A Study of the Kumamoto Earthquake and "Disaster Prevention 4.0"

Masamichi Nishizawa*
Siying Jin**

Acknowledgments

The authors would like to thank Professor MUROSAKI Yoshiteru (Kobe University), Professor YAMORI Katsuya (Kyoto University), and Professor OOYANE Jun (Senshu University) for their detailed comments and suggestions and constant support. This research was partially funded by an Egashira Foundation Grant, Consumer Co-operative Institute of Japan, Asahi Group Foundation, and KAKENHI (JP17J09978) Grant-in-Aid for JSPS Fellows.

Needless to say, nobody other than ourselves should be held responsible for any deficiency in the eventual outcome.

* Associate professor of law, Faculty of Law, Fukuoka University
**Visiting lecturer, Faculty of Law, Fukuoka University, JSPS Fellows., Visiting researcher, Senshu University, Doctor's Course, Graduate School of Sociology, Senshu University

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1. Introduction

Japan is located on the Circum-Pacific Mobile Belt where seismic and volcanic activities occur constantly. Although the country covers only 0.25% of the land area of the planet, the relative number of earthquakes and active volcanoes here is quite high.[1]

Since numerous catastrophes have occurred in the past in Japan, much effort has been directed toward overcoming disasters. After the Great East Japan Earthquake of 2011, I (Nishizawa) worked in the Cabinet Office as a bureaucrat in charge of disaster management. Among other things, I revised Disaster Management Laws.

I moved to the General Affairs Division of the Minister's Secretariat of the Cabinet Office and transferred from Tokyo to the university in Fukuoka in April 2016. Fukuoka is a developed metropolis similar to Tokyo. The quality of food and culture in Fukuoka is high and, for that reason, I found Kyushu,

[1] See Cabinet Office 2015.

including Fukuoka, to be a very nice place. However, the Kumamoto earthquake occurred two weeks after I moved to Fukuoka. Extensive damage occurred in the Kyushu district. Even my apartment in central Fukuoka city was damaged. By the beginning of April 2017, more than 230 people, including disaster-related deaths, had died by the Kumamoto earthquake.

After the Great East Japan Earthquake, I was placed in charge of disaster management by the government and was also conducting research on the various forms of disaster management.

Thus, I had lectured about the administration of disaster management plans in classes and seminars before the Kumamoto earthquake. In them, I explained the risk of disasters in the Kyushu district, including the Kego Fault Zone, which caused the 2005 Fukuoka Western Offshore Earthquake. From the viewpoint of disaster management experts, there are many volcanoes in Kyushu district, and it is not surprising for large earthquakes to occur; therefore, I explained that preparation for disasters is important.

After the Kumamoto earthquake, students pointed out my predictive ability. However, it is natural for scholars studying disaster management to point out the dangers of the geographical characteristics of the Kyushu district.

Immediately after the Kumamoto earthquake, we conducted a survey in disaster areas such as Kumamoto city, Mashiki city, and Nishihara village with guidance from students from the affected areas. We discovered that the problems pointed out in the Great Hanshin-Awaji Earthquake of 1995 and the Great East Japan Earthquake of 2011 were still prevalent. Although it was widely reported afterwards, we discovered issues such as the lack of disaster prevention consciousness and earthquake-resistant buildings in afflicted ar-

eas and the need for stockpiling and shelters. These are the same problems of past large-scale disasters.

We interviewed administrative officials, companies, residents, and others in the disaster area. One respondent commented: "As a matter of course, we knew that it was important to prepare for disasters by watching the Great East Japan Earthquake and the Great Hanshin-Awaji Earthquake on television, but we have lived in Kyushu. So far, there was no experience of a big earthquake. We thought that we had nothing to do with the earthquake."

Residents demonstrate the psychological characteristics of "normality bias"[2] in which people ignore inconvenient information like that pertaining to disasters. Moreover, people underestimate information; further, they assume that they are safe without a clear basis for this assumption. Particularly in a disaster-prone area, this is a very dangerous characteristic.

Although it seems easy to think about disaster management as a familiar problem, it is actually quite difficult. The primary aim of disaster management is to learn how to approach disaster management as a familiar problem.

In this paper, we explain the sequence of disaster countermeasures by considering disaster management to be a familiar problem. In doing so, we will describe the efforts of the Cabinet Office's "Disaster Prevention 4.0" Future Conception Project. Next, we will present the implications of the Community Disaster Management Plan introduced under the revised Disaster Countermeasures Basic Act in 2013. We offer these reflections looking back a year after the Kumamoto earthquake[3].

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[2] See Ripley 2005, Leach 2004, National Institute of Standards and Technology 2005.

[3] See Nishizawa and Tsutsui 2014 and Cabinet Office 2014.

The analysis and opinions expressed in this paper do not reflect the official views of tour previous or present organization. They are personal evaluations and opinions of the authors.

2. Methodology

In a prior study on the lessons learned from the Kumamoto earthquake and the Community Disaster Management Plan system, Jin 2017 analyzed cases in Chuo district, Kumamoto City, and examined the possibility of creating a Community Disaster Management Plan for apartments.

In addition, several works by experts (Nishizawa, Isouchi, and Jin 2017) emerged from the discussions regarding the Community Disaster Management Plan at the symposium held at Fukuoka University immediately after the Kumamoto earthquake.

Nishizawa, Jin, Tsutsui, and Hayashi 2016 examined the possibility of utilizing information and communication technology (ICT) based on interviews with local residents in designated districts of the Community Disaster Management Plan model project of the Cabinet Office.

Reflecting another perspective, interviews were conducted in the disaster area of the Kumamoto earthquake from the viewpoint of sociology and administrative science; results from these led to an examination of ways of strengthening regional disaster management power by utilizing the Community Disaster Management Plan system (Nishizawa, Jin, and Tsutsui 2016 and Hayashi, Jin, Nishizawa, and Tsutsui 2016).

Other recent works examine the relationship between the Community Disaster Management Plan system, which is a disaster management effort of the local community, and the Business Continuity Plan (BCP), in order to im-

prove the disaster management activities of local companies (Nishizawa, Jin, and Hayashi 2016 and Hayashi, Jin, Tsutsui, and Nishizawa 2017).

These works present the results of a sociological interview conducted with victims and administrative officials after the Kumamoto earthquake. They integrate findings taking into consideration the views of institutions, planners, and discussants at the symposium.

In this paper, we will offer a new perspective that involves a literature survey, the "Disaster Prevention 4.0" Future Conception Project, and interviews conducted in the disaster area one year after the Kumamoto earthquake. This paper is a revised version of Nishizawa 2017.

3. Results

3.1 Literature survey

Taro Kono, Minister of State for Disaster Management in the Cabinet Office, clarified the aspect of the disaster that is expected to intensify with global warming and pointed out the importance of considering necessary and effective disaster prevention measures to safeguard the people. In December 2015, he began a study meeting on the "Disaster Prevention 4.0" Future Conception Project, and he became the chairperson of the meeting. In addition to the minister, the study group consisted of eight well-known experts. In June 2016, the Cabinet Office announced the proposal made by the experts.

In this proposal, the experts made a few recommendations. Responding to global climate change and the corresponding increase in the number of disasters, it is important to prepare residents, local communities, and companies, and to utilize information and communication technologies, for disaster prevention. We outline the recommendations below.

The most distinctive feature of this proposal is that the experts at the conference categorized Japan's disasters after the Second World War in the following way. First, they labeled the Ise-wan Typhoon of 1959, which marked a turning point in Japanese disaster management, "Disaster Prevention 1.0." In addition, they termed the 1995 Great Hanshin-Awaji Earthquake "Disaster Prevention 2.0" and the Great East Japan Earthquake of 2011 "Disaster Prevention 3.0." Finally, they referred to the present efforts to prepare for the increasing frequency of disasters "Disaster Prevention 4.0." [4]

Second, they pointed out that Japan has developed by learning lessons from past disasters. Furthermore, strategies to manage disasters in the country are still in the process of being developed. It was emphasized that awareness of "preparation" for disasters by citizens, companies, and other bodies is not sufficient.

Third, they pointed out that it is imperative that diverse actors such as regions, business circles, residents, enterprises, and so on regard disaster management as a familiar problem. Thus, it is important to reconstruct networks between stakeholders. Finally, it is necessary to raise social resilience.

In addition, they pointed out that it is important to grasp that preparation for disasters is a familiar problem − both residents' and regions'− based on the "limits of public assistance" available at the time of a disaster. As such, it is indispensable for local communities to foster awareness of "mutual help." Additionally, the formulation of disaster prevention measures should involve the participation of residents.

With regard to preparations by businesses, they pointed out that compa-

[4] Details of the characteristics of each of these disasters and the sequence of law revisions are compiled in Nishizawa, Jin, and Tsutsui 2016 and Hayashi, Jin, Nishizawa, and Tsutsui 2016.

nies should prepare for the maintenance of economic activities and recovery at an early stage by formulating and implementing BCP / BCM (Business Continuity Management) . Further, it is necessary for companies to secure supply chains and lifelines among themselves.

Information and communication technologies (ICTs) are also emphasized. It is particularly important to use regional information aggregation systems utilizing social media during normal times[5].

3.2 Interview with local residents

After the Kumamoto earthquake we carried out semi-structured interviews with local residents, companies, administrative officials, researchers, and others in Kyushu, including Kumamoto city, Mashiki city, and Nishihara village. In what follows, we introduce the results of this qualitative survey.

The semi-structured interview is an interviewing method that allows you to change the expression, sequence, content, etc. of questions according to the circumstances. This makes it easier for informants to respond naturally; in turn, the questioner, too, has a better chance of obtaining appropriate answers from the informant. Through field surveys, we discovered the following.

First, the local officials in charge of operating evacuation centers became confused and overwhelmed at the time of the emergency. They had never undergone much training. Additionally, even though a large number of staff arrived from local governments nationwide, it was difficult to coordinate and make good use of them.

[5] See Cabinet Office 2016a and Cabinet Office 2016b.

Second, officials on the support side could not grasp the situation of the whole evacuation center; therefore, they could only lead their own sections. The support side staff were new to the area and thus could not manage the entire evacuation center. Moreover, volunteers who arrived from around the country to support relief efforts needed direction from local workers, who were too busy with the operation of the evacuation centers to designate jobs for them.

On the basis of the above, we identified two major bottlenecks: first, the number of local staff responsible for evacuation management is small; second, they had too many jobs to oversee at the same time.

3.3 Interview with a local company

Royal Holdings Co., Ltd. is headquartered in Fukuoka. The company is famous for developing a family restaurant, Royal Host. Six months after the Kumamoto earthquake, we conducted an interview with the persons in charge of the company's Corporate Planning and General Affairs departments. They characterized their experience as follows.

After the disaster, it became difficult to obtain food products as logistics ceased. However, they developed their own menus with limited ingredients. They disregarded profits and cooked in the kitchen at each store. Their aim was to facilitate the early restoration of the community in the disaster area. For this reason, they continued to provide meals in disaster areas.

In afflicted areas, companies often distribute goods free of charge. However, Royal Host does not. This is because, after the Great East Japan Earthquake, victims said, "We do not have money; we hope you will provide a paid service firmly for the future community."

They did not place emphasis on distributing things; instead, they focused on continuing to run the business, working to keep stores open from the perspective of local community support.

In the food service industry, there are many companies that will just close their stores at the time of a disaster, but Royal Holdings greatly raised awareness as a local company in Kyushu and continued operating the business for the benefit of the community. In addition, the Egashira Foundation founded by them has widely promoted the importance of community disaster prevention in collaboration with Fukuoka University. There is a possibility that their efforts will lead to the early recovery of the community.

4. Discussion

4.1 Support received

In large-scale disasters, the administration cannot support victims adequately. This is the "limit of public assistance." In the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake, these limits were visible; similar phenomena were observed in the Kumamoto earthquake.

In interviews with local residents, it was pointed out that the inadequacy of the local disaster management system was one of the reasons for the failure of emergency response and delays in restoration.

The locals received generous support from the whole country, but support did not help because the local side was not sufficiently prepared. In order for support to function well, it the local side must carry out simulations beforehand in order to practice receiving assistance. In addition, the local side should have made plans and conducted emergency drills.

4.2 Community Disaster Management Plan

When the "limit of public assistance" is reached, what victims can rely on is assistance by local communities and companies. This was noticed after the Great East Japan Earthquake. In 2013, the Disaster Countermeasures Basic Act was revised accordingly. A Community Disaster Management Plan was established under the amendment. This is a "bottom-up" system in which residents and businesses of the local community can cooperate to prepare a plan according to the characteristics of the area.

This system was aimed at raising local disaster management capabilities in preparation for large-scale disasters over a wide area by cooperating with local communities and companies and promoting public assistance from municipalities. In the period from 2014 to 2016, the Cabinet Office implemented a model of the system in 44 districts throughout the country. In these, local communities have been cooperating with municipalities for a long time, and there have been cases in which advanced plans were created and practical training based on such plans was implemented.

This model project is also taking place in Kouzan School District, Kumamoto City, an area affected by the Kumamoto earthquake. Unfortunately, this began after the Kumamoto earthquake occurred; during the disaster, this system was not active. Regardless of the success or failure of the project, we believe that we must face the fact that such a major disaster occurred in this unspoiled area.

Additionally, the following points need attention. Case models will be helpful for disaster management in local communities and companies. However, it is inappropriate for each district to imitate these. In Cabinet Office 2014, they said that each district should not make similar plans across the

country. Rather, they had to prepare a plan according to regional and social characteristics. Moreover, each district was supposed to review the plan through training every year. In addition, Cabinet Office 2014 pointed out that it is important to make original plans that each district can continue to use.

5. Conclusion

Since the impact of the Kumamoto earthquake in Kyushu was quite large, a symposium on the Community Disaster Management Plan based on the Kumamoto earthquake was held at Fukuoka University in the month following the disaster, organized by the Japan Society of Community Disaster Management Plan.

Researchers from universities and laboratories, disaster management officials from government and corporations, and people engaged in local disaster management activities participated in the symposium. With over 120 participants, the venue was packed.

A similar symposium was held the following year at Fukuoka University in April 2017, since the original event was so successful. The 2017 symposium had 150 participants.

These symposia were reported in major Japanese media including NHK, Asahi Newspaper, Yomiuri Newspaper, Mainichi Newspaper, and others.

At the symposia, many panelists noted, "What we learned from the Kumamoto earthquake is the preparation and constitution in advance as well as the fundamental capabilities of local communities and companies. If local communities and companies were making Community Disaster Management plans in advance, damage of the Kumamoto earthquake would have been less."

Another problem pointed out by participants is that of disaster-related death. At the first symposium one month after the Kumamoto earthquake, the danger of disaster-related death was strongly emphasized along with the need to utilize relationships within local communities and support them. However, disaster-related deaths have still increased, exceeding the number of direct deaths from the disasters.

Disaster-related deaths are often caused by the economic syndrome and changes in the environment caused by the relocation of hospitals. Moreover, lonely deaths are on the increase now. One of the reasons for this is that the fabric of human relationships within local community before a disaster can be severed by a disaster.

In this regard, we have deep regrets because we have been engaged in formulating the Community Disaster Management Plan system and spreading awareness for a long time. On the basis of the lessons learned from the Kumamoto earthquake, we feel that we need to work harder to disseminate this system.

According to Cabinet Office 2014, creating a district disaster prevention plan in the community will enrich "social capital," [6] which mainly consists of local residents' networks, trust and reciprocity, etc. Additionally, there is a possibility that it will lead to the revitalization of local communities and town planning.

On the other hand, it was pointed out that as members of the region, companies are required to actively contribute to the region, and it is important to cooperate with the region even in normal times. Further, such efforts

[6] See Coleman 1990, Putnam 1993, Putnam 2000 and Lin 2002.

can lead to companies gaining support from the local community after disasters, thus leading to prompt recovery.

On the basis of the lessons learned from the Kumamoto earthquake, residents and companies in the local community will work together on disaster management activities such as creating Community Disaster Management Plans, which will allow them to prepare for disasters. They may also prove to be an effective tool to revitalize the local community.

This aligns with "Disaster Prevention 4.0" of the Cabinet Office. In the future, it is important for local residents and enterprises to approach disaster management as a familiar problem, to rebuild networks in the local community, and to enhance the resilience of the whole society. From the viewpoint of assistance by local communities, it is important for residents and companies to involve themselves in the process of disaster management preventative measures such as proposals for the Community Disaster Management Plan system. In this way, residents and businesses will view disaster management as a familiar problem and actively respond to disaster reduction.

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