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Distribution and Application of Community-based Disaster Risk Information : Lessons from Shiga Prefecture in Japan*

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Abstract

Purpose - This paper aims to explore the distribution and application of community-based disaster risk information and employ a case study as a qualitative research method to make some implications and suggestions for disaster management in the future.

Research design, data, and methodology - This research has basically adopted an idiographic approaches to examine the basic policy of integrated flood risk management of Shiga prefecture in Japan. The methodology is based on a retrospective analysis, which starts from critical events and traces backwards processes to find out what goes well or wrong.

Results - The results of this paper support that the multiple stakeholders in a community have to share and distribute disaster risk information in the proper time. The distribution and application of community-based disaster risk information cannot be overemphasized in that the local communities are culturally rich in traditional flood management knowledge, have voluntary organizations and have enjoyed mutual support and human network to cope with floods.

Conclusions - The study results also imply that local residents of the community will be abe to have an important role in coping with natural disasters, which involves more proactive actions than passive actions for the enhancement of disaster management.

Keywords: Community-based Disaster Management, Distribution of Risk Information, Shiga Prefecture.

JEL Classifications: D70, D74, D83, H75, O21.

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 study 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 are comprised of 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 study 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 study discusses the 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 study analyzes public meeting synthetically by summarizing the concerns in a table. Participants identified the high vulnerability that exists in the five spheres of

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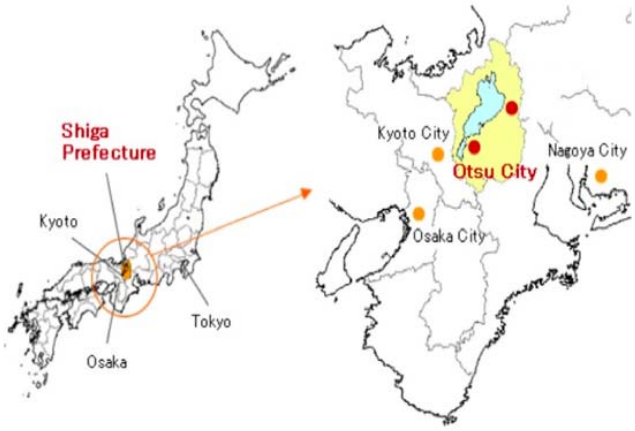
community life, which are cultural, community, institutional, living environment, and economic and material well-being. After creating the concerns table, a SWOT analysis in two phases was carried out to explore and identify possible capacities and weaknesses derived from community-expressed concerns 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 one with a direction to develop new knowledge and planning options for improved scoping and flood management.



<Figure 1> Location of Shiga Prefecture in Japan

2. Idiographic Approaches to Community-based Disaster Management

2.1. Community-based Disaster Management of Shiga Prefecture

According to the 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 Arrivers 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 of Gifu Prefecture's boundary, Amasugawa River, Kanpugawa River, and Mukugawa River of the 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 highly susceptible to floods.

Thus, Shiga Prefecture is prone to flood. From 1950 until the present, 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 1> that were catastrophic in nature. Disasters in Shiga are mainly attributable to heavy rain and typhoon-induced flooding. Table 1provides detailed descriptions of the floods and their impacts in Shiga prefecture between 1950 and 2013.

<Table 1> Flood history, Shiga Prefecture

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	0	0	9,390	29,284
Typhoon No. 7 in 1959	4	0	0	2,434	17,081
Typhoon Isewan in 1959	16	0	0	5,920	19,816
Typhoon No. 24 and heavy rain in 1965	3	0	0	1,662	12,282
Heavy rain in 2001	0	1	9	4	387
Typhoon No. 18 in 2013	1	7	81	212	713

Source: Shiga Prefecture (2014).

2.2. Case Study on the Community-based Disaster Management of Shiga Prefecture

This study examines the public meetings that were organized by the Flood Management Office under the River Basin Policy Bureau of the 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. That is, the determination of the prospective role of individuals, households, and communities in local flood management in Shiga Prefecture. And 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, their community work experience, their age, their 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 member sex tended from March 9, 2008 to March 31, 2009. Members of the public meetings had received cash rewards and travel allowances.

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. 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 2>. At the end of this series of workshops, the proceedings of the workshops were summarized and presented in a declaration.

The concerns of the participants expressed in the public meetings are summarized in <Table 3>. The concerns table indicates that residents’ major concerns pertain to flood vulnerability rather than exposure and hazard. The social impact factors of the concern table are modified by Vanclay (2002). The overflow of swelling 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.

<Table 2> Dates and main business of the public meetings

Date	Agenda of the Meeting
March 9, 2008	• Introduction of the “public meeting” by the governor • Self-introduction by the 10 residents’ representatives • Reporting the present condition of flood risk management by the River and Port Management Office, Shiga Prefecture • Discussion about the necessity, importance, and vision of flood risk management in Shiga Prefecture
May 2, 2008	• Election of the chairman of the “public meeting” by the 10 residents’ representatives • Discussion about the state and condition of local disaster prevention in Shiga Prefecture
June 1, 2008	• Field survey of Hino River • Discussion on enhancing local disaster prevention in Shiga Prefecture
June 28, 2008	• Preparing a draft document on “self-help” and “mutual-help” for the “resident declaration,” and its discussion
July 28, 2008	• Preparing a draft document on why disaster prevention activity is needed at the community level for the “resident declaration” and its discussion
September 11, 2008	• 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
October 29, 2008	• 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
December 1, 2008	• Completing the preparation of the “resident declaration” and its discussion
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

Source: The residents committee for Shiga Prefecture flood management (2008).

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 subsystems. 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. In addition, new migrants are unaware about flood risks because of cultural reasons and, as a result, constructions are booming along the riverside, which are highly vulnerable to flood risks.

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 neither useful nor effective because only a few residents can understand the map; therefore, taking such initiatives would help to change the social impact of material well-being.

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, 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. Further, existing voluntary organizations are disappearing due to a lack of intuitional initiatives and cultural support (Phouc et al., 2018).

<Table 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 are 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 well-being	• Traditional flood knowledge is disappearing. At present, the young generations and new immigrants had neither experienced flood nor had they inherited 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	• Young people from villages emigrate 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 are 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 well-being. • Many people do not want to evacuate because they do not know how and because the evacuation area is unsuitable.
Economic and material well-being	• The local government or administrator should try to convince local residents about 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.
Institutional, legal, political, and equity well-being	• 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. • New construction work along the riverside, without which the area would be more vulnerable to floods, was halted. 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.

4. Other Implications

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 in identifying the social and economic factors responsible for flood risks in order 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.

4.1. SWOT Issue Analysis

As previously mentioned, SWOT issue analysis was 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 (0) and threats (T).

The SWOT issue analysis, as shown in <Table 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 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 (Chen et al., 2006). For example, new migrants and young 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 them 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 (Chess & Purcell, 1999; Choi, 2015).

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 (Kim, 2016; Lee, 2017). 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), 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 (Cho et al., 2016; Mehadi et al., 2018).

Currently, the challenge is to derive or identify potentially effective strategies from these internal and external strengths and weaknesses through collaboration between the residents and the local government. For this, as previously mentioned, this study 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 4> shows how a community's 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 5> shows the collaboration of the community and government to foster changes in cultural and intuitional 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, local leaders' power, and support provision 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 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 (Seong et al., 2016).

<Table 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 participated in the "public meetings." • Traditional ancestors' wisdom and knowledge on flood risk management.	• Many villages and communities live below the riverbed level that is, 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" were proactive earlier. • 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 that is, no firsthand flood experience nor interest 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. • Residents still rely on ancestral wisdom that is, traditional ancestral wisdom and knowledge on flood risk management. • The traditional culture of voluntary work and organization - 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 among local government, NGOs, and citizens. • This 'public meeting' does not consider the participation of local industries in Shiga Prefecture.
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.

4.2. SWOT Strategy Analysis to Identify the Subject, Purpose, and Method

Hill (1997) and 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 a 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 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 5> shows the collaboration of the community and government to foster changes in cultural and institutional structures and functions. 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, local leaders' power, and support provision 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, for one. 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 meant to enhance and restructure the traditional cultural system and the local administrative and institutional systems.

<Table 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 help between the local government and local residents.	**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 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. • The government of Shiga prefecture should involve local industries in public meeting in order to make the flood management plan effectively.	**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. • Local industries should participate to make the flood management plan more actively to propose their concerns.

5. Discussion and Conclusions

5.1. Summary

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. Swelling and overflowing rivers during the rainy season are considered to be the main hazard by the community. It means that the living environment of community is likely to be exposed to the flood danger. 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 subsystems. 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.

5.2. Implication

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 the 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, this study carried out a SWOT analysis in two phases to explore and identify possible strengths and weaknesses 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 have enjoyed mutual support and human network to cope with floods. However, because of the lack of flood experience and the efflux oftime, communities are gradually losing their traditional knowledge, and residents are unwilling to participate in flood risk reduction activities.

SWOT issue analysis also revealed that the communities' capacity to fight against disasters play a key role in coping with disasters. 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 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, this study has quite effectively initiated the development of a methodology that can not only visualize the community's concern, but can also provide people with a direction for developing new knowledge and planning options for improved scoping and flood management.

5.3. Limitations and Further research

This study attempted to explore community-based disaster management strategy regarding the distribution of risk information. Although it can make some contributions to new approaches such as concern assessment and scoping of residents, this study still has some limitations. That is related to the reflection of industries stakeholders concern. In public meeting, there was no person concerned from industries in Shiga prefecture. Manufacturing sector of Shiga prefecture captured about 35.4% of Gross Regional Domestic Product. This is the highest in Japan (Shiga Prefecture, 2018). Therefore, the industries' stakeholders in Shiga prefecture would be one of the most important agents in order to establish a disaster management plan such as basic policy of integrated flood risk management. They should have participated at public meeting, where they could have expressed residents' concerns about flood risk in Shiga prefecture. Unfortunately, local government in Shiga prefecture recruited participants in public meeting, they mainly focused on reflecting residents' opinion. In a sense,

it is efficient and rational to establish an effective disaster management plan because residents will be victims to flood risk as well as main agents against flood risk. This public meeting was held for the first time, where the community residents attended and carried their concerns to the 'basic policy of integrated flood risk management' in Japan. In the same manner, Shiga local government should have involved the industries' stakeholders to public meeting. They may be not only important parts in Shiga economy, but also main agents who can support residents and cooperate activities against disaster. In these contexts, it should be noted that the participation of industries' stakeholders are necessary to better establish more effective 'basic policy of integrated flood risk management'.

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