should be supported by the “Flood Management Office

of the River Basin Policy Bureau” in the Shiga Prefecture government, to enhance the capacity against flood risks in a sustainable manner.

ST strategy

After the workshops, the officials of Shiga Prefecture infrequently visited the community, and the relationship between citizens and the local government city office may have weakened. Ultimately, the responsibility for executing the flood risk plan sustainably rests with the residents and they are accountable for it. In the Muraida community, there is a well conceived residents association system. Once a year, the household representatives gather at Tatsugahana meeting hall and elect their community leader. The person who receives the most votes becomes the community leader, i.e., the leader of the resident association (the community leader cannot serve consecutive terms and cannot again become a community leader within 3 years). Further, in the eight sub groups, people take turns to become each sub group’s leader. Each sub leader selects a vice sub leader. Further, a vice sub leader becomes the group leader the following year. The community leader and all eight sub group leaders have regular meetings once a month at Tatsugahana Meeting Hall to discuss critical issues concerning the settlement and community. Further, the members of the community association are reported in the community newspaper, which provides a summary of the discussion at the regular meetings that take place once a month. They all feel a strong sense of responsibility towards their roles.

The members of the resident associations conduct “community events” with community residents every year. For example, the community spring clean event in March, the sports event in May, and the disaster drill in November. The members of the resident associations should utilize these “community events” to execute the flood risk reduction plan.

WO strategy

It is no exaggeration to say that the reason why the workshops were held at Muraida was to establish the WO strategy. The workshop members discussed the weakness, and proposed countermeasures. First, “two water gauges” were set to easily check the water level of De River because the river is often inundated. Specifically, one of water gauges was set at the place desired by residents. Second, “a water gauge” and “a water level signboard” were set to check the water level of Ane River because it is seldom flooded, but if it floods, the damage would be immense. Third, the Marugoto Machigoto

hazard maps were provided because there are flood prone areas throughout the community, even though the Kami area is higher than the Simo area. Fourth, there are many ditches and agricultural irrigation canals. These are risky because they get inundated quickly. Suitable evacuation sites, roads, and rules were shared and proposed by the DIG. Finally, community residents created the “community based hazard map,” taking the initiative to include the above information. The community based hazard map was distributed by eight sub group leaders to every household for nonparticipants who did not have proper knowledge and awareness of the existing risks of the DIG and the “report meeting.”

WT strategy

“River improvement (i.e., structural measure)” of Ane River has not been completed. Further, after the workshops, officials of the Shiga Prefecture infrequently visited the community. Therefore, the members of the resident associations should adopt non structural measures that are recommended by the workshops.

First, concern about “persons needing aid in disasters” was expressed several times in the workshops. In the final workshop, the concern was discussed seriously but could not be resolved conclusively. Community residents should themselves help “persons needing aid in disasters” when floods occur. The members of the resident associations stated that they are aware of “persons needing aid in disasters” who have registered for the emergency telephone service. However, if those individuals do not renew their service, it will be difficult to establish contact with them during disasters. Information about “persons needing aid in disasters” is available only to community welfare commissioners. The information is sourced from the Department of Social welfare, Maibara City government. The community leader suggested that the names of vulnerable individuals and their locations be added to the community based hazard map. Hence, it can be considered that eight sub group leaders should identify “persons needing aid in disasters” in their areas. Subsequently, the community based hazard map should include their information after obtaining their consent.

Finally, the sluice gate at the mouth of De River was expected to obstruct the flow of the river during flooding. The members of the resident associations want to remove or repair it. However, the owner of the sluice gate is the “reformed shore district at the Ane River” (in Japanese, Anekawa engan tochi kairyouku). Therefore, the members of the resident associations requested the removal and maintain of the sluice gate to the “reformed shore district at the Ane River.” However, the “reformed shore

district at the Ane River” replied that removing the sluice gate would be difficult because of irrigation. The members of the resident associations should elaborate on, and deliver the document that describes the risk when the sluice gate is not maintained, to the “reformed shore district at the Ane River.”

4.5 Conclusion

This chapter discusses and presents changes in community concerns by dynamically using the concerns table. Through this process, the authors gained a better understanding of the problems faced by residents when they attempt to develop a flood reduction plan.

Simply put, countermeasures taken by community residents against potential hazards play an important role in risk management. For example, when residents create hazard maps, they are not just plotting shelter locations for estimated flood areas. They are also sharing information such as evacuation routes and timings with both the government and community members. Therefore, if the concern assessments of residents are not conducted, the residents may devote less time to risk management. Residents possess knowledge and understanding of community concerns that might be harder to grasp by outsiders or experts. Although experts possess general knowledge about the many kinds of disaster damage, in many cases, they may learn about more specific concerns (e.g., the range and limits of actions due to unique community environments or the extent or route of the damage) through communication with residents.

In Shiga Prefecture, the local government held many flood reduction workshops in the identified flood areas. The Muraida community in Maibara City conducted ten workshops during the years 2010 through 2013. Many important concerns were expressed by stakeholders. The valuable information shared by stakeholders prompted authorities to take quick action to reduce the city’s vulnerability to floods. Prior to participation in the DIG, potential vulnerabilities in Muraida were identified and discussed. Following DIG participation, concerns were identified and efforts were made to address them. Although gains were made, some problems still need to be resolved. However, all of these problems can be solved through the use of sustainable flood risk governance.

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Chapter 5

Community Led Disaster Risk Governance (DRG) Processes: A Series of Workshops in Rajiv Gandhi Nagar, Dharavi, Mumbai, India

5.1 Introduction

This chapter discusses a series of workshops conducted in Rajiv Gandhi Nagar, in Mumbai's Dharavi area. India's financial capital Mumbai is a low lying coastal megacity and a risk management "hot spot." Here, flooding is an annual phenomenon. This chapter discusses community led flood risk management action plan development as it occurs in Mumbai. Ten workshops that included the YSM were held here in 2011 and 2012. After conducting the workshop exercises and preparing a plan, the Rajiv Gandhi Nagar community implemented some of its proposals during the first phase of its plan. This chapter investigates this process to provide a platform by which risk awareness and knowledge can be used to share hopes and visions and stimulate collaborative plan development within a flood risk governance framework.

5.2 Pre-assessment: Mumbai City, Prevailing Disaster Risks, and the Importance of Participatory Disaster Risk Management

As identified by the IPCC (Intergovernmental Panel on Climate Change), Mumbai is among the 21 most vulnerable coastal megacities of the world, (Misra and Shukla, 2012). The city's growth has been rapid and uncontrolled. An influx of migrant workers has seen the population rise from 9.9 million in 1981 to 13.0 million in 1991 and to 17.7 million in 2001 (Census of India, 2001). Rapid and unplanned development took place to cater to this sudden rise in population, leading to serious environmental degradation (Parthasarathy, 2009). In response to existing and potential risks, a disaster management plan was prepared and put into operation by the municipal government, the Municipal Corporation of Greater Mumbai (MCGM), for the area under its jurisdiction (Misra and Shukla, 2012). Though the city's disaster management plan came into force in 1999, the city experienced its most severe urban flooding on July 26, 2005. Within 24 hours, the city received 944

mm of rainfall, a 100 year record (Bohra et al., 2006). The immediate impact of the heavy rainfall was the total collapse of the city's transportation and communication systems (Government of Maharashtra, 2006). At least 419 people lost their lives, including 65 in landslides (Samaddar, 2012). In addition, 216 people died from various deluge related epidemics. Many buildings were damaged: 2000 residential buildings were destroyed while 50,000 were partially damaged, and 40,000 commercial establishments suffered heavy losses (Gupta, 2007). Total losses amounted to between 3 to 5 billion dollars (Stecko and Barber, 2007).

The devastation of the 2005 flood revealed the importance of collaborative and participatory flood disaster management and planning. Mumbai's flood victims were the poorest of the poor; they suffered the most and were the first to suffer (Samaddar et al., 2011). They comprise more than 65% of the city's population, but their lack of political, social, and economic power and resources accelerate their vulnerability and limit their stake and voice in the city's development and disaster management process (Misra and Shukla, 2012; Surjan et al., 2009). For example, after the flood, a joint committee called the Mumbai Disaster Management Committee (headed by an Additional Chief Secretary) was set up to deal with disaster and emergency risks. This committee includes representation from a wide swath of government agencies, including police, military, transportation, government, food supply, and metrology experts; notably absent, however, are non governmental and civil society representatives (Someshwar et al., 2009), despite the fact that local participatory platforms and community driven groups have played significant roles in Mumbai's disaster and environmental risk reduction activities (Surjan and Shaw, 2009). For example, ALM (Advanced Locality Management), a group partnership of local municipal agencies and neighborhood groups (usually consisting of 1000 households) has played many important roles in neighborhood development and management, including solid waste management, water supply and drainage system management, and flood rescue and relief operations (Surjan et al., 2009). The efficient management of the city's disaster risk requires that the capacities of such participatory platforms and programs be enhanced and the community's self reliance induced. The 2005 Mumbai flood showed that local governments cannot always set up local emergency management centers and engage in rescue and relief activities as quickly as necessary (Gupta, 2007; Bhagat, 2006). Local rescue and relief management teams were sometimes unable to respond quickly after the flood, especially in slum areas. Many people, particularly in poor communities, lacked food, drinking water, and emergency health care services for days or, in some places, for a week (Tatano and Samaddar, 2010; Samaddar et al.,

2011). Moreover, poor people living in Mumbai's low lying Mithi river valley regularly experience hazardous flooding, which is not expected to improve, as the costs of further flood risk reduction would be hard to recover given the limited finances available. Two of the most crucial projects designed to keep floods in check—the Brihanmumbai Storm Water Drainage (Brimstowad) project and the development of the Mithi River—remain incomplete due to lack of funds (Gupta, 2007; Jamwal, 2007). Studies have shown (Chatterjee, 2011) that mutual support within communities, especially in slum areas, is important not only during the flood but also in the post flood period and for long term recovery. Consequently, enhancing disaster coping capacities and preparedness at the community level is crucial. Many local governments and community organizations in India and in other Asian countries have just started to plan for and test community preparedness enhancements as part of their risk management policy (Surjan and Shaw, 2009; Bajek et al., 2007; Yamori, 2009). The new challenge for local communities is developing an executable action plan with appropriate external support. Practitioners and researchers advocating and practicing participatory disaster risk management are still seeking suitable and applicable strategies (Okada and Matsuda, 2005).

5.3 Method: Community Led Disaster (Flood) Management Action Plan (CLDRM) in Rajiv Gandhi Nagar: Objectives, Venue, Time, and Participants

This chapter studies an initiative on participatory disaster risk management, called the Community led Disaster (Flood) Management (CLDRM), conducted in Mumbai's Rajiv Gandhi Nagar slum community to understand the flood risk governance process. This CLDRM was organized in November 2012 by Kyoto University under the GCOE HSE program in collaboration with New Delhi's School of Planning and Architecture (SPA), and the MCGM. The objective of the workshop was to encourage the local community to identify their own capacities and become independent from external sources by developing a collaborative action plan for flood management. Several workshops and public meetings were organized by the Kyoto University GCOE HSE group from January 2011 to February 2013; a list of these appears in Table 5.1.3. Most of the workshops were organized in the community, but due to lack of space and equipment, three workshops took place at the J.J. College of Architecture, outside the community.

As the involvement of non governmental and governmental organizations in disaster risk management in this area is negligible at best, it was challenging to find local community leaders or people with leadership roles and establish a direct link with them. In the absence of a democratic platform, we considered the self elected and interested candidates and volunteers as the true representatives of the community and built relationships of trust with them. Besides the informal meetings, these relationships were further cemented by having the community representatives participate in two expert group meetings and workshops on Mumbai's disaster management organized through Kyoto University's GCOE HSE Program. After a rapport with community leaders was established, a series of workshops was proposed to develop a flood management action plan for Rajiv Gandhi Nagar.

Table 5.1 List of workshops and events organized by Kyoto University for CLDRM plan preparation in Rajiv Gandhi Nagar, Mumbai

Date and Time	Venue	Focus/Theme of the workshop	Major tools used	Total Participants	Number of Community Representatives
February, 2011	Rajiv Gandhi Nagar.	Discussion on Flood risks and risk preparedness in Dharavi	Group Discussion	28	17
21 st May, 2011	J. J.College of Architecture	Integrated Community Based Flood Risk Identification and Mitigation in Micro Hotspot Dharavi, Mumbai	Group Discussion	31	7
August, 2011	Rajiv Gandhi Nagar	Participatory Risk and Resource Mapping	Town watching, risk mapping, resource mapping	23	14
November, 2011	J.J. College of Architecture	Collaborative Knowledge Development through Yonmenkaigi System Method	Yonmenkaigi System Method	28	18
3 rd December, 2011	J.J. College of Architecture	Community Based Disaster Risk Reduction Planning & Plan Preparation: Working With The Community	Focus Group Discussion, Structure dialogues.	30	8
10 th June, 2012	J.J. College of Architecture	Community Led Local DRR Planning and Plan : Working with the Community	Focus Group Discussion, Structure dialogues.	28	15
26 th August , 2012	J.J.College of Architecture	Community Led Disaster Risk Reduction Planning and Plan Preparation: Phase II	Focus Group Discussion, Map Analysis,	25	12
September, 2012	Rajiv Gandhi Nagar	Participatory Risk Mapping and Discussion	Risk mapping, Town Watching, Drawing and Focus Group Discussion	19	12
November, 2012	Rajiv Gandhi Nagar	Collaborative Knowledge Development for Flood Risk Reduction	Yonemenkaigi System Method	27	18
November, 2012	J. J. College of Architecture	Discussion for Refinement of the CLDRM Action Plan for Rajiv Gandhi Nagar and Kala Killa Hotspots	Focus Group Discussion, Structure dialogues.	28	10

It was intended to involve representatives of each of Rajiv Gandhi Nagar's 18 chawls (semi neighborhoods generally representing a cluster of homogeneous socio cultural groups defined by religion, language or other factors and headed by two or more informal leaders). However, the participants represented only eight of the chawls. The average number of participants was 12, though the number varied from workshop to workshop. It was also hoped that the same community representatives would participate in every workshop; however, some variation was reported, as new members joined later, and some original members left. Details on the participants and the workshops appear in Table 5.1.

The CLDRM plan workshop for Rajiv Gandhi Nagar was conducted by a chief facilitator, who used to serve as the chief warden of Mumbai Civil Defense, and a few sub facilitators who were students at the Disaster Management Department of Mumbai's Tata Institute of Social Science. Before the Yonmenkaigi workshop, the experts from Kyoto University's GCOE HSE program carried out orientation and training sessions with the chief facilitator and the sub facilitators. During the orientation, the facilitators were trained interactively in how to facilitate community representatives' spontaneous expression and articulation of their ideas on a formal platform, especially important for the less educated participants. The main role of the chief facilitator was to demonstrate the workshop's processes and rules interactively. The sub facilitators addressed participants' queries by providing support (such as writing on behalf of the less educated participants or explaining the local meaning of obscure expressions and terminology) and conversed with participants to encourage them to share their views freely.

5.4 Study Area: Rajiv Gandhi Nagar, Dharavi, Mumbai

The flood prone slum community of Rajiv Gandhi Nagar, infamous for being the largest slum in the world, is located in the heart of Mumbai, on the bank of the Mithi River. About a hundred years ago, Dharavi was a small village of marginal communities engaged in fishing and pottery. During the textile boom that occurred from the 1930s to the 1960s, huge numbers of migrants from neighboring states who had come to Mumbai looking for work could not afford formal housing. High rents forced them to choose abandoned, fragile, and hazardous housing. Over time, extremely dense and complex living quarters developed in Dharavi, which covers about two square kilometers. Rajiv Gandhi Nagar is the most recently developed part of Dharavi. In 1985, the present slum began to develop into rows

of temporary shelters on the roadside beside the mangrove forest. Extremely dense and complex living quarters developed into the current slum, with its more than 20,000 inhabitants on an area of only 1000 square meters. There is a significant lack of sanitation, potable water, ventilation, and lighting. The area's multi ethnic and multi linguistic inhabitants are informally engaged in various trades. The area is predominantly residential.



Picture 5.1 Rajiv Gandhi Nagar along the Bank of Mithi River

Rajiv Gandhi Nagar was selected for the CLDRM exercise for several reasons. First, it was identified by the local municipality office (the G-North Ward Office of the Municipal Corporation of Greater Mumbai) as one of the most flood prone areas along the Mithi River. According to local sources, the area's average estimated household losses during the 2005 flood were approximately 20,000 to 25,000 INR (400 to 450 USD), more than double the area's average monthly household income. Further, part of the slum was developed by cutting through the mangrove forest and reclaiming the marshy area of the mangrove swamp by filling it with debris and garbage, which contributed to the water logging and other water related problems that occur as annual phenomena there. Therefore, reducing the flood risk is an urgent concern for the local people.

It was also reported that there was a complete absence of any initiative from governmental and non governmental organizations to mitigate disaster risk in the area. The lack of civil works, evident throughout the area, accelerated its flood risk. As this community is poor, it lacks the socio economic resources and political will to mobilize and/or influence the local disaster management authorities to take the initiative in disaster mitigation. Through its inexperience, the community was unable to systematically or logically make a sound diagnosis of the current state of their community and work

out a collaborative action plan to achieve their goal. Therefore, the YSM was the appropriate participatory workshop method for reducing their flood risk.

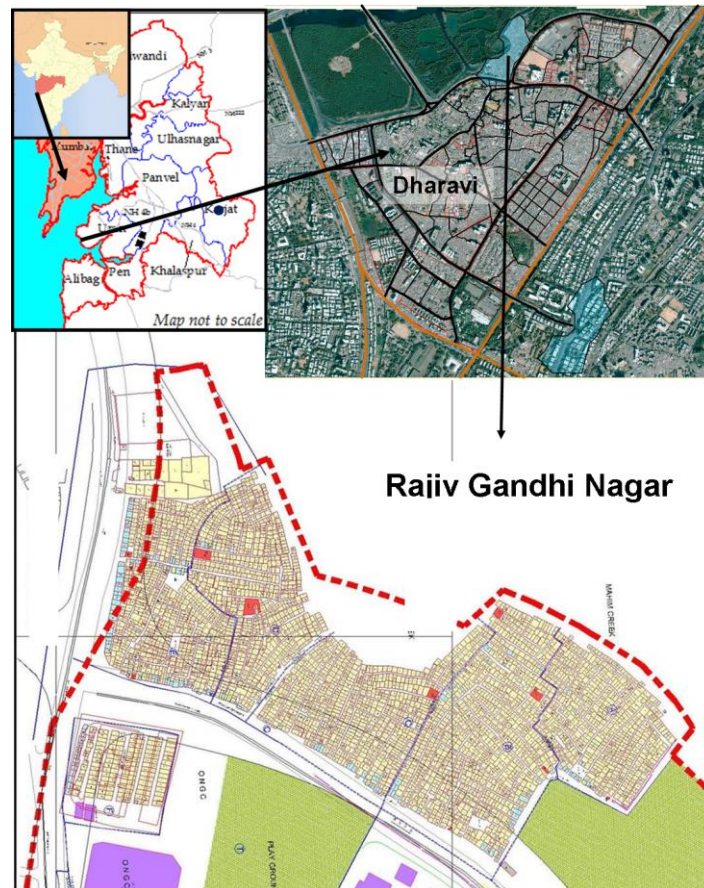


Figure 5.1 Location of Rajiv Gandhi Nagar, Case Study Area

Moreover, unlike other nearby slum communities, Rajiv Gandhi Nagar was an accessible and operationally convenient area for organizing workshops (particularly the pre workshop meetings), rapport building, and conducting site visits for primary data collection. Moreover, the local leaders had shown a keen interest in initiating activities to improve their community.



Picture 5.2 Community people and experts discussion and marking flood vulnerable areas during an event, Rajiv Gandhi Nagar

5.5 Concern Assessment

Table 5.2 summarizes the community concerns expressed during the workshops and participatory disaster management events in Rajiv Gandhi Nagar.

The community claimed that heavy rainfall along with high tides could cause flooding in the area, as it is very close to the river and lies on reclaimed land. Apart from flooding, environmental pollution is also a great concern for the community. The houses close to the river and those run by women were identified as being most exposed to flood risk.

The community identified three factors that increase their flood vulnerability: their living environment, their economic and material wellbeing, and the area's institutional and political system. These three factors are interconnected. The community's deepest concern was their living environment. The community listed flood vulnerability issues such as the fact that their land was marshy, too near the riverbank, was encroaching upon the river, required the deforestation of the mangrove forest, and featured narrow lanes and drains. Economic factors such as their low incomes and poor economic conditions forced them to live in such a fragile and vulnerable place. Moreover, when a flood devastates their houses and disrupts their livelihoods, their poverty hinders recovery. Basic infrastructure and services are inadequate, increasing their flood losses and vulnerability. Their

flood vulnerability was also linked to institutional structures and the political system. The people have little political power or access to local government and thus feel helpless to prevent illegality like river encroachment or cutting in the mangrove forest, which worsen their flood vulnerability. Lack of political capacity makes this community voiceless. The community cannot access the support from local government or external agencies needed to improve their living environment, which also increases their flood vulnerability. Therefore, problems like narrow lanes, unpaved and narrow drainage facilities, and inadequate sanitation facilities remain unaddressed for decades, making the community highly vulnerable during floods. Improving their flood vulnerability requires that their living environment be improved.

The community believes that reducing their vulnerability depends on their cultural capacities. The community is densely populated and has a tradition of mutual assistance during emergencies. The community believes that this culture of mutual help can be mobilized to improve their living conditions. Moreover, that people see that their culture and risk awareness have been changing since the 2005 flood, when residents became more aware of their risks and showed a willingness to prevent them. This changing risk awareness is seen as an important community capacity.

Table 5.2: A summary of community concerns in Rajiv Gandhi Nagar

Social Impact	Hazards
Living Environment (Livability)	➤ The depth and width of the drainage is too small, and the habit of throwing waste chokes it, reducing its capacity even more. In the rainy season, when there are heavy rains and high tides, the drainage is filled very quickly and starts overflowing. This water enters our houses and causes damage. ➤ There was a huge flood in 2005. We had more than six feet of floodwater inside our houses for more than two days. ➤ The area is low lying and close to the river. We are worried that a flood like that of 2005 may happen again. ➤ Water logging is an annual phenomenon in this slum. ➤ There is a foul smell from gutters and leather factories.
Health and Social Well being	➤ There is a foul smell all around the community that comes from drains and water, and it increases during the rainy season. Many people are in ill health due to this foul smell and unhealthy environment. ➤ All the people of Rajiv Gandhi Nagar are potential victims of malaria. Every year, more than five malaria cases occur in this area. Malaria is increasing due to our poor environment, including the poor management of solid waste, water logging, and open drains.
Social Impacts	Exposure
Family and Community	➤ Houses close to the river and drains are more prone to flooding. ➤ Elderly people and women headed households are most vulnerable during floods because it is not easy for them to evacuate.
Living Environment (Livability)	➤ Rajiv Gandhi Nagar is a marshy area. All buildings and houses are built on reclaimed land. There is no foundation to the houses. Therefore, all buildings can easily be exposed to flooding and other disasters. ➤ Most of the houses do not have a second floor, which is why many families cannot move to a top floor during disasters. ➤ There are widely dispersed illegal and unplanned developments growing close to the riverside. ➤ The whole Rajiv Gandhi Nagar area is marshy. All buildings and houses are built on reclaimed land. There is no foundation to the houses. When rains come, soil erosion takes place, and the ground is displaced. There is a constant fear that the buildings will collapse.
Social Impact	Vulnerability

Health and Social well being	➤ The garbage bins provided by the BMC (Bombay Municipal Corporation) have a limited capacity. Further, the BMC is irregular in its garbage collection. As the capacity of the bin is limited, the bin becomes over filled, and the garbage is spread around. This causes health and environmental problems.
Living Environment (livability)	➤ We do not have proper evacuation information. In 2005, when we tried to evacuate to government schools, the ONGC building, and the BEST depot, we were not allowed to enter there. The BMC does not take the responsibility of providing temporary shelter. We still do not know where to evacuate if such a situation occurs again. ➤ Cables are open and very old. Even the transformers are not at a safe height, so we fear that a short circuit can occur at any time and kill us. ➤ There is no riverbank because of the encroachment. In the rainy season, water enters the houses on the encroached land very quickly. There is no wall separating the river from the houses on the encroached land. The people believe that building a wall will create a boundary and stop further encroachment. ➤ In the rainy season, when there are heavy rains and high tides, the drainage fills very quickly and starts to overflow. This water enters our houses and cause damage. The whole Rajiv Gandhi Nagar area is marshy. All buildings and houses are built on reclaimed land. There is no foundation to the houses. When rains come, soil erosion takes place, and the ground is displaced. There is a constant fear that the buildings will collapse. After 2005, many roads were elevated, but the floors and plinths of the surrounding houses were left as is. Therefore, a small flood may cause great harm to the houses below the roads. ➤ The basic infrastructure of the area, such as drinking water facilities, sanitation facilities, and garbage management, is very poor, increasing the community's problems during a flood. ➤ Many houses are <i>kachha</i>, meaning they were built using temporary building materials. They are thus vulnerable to flooding and other natural calamities. ➤ The roads are very narrow. It is difficult for fire brigades to enter into the community for rescue operations.

Economic and Material Well Being	➤ Some people who obtained shelter during the 2005 flood experienced theft in their houses. ➤ Many people in this area work as taxi drivers, and some have their own small business or shop. Floods destroy their livelihoods. ➤ We are not rich and have temporary jobs. Disasters are expensive for us, and we struggle to cope. ➤ Many of us lost important documents like ration cards, voter IDs, and SSC certificates. During the flood, we did not realize that our documents could be destroyed, and so we did not think of keeping them in a safe place. Now we face many problems because we do not have these important documents. ➤ Our flood loss was enormous. We lost an average of 25,000 INR (50,000 JPY), double our household income. ➤ People living close to the river or a big drain lost everything, like clothes, furniture, and durable assets, in the 2005 flood. ➤ Poor people have inadequate financial capacity to overcome flood losses. If we lose our jobs during the floods, it is not easy for us to get other jobs, and we cannot survive without jobs, even for a single day.
Cultural	➤ We do not know when a flood will come because we have very little knowledge and are worried that, if a flood happens again, we will not be able to handle the situation by ourselves. We experienced flooding for the first floods in 2005. We were confused about what to do. ➤ People throw garbage in drains. ➤ Many people use public space for personal and domestic use, like keeping drums in lanes that are already very narrow. This may create problems in an evacuation. ➤ Lack of education hampers our flood risk awareness. People are sometimes ignorant about important issues and fight about trivial issues.
Family and Community	➤ During heavy rain, the mobiles do not work, and we are not able to communicate with our family, who thus are unaware of our condition. ➤ During the day, male members of the households go to their jobs. During a flood, it is very difficult for the women to handle the situation. Without males, it is not easy to move furniture or evacuate.
Institutional, Legal, Political and Equity Impacts	➤ There is inadequate communication between the local people and the government concerning issues such as flooding, precautions, and alert signals. ➤ There are many illegal water and electricity connections in Rajiv Gandhi Nagar. If we lodge a complaint with the BMC, they take no action because they are bribed. If the news reaches the mafias, they harass and threaten us. We think that nobody will stand by us if we raise our voice. Moreover, any development plans taken up by the government keep being postponed, which reduces the interest of the local people and makes them indifferent about further involvement.

	➤ People throw waste on the riverbanks, which reduces the width of the river. People eventually settled on this encroached land, but the local people are not involved in this encroachment. However, the mafias and political parties are involved; therefore, taking action against this has become difficult. ➤ Leaders are corrupt and never perform quality work. People reduce the size of the lanes by extending their verandahs or keeping their vehicles or other obstacles there. This narrows the lanes and makes evacuation difficult. ➤ We do not have an early warning system. The local government must supply one.
Gender	➤ Single women headed families are vulnerable during disasters. ➤ Women and children were most severely affected during the 2005 flood.
Social Impact	Capacity
Living Environment (livability)	➤ There are many tall buildings surrounding the chawls (neighborhoods) and slums here. Whenever there is a need to evacuate during heavy rains, these buildings can be made available. ➤ There are many sand sacks available nearby. These sacks can be used on a temporary basis to reduce the pressure of the water entering the houses.
Health and Social Well being	➤ Dustbins are made available by the BMC. People have improved their health habits and now throw their garbage in the dustbins, but the waste is not regularly collected. Community participation in solid waste management needs to improve.
Cultural	➤ Before the 2005 flood, people hardly believed that a flood could happen in Mumbai. They never thought that heavy rains could turn into a disastrous flood. Now their perception has changed. They are more aware about monsoons and floods. ➤ During the 2005 flood, we obtained experience in evacuation. If such an incident occurs again, we will be able to make some temporary evacuation arrangements for ourselves. ➤ With our local knowledge, we have developed ideas for reducing flood damage to houses. ➤ Now, people are aware of the concept of waste management and, therefore, have improved by not throwing waste just anywhere, but in the dustbins provided by the BMC. Recently, new toilets have been built, and open defecation has been reduced. ➤ We have manpower. During a flood emergency, we all come together to help each other protect our assets and household goods. When rainwater enters the houses in Dharavi, people help their neighbors evacuate. ➤ We have a good relationship with neighboring communities. ➤ From the 2005 flood experience, people have realized that there is a need for early warning alerts so that information can be circulated among the local people. ➤ We have several traditional and local groups that can be mobilized for risk information dissemination and flood preparedness. This information can be circulated in three ways: (i) through small groups like the <i>Mahila Jagruti Mandal</i> (Women's Empowerment Group); (ii) by teaching school children about flood management; (iii) by

	circulating the “does and don’ts” of coping with flooding; (iv) by using TVs or mobile phones to inform people about possible flooding; and (v) by using notice boards. ➤ We have local knowledge and experience to deal with flooding and environmental pollution.
Institutional, Legal, Political, and Equity Impacts	➤ There are many small local chawl (neighborhood) committees that can come together to meet and discuss flood related activities and precautions and distribute tasks and duties accordingly. ➤ There are many political parties that can be asked to help improve our flood condition under pain of losing our votes.

The community expressed its concerns about hazards and exposure during the initial workshops. These concerns became more focused on vulnerability and, ultimately, on capacity. The concerns related to vulnerability changed from workshop to workshop. In the first phase, the community expressed concerns about their living environment and vulnerability but later expressed concerns related to economic well being and the intuitional and political system. Most of the concerns related to capacities were expressed later. Therefore, a clear timeline for the community's articulated concerns can be drawn: first, they expressed concerns about hazards and exposure and their vulnerability due to their living environment. In the second phase, the community expressed that their intuitional and political system and economic condition contribute greatly to their vulnerability. In the last phase, the community announced their capacity to cope with disasters.

5.6 Scoping: Collaborative Action Plan Development through the Yonmenkaigi Chart and General and Inverse Debating

To understand the scoping process of the Mumbai CLDRM program, I used a Yonmenkaigi Chart (detailed in Chapter 2). The chart helps us to identify the major stakeholders and their possible roles and responsibilities and to prioritize the action needed for flood risk reduction. I present the Yonmenkaigi Chart developed by the workshop participants in picture 5.7. Through majority opinion and the facilitator's suggestion, four components and roles were established: (1) management, (2) finance, (3) information/communication, and (4) logistics. After the identification of the four components, the participants were divided into four groups and roles. Each group was assigned to one role sharing activity, from amongst the four groups. The timeline drawn for executing the actions was divided into "within three months," "within six months," and "one year." The implementable collaborative action plan derived from the YSM is a combination of the action plan developed through these four phases (see Table 5.3).

A synopsis of the action plans developed through the Yonmenkaigi Chart exercise is presented in Table 5.3. The major observations drawn from it that assist in understanding the scoping process are listed below:

(I) The action plan is prepared for a one year timeframe. There are four major components and roles: management, finance, information, and logistics.

(II) In the first phase of the plan (within three months), the emphasis is on establishing a local disaster management committee and supporting it through the initiation of basic logistic development and financial arrangements. This committee would collaborate with existing chawl (semi neighborhood) committees to divide the tasks, roles, and responsibilities of each community and neighborhood. To ensure the ability of the disaster management committee to perform disaster management activities without significant external support, the plan proposes to develop a budget and then collect funds from the community. It also recognizes that keeping the disaster management committee active requires that a space in the community be found where members can meet and discuss regularly in order to make progress. Logistical improvements are also seen as vital, especially the exploration of possible sources of internal funds. Moreover, the plan proposes to encourage other members of the community to join in its activities and provide voluntary service by displaying posters and banners announcing local disaster management initiatives.

(III) In the second phase of the plan (within six months), the plan proposes to develop an information base through collaborative initiatives between four groups for systemic vulnerability and capacity assessment. The community has realized that, to develop future strategic actions, it is important to identify their internal and external vulnerabilities and capacities. Therefore, the management group will identify internal vulnerabilities like water logging areas, vulnerable people and buildings, and pending municipal works. Once this information is collected and assessed, other groups will identify potential internal and external capacities such as keeping records of commercial activities, seeking external funds, collaborating with government and civil defense for training and awareness, and meeting with owners of high buildings to ensure community access during evacuations in emergencies. A tentative plan would then be formulated for flood mitigation and prevention activities. The entire task would be carried out by local community representatives, chawl committee members, and the core members of the newly established disaster management committee.

(IV) The third phase of the plan focuses on flood mitigation and reduction activities. In this period, the management group will initiate actions to ensure proper solid waste management, prevent garbage from being thrown in gutters, ensure routine municipal work, ensure access to evacuation shelters, and remove private belongings from public spaces and narrow lanes to improve evacuation preparedness. In addition, it will ensure a centralized system by which households' valuable goods and documents can be kept during emergencies. Special emphasis has been placed

on evacuation awareness and planning. This plan involves networking buildings with government organizations, using civil defense for training programs, and conducting public rallies and door to door campaigns to raise flood awareness. Young members of the community would be encouraged to join the activities and provide voluntary service. Simultaneously, the disaster management group would be looking for outside funding and seeking other collaborations to sustain its disaster management activities.



Picture 5.3 Yonmenkaigi Workshop, a special workshop tool used for CLDRM plan making in Rajiv Gandhi Nagar, Mumbai (Workshop was held in J. J. College of Architecture, 2012)

To clarify the scoping process, all actions and collaborations inside and outside the groups and their timeframes appear in the map shown in Figure 5.2. The arrows in the diagram show how an action is either supported by another (preceding) action or provides support to another action. The networks operate within and outside the group boundary. Therefore, the networks represent a collaboration over time. The action plan map for Rajiv Gandhi Nagar shows that the maximum extent of joint action support would be provided by M:1 (establishing a local disaster management committee) and action M:4 (establishing different committees for different communities).

Therefore, these two actions are instrumental for carrying out disaster management activities in the area. On the other hand, action M:10 (developing a tentative action plan for flood mitigation) has the most ties; thus, a great many actions are jointly pursued to reach this action point. The map also shows that the management group's actions are the most collaborative and that intra and inter collaborations occur among many other groups and actions. Therefore, these networks reflect the joining of the hopes and visions of two representatives that may have conflicting perspectives. Joining two ideas and putting them in operation may strengthen the potential for action implementation and collaborative knowledge development.

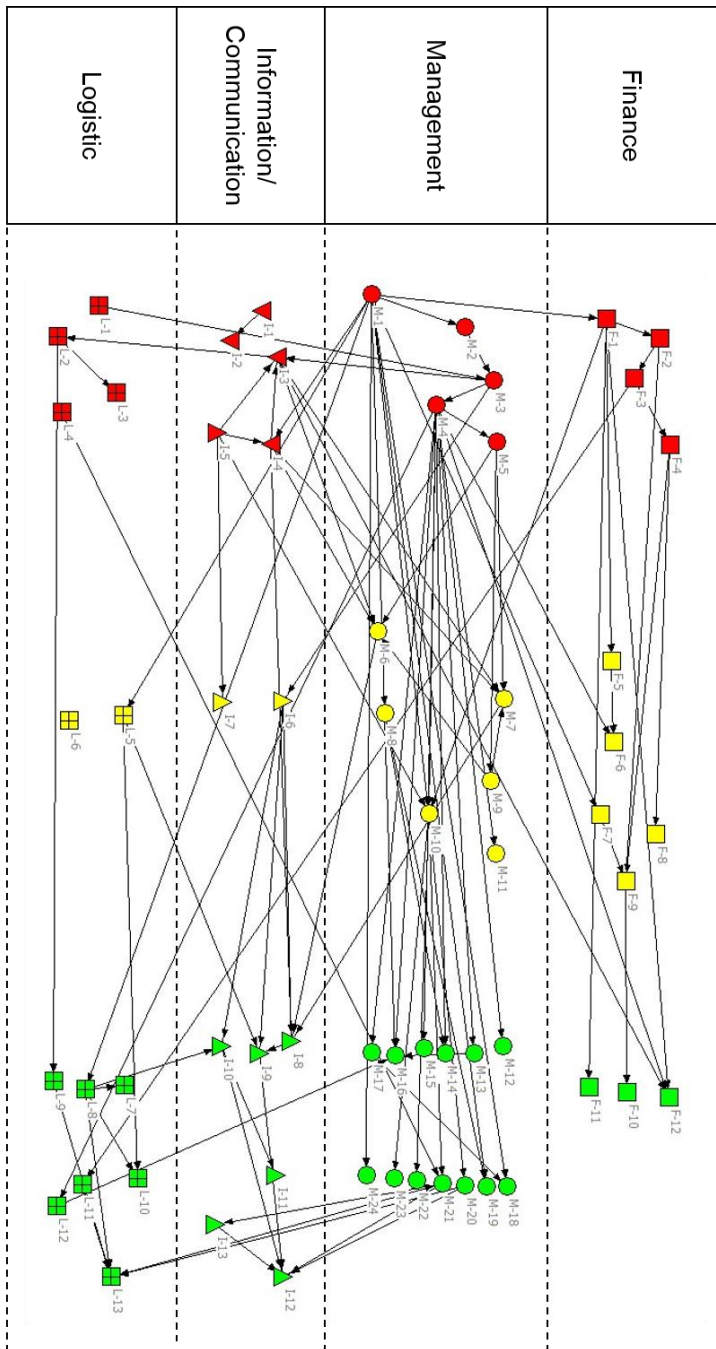
Table 5.3 Action plan chart for Rajiv Gandhi Nagar

Time frame	Management	Finance	Information/ Communication	Logistics
3 Months	(M:1) Establishing a local disaster management committee (DMC). (M:2) Contacting all established chawl (neighborhood/cluster) committees and informing them about the DMC. (M: 3) Organizing regular meetings with chawl committees. (M:4) Establishing different committees for different communities and groups. (M:5) Distributing committees' roles and functions.	(F: 1) Preparing a core finance group. (F:2) Preparing a tentative budget. (F:3) Collecting funds from every house for disaster management. (F:4) Managing funds.	(I:1) Preparing posters and banners asking people to register their names in the local disaster management group. (I:2) Providing names of people for registration into groups. (I:3) Collecting all available information about the area, including flood problems. (I:4) Contacting GCOE Mumbai and other NGOs to collect flood information.	(L:1) Arranging a meeting space. (L:2) Collecting details about ration shops and food storage places. (L:3) Meeting with medical shop owners, travel and transport agencies, and grocery shops. (L:4) Meeting with owners of tall buildings near the Rajiv Gandhi Nagar.

			(I:5) Establishing a risk communication group.	
6 Months	(M:6) Identifying water logging areas and related problems. (M:7) Identifying vulnerable areas and people. (M:8) Identifying pending BMC works. (M:9) Identifying local leaders who can report local flood problems and vulnerabilities. (M:10) Developing a tentative plan of action for flood mitigation. (M:11) Checking the progress of work in every phase.	(F:5) Identifying commercial plots and sites in the area. (F:6) Ensuring commercial land-holders pay more money to the disaster management committee. (F:7) Seeking funds and grants from the BMC and other sources. (F:8) Allocating funds for DMC operations and maintenance. (F:9) Revising the budget.	(I:6) Identifying people's information requirements through meetings. (I:7) Preparing a list of emergency services and government contacts.	(L:5) Meetings with civil defense and NGOs for organizing awareness and training programs. (L:6) Preparing a list of vehicles (including auto rickshaws, taxis, cars) in the area to be available during emergency.
1 Year	(M:12) Ensuring that nobody is throwing waste in gutters. (M:13) Ensuring that gutters are properly and	(F:10) Allocating funds for different tasks and duties.	(I:8) Providing information on rain and water logging by distributing handbills to every house.	(L:7) Arranging training programs for youth. (L:8) Collaborating with civil defense and NGOs to

routinely cleaned by the assigned BMC worker. (M:14) Ensuring that the BMC person in charge of solid waste management is collecting garbage regularly. (M:15) Ensuring that the repaired guttered are well constructed and deep enough. (M:16) Clearing and removing obstacles and waste that obstruct the flow of water. (M:17) Removing the obstacles in narrow lanes. (M:18) Serving notice to those who are putting private belongings in public lanes and spaces and blocking them. (M:19) Ensuring the occasional spraying of insecticides. (M:20) Identifying potential nearby evacuation shelters.	(F:11) Finding information on new funding. (F:12) Fundraising in the community and outside.	(I:9) Making people aware about health and environmental hazards and preparedness. (I:10) Organizing public rallies, meetings, handbill distribution, and poster making to raise public awareness of flood related risks and preparedness. (I:11) Informing people about government schemes, services, and programs for flood risks. (I:12) Informing the community about possible evacuation shelters and routes and when to use them. (I:13) Placing banners and signboards in front of the evacuation shelters.	organize public awareness programs. (L:9) Establishing a place where people can obtain food during emergencies. (L:10) Organizing training for evacuation shelter management. (L:11) Purchasing important instruments like torches, loudspeakers, and sirens for public warnings and announcements. (L:12) Organizing local volunteers for gutter cleaning and waste clearance. (L:13) Arranging evacuation shelters.
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	(M:21) Ensuring access to the shelters during emergency. (M:22) Helping people keep their vital documents in a safe place. (M:23) Keeping second copies (e.g., Xeroxed copies) of vital documents in a centralized and safe place. (M:24) Building up networks and relationships with the BMC and local ward office.			
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Note :
The Diagram is not in Scale.
Color represents time frame as follows -
Red = Within 3 Months, **Yellow** = Within 6 Months, **Green** = 1 Year
Shape of Node represents each role or group.
Tag on the node represents action numbers in correspondence with Table -1 action plan chart.

Figure 5.2 Action plan networks map for Rajiv Gandhi Nagar

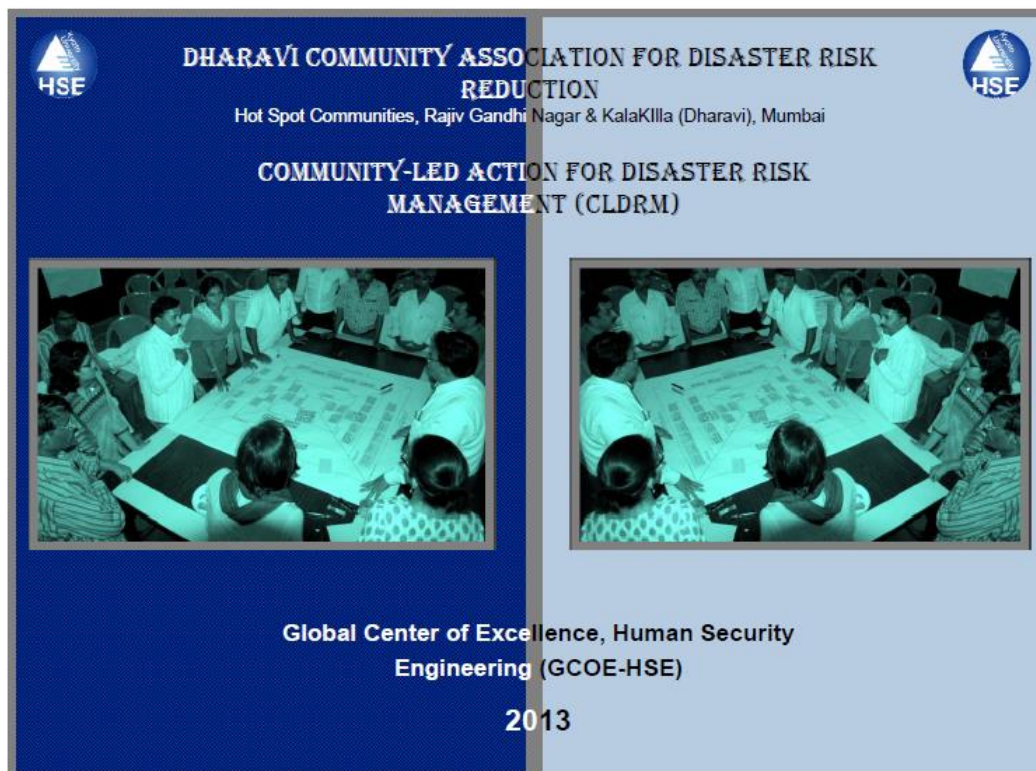
5.7 Discussion and Conclusion

This paper has described a collaborative knowledge development process, Community led Disaster Risks Management, to explain the risk governance process and demonstrate the importance of concern assessment and scoping. The outcomes of the exercise show that it is an effective means of ensuring that knowledge and concerns are shared among stakeholders, and that an implementable collaborative plan for disaster risks management is produced.

The process provides a platform for carrying forward participants' awareness and knowledge and sharing hopes and visions towards collaborative plan development. First, the identification of the four most critical elements of the plan through the Yonmenkaigi Chart allowed participants to use the model as a medium for representing and reflecting upon their own and others' goals, beliefs, and expectations. Participants changed the roles and plan components as they appear in a typical YSM framework. They recognized that management, information, finance, and logistics were the four critical components needed for executing their disaster management plan. This modification may also indicate that the exercise became more implementation oriented. During the Rajiv Gandhi Nagar Workshop, the action component cards "revising the budget," "identifying vulnerable areas," "managing funds," and "collecting detailed information about ration shops and food storage places" as well as 30 other action cards were identified as the actions needed for collaborative efforts and support between groups. Participants then identified their own resources and strengths, like collecting funds from household, mobilizing community youth groups, and ensuring the routine works of municipalities to reduce their dependency on external agencies. However, the participants know that they lack the resources needed to perform these activities. Therefore, they proposed collaboration with local NGOs, civil defense, and academic institutions in their action plan. The outcome was a joint action plan.

After the workshop exercises and plan preparation, the Rajiv Gandhi Nagar community implemented some of their proposals in the first phase of the plan. A core committee for disaster management was formed by 14 volunteers from the community. This committee, with the help of the Kyoto University GCOE HSE project team, organized three group meetings devoted to plan implementation. Finally, a flood management plan, the Community led Flood Management Plan for Rajiv Gandhi Nagar, was published in the local language and distributed among the community members. The initiative was also taken to register the basic demographic details of area households, including the names of the heads of households and the number of infants, women, and elderly members. Posters and banners have been displayed during community festivals to raise awareness of the local initiatives on disaster management and encourage people, especially youth groups, to join in this movement. Moreover, the names and telephone numbers of core committee members have been circulated in the community to make clear

that committee members are available to provide voluntary support to any community members during emergencies. These post workshop activities were all organized with the support of the Kyoto University research team, however, and no subsequent initiatives for plan implementation have been reported. Having external support, particularly in the initial phases, may be critical for this slum community, which has so many pressing daily issues to deal with. Thus, though high motivation and initiative appear among the community immediately after a disaster, the community eventually becomes demotivated and less enthusiastic. Therefore, the availability of external support until such time as the local community achieves a milestone is critical for translating a collaborative plan into action.



Picture 5.4 Community Led Disaster Risk Management Plan : An Action Plan developed by the community of Rajiv Gandhi Nagar, Mumbai.



Picture 5.5 To encourage Flood action committee volunteers and improve risk awareness among the community, Kyoto University GCOE team the local community to publish banners and posters and name on flood risk and preparedness

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Chapter 6

Conclusion

6.1 Summary of Research Findings

This thesis proposes a comprehensive flood risk governance framework for participatory disaster risk reduction plans and verifies its effectiveness by conducting case studies. A relatively broad range of stakeholders are often present when developing and implementing integrated flood risk reduction plans. To involve diverse stakeholders with respect to knowledge, interests, resources, and authorities, the participatory planning process may offer incentives for participation by providing opportunities for organized communication. The proposed process for participatory flood risk reduction plans is designed primarily to provide a platform intended to enhance face to face communication that will reveal stakeholders' concerns, deepen understanding of differences, and develop community action plans, or "socially viable solutions."

The proposed process is applied to three case studies that differ in terms of the scope of planning and in the degree of commitment by local government. The scope of planning, in this thesis, means "new policy development which can be applied over a prefecture" or "action plan to be implemented." The former case is described and analyzed in Chapter 3 as prefecture wide policy formulation for integrated flood risk reduction through public meetings. The latter cases are illustrated in the two cases in Chapters 4 and 5. Both cases deal with action plan formulation for community level flood risk reduction. The extent of local government commitment measures the differences in government involvement. The cases in Shiga prefecture, in Chapters 3 and 4, demonstrate high government commitment in which the local governments basically initiated the planning process and committed to the plans. Low government commitment is illustrated in Chapter 5. The government (MCGM) did not initiate the process and did not commit to the action plan. With these three different cases studies cover the all the cases which can be categorized by the difference between "scope of plans" and "degree of commitment of government" because prefecture wide policy formulation requires the strong commitment of the prefecture government.

The data collected from the three different public participation workshop exercises were systematically analyzed using a concern table, SWOT issue and strategy analysis, and YSM to examine the methods

and components of flood risk governance frameworks, including concern assessment, scoping, and planning. The thesis has taken an effective initiative in developing a methodology that can not only visualize community concerns but also provide a direction for developing new knowledge and planning options for improved scoping and flood management. The thesis critically examines the concerns of the residents and government officials, as revealed in the workshops, and then discusses the role that sharing those concerns plays in supporting the planning and managing of flood reduction.

The findings in each chapter are summarized below.

Chapter 1 explains why a participatory flood risk reduction plan is required for flood risk management and argues for the necessity of developing a scientific methodology for feasible plans (so called “socially viable solutions”) that respond to stakeholders’ with diverse interests, authorities, and abilities.

Chapter 2 proposes a flood risk governance framework process that accounts for features of the participatory disaster risk reduction plan by IRGC. The methodologies of the flood risk governance process are described and explained. In particular, concern assessment and scoping are addressed as ways to promote understanding of a planning process of flood risk management among stakeholders.

Chapter 3 discusses Shiga Prefecture’s “public meeting” held to develop a new policy of integrated flood risk management in Shiga Prefecture. The public meeting was intended to integrate residents’ concerns and intentions for prefecture level risk management policies at a consensus meeting. The residents’ concerns were collected systematically at their tables. Then, SWOT analysis was carried out on these concerns to explore and identify a possible risk management plan. The results suggested ways that communities’ concerns may be mobilized to identify options and strategies for improved flood risk management.

Chapter 4 discusses a series of flood risk reduction workshops held in Muraida community, Shiga Prefecture, in Japan. At these workshops, residents and local government agents worked together to develop a plan. The concern table provided a means of dynamic communication between the government and the residents that influenced the residents’ concerns. As a result, although there were differences between the local government and the residents regarding the importance of tasks and what was important to consider, the workshop process brought the two sides together and made collaboration on an action plan possible.

Chapter 5 discusses a second series of workshops, held in Rajiv Gandhi Nagar community at Dharavi, India. The initial process allowed residents to share concerns and develop feasible options. Then, the scope of planning was clarified from this range of options that residents felt were feasible and that complied with the requirements of the local government. For example, while immediately after a

disaster, residents tend to demonstrate high motivation and initiative in carrying out a plan, after some time has passed, the residents lose their motivation and energy to carry out such actions on their own. Therefore, initial external motivations and supports for the tasks necessary to implement the plan are critical to translate this collaborative knowledge or plan into lasting action.

6.2 Future Research

Future research on flood risk governance should focus on

- 1) developing a flood risk communication method for each governance phase. Effective flood risk management requires a flood risk communication method. Rowan (1995) proposed the CAUSE model for effective flood risk communication, which may serve as a valuable evaluation guide.
- 2) the implementation of proposed methods in other case study areas. It is important to carry out more extensive analyses based on the proposed framework by applying it to different locations.
- 3) evaluating the proposed methods by involving potential stakeholders who proposed SWOT strategies analysis to improve the assessment and evaluation of participation. This also requires continuous fieldwork towards developing and maintaining communication channels with key community leaders and other local residents.

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