

Challenges in Counter-disaster Measures for People with Functional Needs in Times of Disaster Following the Great East Japan Earthquake

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Abstract: This article describes the three major challenges that were identified and their possible solutions are proposed in counter-disaster measures for “people with functional needs in times of disaster (PFND)” following the 2011 Great East Japan Earthquake. First, recent developments in preparedness measures for PFND in Japan have been uncritically relying on the assumption that hazard maps represent “correct” estimates of future hazardous events, which are based on the maximum probable event (MP_rE) framework. In reality, however, a maximum possible event (MP_oE) has occurred in the Tōhoku regions. This has tremendous implications for fundamentally re-thinking the entire hazard estimation process from a MP_rE to MP_oE framework. Second, counter-disaster measures for PFND have focused mainly on warning and neighborhood-based evacuation assistance activities. Needs for shelters and temporary housing units that were specially designated for PFND arose following the earthquake. However, their provisions were neither systematic nor universal due to the lack of pre-planning. More detailed guidelines for specially designated shelter and temporary housing operations need to be developed in order to address this issue. Third, people with disabilities (PWD) became invisible in shelters and communities or in the eyes of local government administrators. This was due to the fact that a majority of PWD did not ask for help in evacuation shelters because they felt general shelters were not “barrier free” and were unresponsive to their functional needs. Furthermore, many local government administrators felt hesitant to release their PFND registry to non-governmental and self-help organizations that were eager to check the whereabouts and current situations of PWD. This was due to the fear of breaking the Personal Information Protection Bylaw despite the fact that the bylaw provided exceptional conditions, where the onset of disaster was clearly one of these exceptional conditions. Further elaboration and education on the use of personal information of PFND during a disaster period is needed among public and local government administrators.

Keywords: people with functional needs in times of disaster, maximum probable event, maximum possible event

Introduction

Counter-disaster Measures for People with Functional Needs in Times of Disaster in Japan

The issue of people with functional needs for communication, medical care, maintaining functional independence, supervision, and transportation (Kailes and Enders, 2007) during disasters has gained significant attention since 2004 when a series of natural disasters hit the Japanese archipelago. These disasters included the July Niigata-Fukushima flood, the October typhoon 23 and the October Niigata Chuetsu earthquake, wherein notably more than 60% of the victims were over the age of 65. As a response to these tragedies, Japan's Cabinet Office established a committee on "Communicating Disaster Information and Evacuation and Sheltering Assistance for the Elderly and Other Population during Heavy Meteorological and Other Disasters." The committee published the first edition of the "Evacuation/Sheltering Assistance Guideline for People with Functional Needs in Times of Disaster" in March 2005. After the guideline publication, the term *saigaiji-youengosha* or "people with functional needs in times of disaster (PFND)" was popularized in place of *saigai-jakusha* or "disaster-vulnerable population." PFND is defined as "a person who is able to function daily, whereby living independently given the proper resources and services when necessary."

Following another series of heavy rainfall, flood and landslide disasters in the subsequent year of 2005, another Cabinet Office committee conducted field research on the 2005 meteorological disaster sites and revised the evacuation and sheltering assistance guideline in March 2006. The 2006 guideline emphasized: (i) establishing a special team in each municipal government that was in charge of coordinating assistance to the target population; (ii) encouraging the information sharing of the functional

needs population within the local government and, if possible, with local community organizations, such as neighborhood associations and community emergency and response team; and (iii) planning. Since the publication of the 2006 guideline and the 2007 report, the Fire and Disaster Management Agency (FDMA) has requested every municipality in the country to formulate its own master plan that directs policy formation on PFND assistance, to identify potential target groups, and to clarify ways to collect and share their personal information. Based on the master plan, municipalities have been further encouraged to start project planning to assign local resident helpers to each individual PFND in times of evacuation. According to the survey conducted by FDMA, as of 1 April 2011, 1262 out of 1622 municipalities (76.8%) completed formulating PFND assistance master plans and an additional 349 municipalities (21.2%) were expected to finish within 1 year. Similarly, 864 (52.6%) municipalities reported that they have finished creating and have been updating the PFND directory. A total of 684 (41.5%) municipalities said that they were currently in the process of making the directories. Municipalities have also been working hard even on assigning local residents/helpers to each PFND for evacuation, which is a time-consuming process. A total of 361 (22.0%) reported that they have completed the assignment, 998 (60.7%) are in the process, and 285 (17.3%) have not yet initiated the process (Fire and Disaster Management Agency, 2011).

In the following fiscal year of 2006, the committee on PFND continued working on more detailed procedures and workflows in order to collect and share information on PFND, and to make individualized evacuation and sheltering assistance plans. In March 2007, the committee published the "Report on Preparedness Procedures for PFND." The 2007 report emphasized the establishment of a system to assist PFND by

facilitating cooperation between the local/municipal government disaster management department and its health and welfare department. The role of the disaster management department is to provide local hazard information, while the health and welfare department provides information on potential vulnerabilities within the target population. The 2007 report encouraged the use of maps where potentially vulnerable individuals, such as the frail elderly and people with disabilities (PWD) were projected onto multiple hazard layers, such as flood, landslide and seismicity. The map can help identify those who are at more risk because of their functional needs as well as of their geographic locations.

Kobe PFND Mapping Project

Tatsuki and Comafay (2010) reported on the 2008 Kobe PFND Mapping Project, which was characterized by a combined use of geographic information system and social survey in order to assess the overall hazard vulnerability of PFND. In response to the FDMA request as explained above, the Kobe city administration (responsible for 1.5 million residents) collated separate social service recipient databases, resulting in an integrated registry involving 120 000 individuals who were considered to be potentially vulnerable in times of disaster. The registry database identified 4329 people with physical disabilities in Hyogo Ward, which has 107 000 residents. The 2008 project geocoded and mapped those with physical disabilities on landslide, flood and tsunami hazard layers. A total of 914 individuals were found residing in hazardous areas (see Fig. 1).

These 914 individuals were then visited by interviewers and 612 or 67% responded to a structured questionnaire which measured demographics (i.e., age and sex), levels of disability, social isolation, housing fragility, and physical immobility. The 2008 project was based on the person-in-environment model of vulnerability, which defined hazard

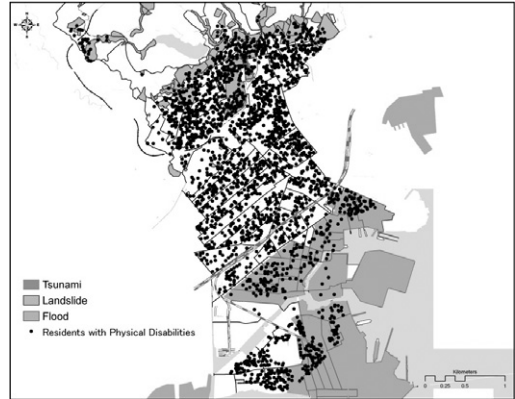


Figure 1. Persons with disabilities living in Kobe's Hyogo ward ($n = 4411$)

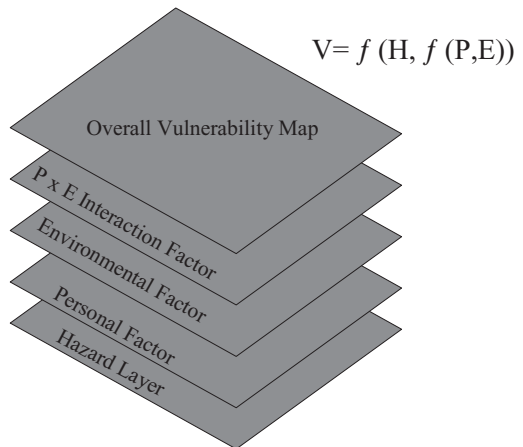


Figure 2. Person-in-environment model of mapping hazard vulnerability

vulnerability (V) as a function of hazards (H), person (P), and environment (E) factors, or $V = f(H, f(P, E))$ as illustrated by Figure 2.

Based on the model, an overall vulnerability score was then calculated as a function of hazards and the five variables for each respondent. As a result, 17% of those who responded were found to be the most vulnerable and requiring priority assistance in times of disaster (see Fig. 3).

Furthermore, a social vulnerability-weighted kernel density map of people with

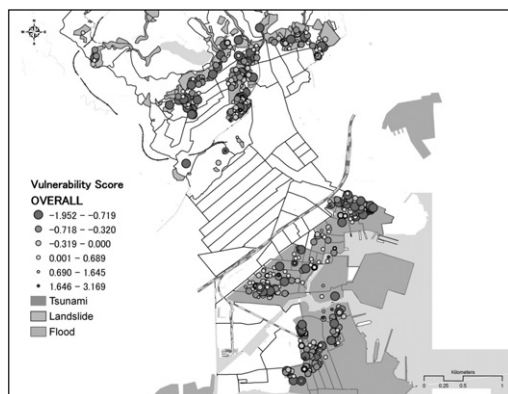


Figure 3. Overall vulnerability scores mapped on to hazard layers



Figure 4. People with functional needs in times of disaster kernel density estimation weighted by overall vulnerability index

functional needs was created (see Fig. 4). This map indicated which particular areas require more human resources for assisting the functional needs population for evacuation and sheltering. The project maps helped representatives from functional needs groups, community emergency response teams, community social services, and emergency management centers to initiate evacuation and sheltering assistance planning in the project areas.

The 2008 Kobe PFND mapping project was an attempt that aimed to provide a stan-

dardized method using individual social vulnerability mapping as an analysis tool to identify more comprehensively the risks that could affect a given community. This could help different stake-holders, functional needs groups, community emergency response teams, community social services, and emergency management centers to initiate evacuation and sheltering assistance planning in high-risk communities.

Three Challenges in PFND Counter-disaster Measures after 11 March 2011

Despite the above-mentioned national and local efforts on PFND counter-disaster measures in recent years, serious problems confronted municipalities, communities, PFND and their families at the onset of the 11 March 2011 Great East Japan Earthquake Disaster. From three reconnaissance missions conducted by the author's team in March and April, at least three major challenges were identified in preparedness, response and relief measures for PFND. Those were, namely: (i) challenges in identifying people at risk by re-thinking "correct" hazard estimates; (ii) challenges in pre-planning specially designated shelters for people with functional needs; and (iii) challenges in utilizing personal information on PFND. Each challenge is explained in the following sections.

Challenges in Identifying People at Risk: Re-think "Correct" Hazard Estimates

Recent developments in preparedness measures for PFND in Japan have been uncritically relying on the assumption that hazard maps represent "correct" estimates of future hazardous events. As Figure 5 below illustrates, this turned out to be a very wrong assumption. Hazard maps were created

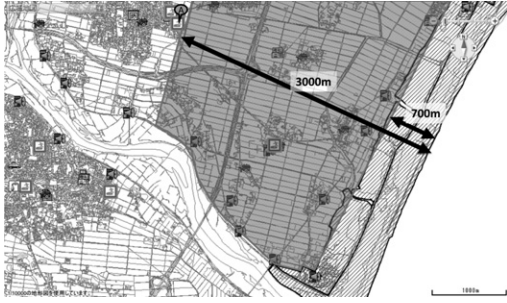


Figure 5. Tsunami hazard map and actual inundation east of Rokugo Junior High School, Wakabayashi Ward, Sendai City

according to a *maximum probable event* (MP_rE) framework. In reality, however, a *maximum possible event* (MP_oE) occurred in the Tōhoku region. This has tremendous implications for fundamentally re-thinking the entire hazard estimation process from an MP_rE to an MP_oE framework.

In the previous section, the person-in-environment model of hazard vulnerability (V) was introduced as a function of hazard (H), person (P) and environment (E) factors or $V = f(H, f(P, E))$. In practice, the hazard factor was estimated by a *maximum probable event* framework and therefore the model could be represented as $V = f(MP_rE, f(P, E))$. The challenge here is to replace the *maximum probable event* hazard estimate with an alternative hazard estimate by incorporating a *maximum possible event* framework. The modified person-in-environment model will therefore be represented as $V = f(MP_oE, f(P, E))$.

Once the hazard estimation endeavor departs from the realm governed by probabilistic and statistical theorem (i.e., MP_rE framework), it enters into the world of “hyper-complexity” where “hypothetical knowledge can no longer be mastered by mechanical testing rules” (Beck, 1992/1986: 157). Beck (1992/1986) calls this state “demonopolization of scientific knowledge claims” (Beck, 1992/1986: 156). The new

maximum possible event framework, therefore, will call for “reflexive scientization” that demands an active coproduction by every stakeholder in society in such areas as politics, business and the public, as well as in the scientific community involved in the knowledge definition process (Beck, 1992/1986: 157). The reflexive scientization process will also demand respect for locally networked tacit knowledge and the collective sensibilities of “lay actors” (Wynne, 1996; Mythen, 2004) as well as for the experts’ formal knowledge and their technologies. Details of this project need to be further investigated.

Challenges in Pre-planning Specially Designated Shelters for People with Functional Needs

As was described in the introduction, counter-disaster measures for PFND have been focusing mainly on warning and neighborhood-based evacuation assistance activities. Needs for shelters and temporary housing units that were specially designated for PFND arose following the 11 March earthquake. However, their provisions were neither systematic nor universal due to the lack of pre-planning. This is partly due to the fact that the 2006 guideline and the 2007 report have not provided detailed procedures on sheltering assistance planning for PFND. The concept of a specially designated shelter for PFND, or *fukushi-hinansho*, emerged in 2004 from the discussions by the committee on “Communicating Disaster Information and Evacuation and Sheltering Assistance for the Elderly and Other Population during Heavy Meteorological and Other Disasters.” It was recognized that general evacuation shelters as shown in Figures 6 and 7 were not capable of responding to the functional needs of PWD and the frail elderly. The committees on PFND assistance, however, have not spent enough time on clarifying the requirements, or the procedures and guidelines for specially designated shelters. Most hazards that the PFND



Figure 6. School Gym Shelter at Rokugo Junior High School, Sendai City (6 April 2011)



Figure 8. Specially designated shelter at Miyagino Day Service Center for people with disabilities, Sendai City (5 April 2011)



Figure 7. Arahama residents in the first-floor classroom at Hakken Junior High School (6 April 2011)

committees have been studying since 2004 have been meteorological and therefore sheltering needs were short-term and considered less life-threatening than evacuation needs.

In the 11 March earthquake disaster, a very large number of people rushed to general shelters and the length of stay was long, creating high functional needs for PFND. The situation apparently required alternative shelters. Disaster-hit municipalities responded in a non-uniform manner. In the case of Sendai City, the city administration had already made pre-planned arrangements/compacts for an alternative sheltering service with 52 local social service providers prior to the March event. Some of those compacted shelters conducted study seminars and practice drills in the previous

year. Thanks to these preparations, some responded to the city administration request quickly and others voluntarily initiated sheltering operations. In total, 26 shelters operated and served about 260 individuals in Sendai City (see Fig. 8).

The downtown center of Ishinomaki City was badly damaged by the March 11 tsunami, forcing more than 30 000 people or about one-fifth of its population to evacuate to general shelters at the peak of the aftermath. A medical doctor helping at one of the large general shelters strongly demanded that the city administration provide an alternative shelter for the frail elderly, PWD and those outpatients who did not require intensive medical care from the Ishinomaki Red Cross Hospital, unaffected by the tsunami. The city temporally designated Inai Junior High School gym as a designated shelter and then later moved the 20–30 shelter occupants to Yugakukan Sport Center gym (see Fig. 9) on 29 March. Yugakukan gym eventually accepted about 130 people, including PFND and their family members. Yugakukan shelter was staffed initially by most of Ishinomaki Municipal Hospital's doctors, nurses and social workers, who lost their workplace due to the tsunami. Volunteer doctors, nurses, social workers, nursing care workers and public administrators from other prefec-



Figure 9. Specially designated shelter at Yugakukan Sport Center Gym, Ishinomaki City (<http://road.nippon-foundation.or.jp/2011/04/007-fcd1.html>)

tures came to the Yugakukan shelter and assisted the operation from early April.

It should be noted that Ishinomaki City was renowned for its citywide community-based evacuation planning initiatives for PFND. The city was recognized as one of the ten model municipalities on PFND preparedness master planning as early as 2004. By the end of 2010, 401 out of 421 administrative districts in the city completed individualized evacuation planning for each PFND in the neighborhood. The city's master plan for PFND, however, did not include planning on specially designated shelters. Inai Junior High School and later Yugakukan shelter operations were all improvised by city hospital doctors and nurses with support from the city. The city, however, was not aware of the special service provision clause in the Disaster Relief Act that qualified additional financial compensations on top of general service provisions from the national government. It was not until almost the end of April that the city formally designated Yugakukan as the specially designated shelter for PFND. To sum up, specially designated shelters operated in Ishinomaki City but the operation lacked a formal logistic support foundation for a prolonged period of time.



Figure 10. Specially designated shelters at Shunpo-en Special Nursing Home (top) and Ochiai Nursery School (bottom) (<http://www.toshinkai.or.jp/image/C8EFBAD2C3CFC7C9B8AFCAF3B9F0.pdf>)

Like Ishinomaki, more than 12 000 or one-sixth of the Kesenuma City population rushed to general shelters after the earthquake and tsunami in March. Until April, the frail elderly, PWD and small children were all mixed with other evacuees who looked after those in need at general shelters. In some shelters, cardboard partitions were used to separate PFND from general evacuees in order to provide some privacy. On 7 April the city administration officially opened the first specially designated shelter for PFND in an unused nursery school site (see Fig. 10). In the following 2 weeks, an additional four specially designated shelters were opened. Shunpo-en special nursing home for the elderly (see Fig. 10) was one of the four new specially designated shelters. It was housing 60 elderly residents as well as more than 100 general evacuees and some PFND from the neighborhood after the March disaster. The home staff workers cared for the PFND. The director, however, was afraid of the financial burden of running a specially designated shelter for an extended period of time. Later in April, the city administrators learned that official designation would allow additional care service provision under the Disaster Relief Act. This was on top of the provision of regular service hours as prescribed by the

long-term-care insurance scheme. This alleviated tremendous financial burdens that the city and/or the designated shelters, like the Shunpo-en home, might have had to bear otherwise. In other words, Kesennum City also lacked pre-planning on specially designated shelters and the administration was not aware of the legal framework (i.e., the Disaster Relief Act special service provision clause) to operate these shelters.

In conclusion, municipalities other than Sendai City did not have compacts on specially designated shelter operations with social service providers. It took nearly 3 weeks for Ishinomaki and Kesennum to formally designate such shelters after the earthquake. It was learned that they were hesitant because they believed their facilities would not meet the standard for specially designated shelters, as outlined in pre-disaster planning manuals. Additionally, many local officials were unaware of the special service provision clause of the Disaster Relief Act covering shelters for people with functional needs. Nonetheless, these kinds of sheltering operations did emerge. Had the local municipalities officially declared that they were operating functional-needs shelters, they would have been eligible for additional resources at the onset from both the national and prefectural governments. More detailed guidelines for specially designated shelters and temporary housing operations for PFND need to be developed in order to address this issue.

Challenges in Utilizing Personal Information on PFND

Among different types of PFND, people with disabilities (PWD) were invisible in shelters and communities or in the eyes of local government administrators. This was due to the fact that the majority of PWD did not ask for help in general shelters because they felt general shelters were not “barrier free” and unresponsive to their functional needs. Furthermore, many local government administrators felt hesitant to release the

PFND registry to non-governmental organizations (NGO) and self-help organizations that were eager to check the whereabouts and current situation of PWD. This was due to the fear of breaking the Personal Information Protection Bylaw despite the fact that the bylaw provides exceptional conditions, whereby the onset of disaster is clearly one of these exceptional conditions. In fact, Minamisoma City officials did release that information to a local NGO, and in Higashimatsushima, members of groups who worked on behalf of disabled persons, such as the Japan Disability Forum, were allowed to accompany public health nurses on their home visits. Other cities might have used similar approaches, but it appeared that in most affected areas officials were unaware of the needs of the mentally ill and developmentally disabled persons and had not attempted to initiate outreach efforts for these populations. As of June 2011, the Japan Disability Forum announced that they were able to meet 1386 PWD in person from their outreach project in Miyagi Prefecture. This number (1386) accounted for only 2.6% of 53 511 persons who were registered as PWD in the affected areas. Researchers and advocates for persons with disabilities were unable to determine what was happening with large numbers of survivors with disabilities. Further elaboration and education on the use of personal information of PFND during a disaster period are needed among public and local government administrators.

Conclusion

This paper first introduced recent developments on counter-disaster measures for PFND in Japan. Based on three reconnaissance missions in March and April 2011, three major challenges and their possible solutions in preparedness, response and relief measures for PFND were presented.

First, challenges in identifying people at risk were illustrated. It is suggested here that there needs to be a shift from a *maximum probable event* to a *maximum possible event* framework. What Beck (1992/1986) calls the reflexive scientization process needs to be envisioned. Second, challenges in operating specially designated shelters for people with functional needs were identified. Further elaboration of the guideline on sheltering was suggested. Third, challenges in utilizing personal information on PFND during disaster were presented. Further elaboration and education on this matter is recommended.

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