Editorial for Special Issue:

Long-term Recovery from Recent Disasters in Japan and the United States



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In this issue of Journal of Disaster Research, we introduce nine papers on societal responses to recent catastrophic disasters with special focus on long-term recovery processes in Japan and the United States. As disaster impacts increase, we also find that recovery times take longer and the processes for recovery become more complicated. On January 17th of 1995, a magnitude 7.2 earthquake hit the Hanshin and Awaji regions of Japan, resulting in the largest disaster in Japan in 50 years. In this disaster which we call the Kobe earthquake hereafter, over 6,000 people were killed and the damage and losses totaled more than 100 billion US dollars. The long-term recovery from the Kobe earthquake disaster took more than ten years to complete. One of the most important responsibilities of disaster researchers has been to scientifically monitor and record the long-term recovery process following this unprecedented disaster and discern the lessons that can be applied to future disasters. The first seven papers in this issue present some of the key lessons our research team learned from the studying the long-term recovery following the Kobe earthquake disaster.

We have two additional papers that deal with two recent disasters in the United States - the terrorist attacks on World Trade Center in New York on September 11 of 2001 and the devastation of New Orleans by the 2005 Hurricane Katrina and subsequent levee failures. These disasters have raised a number of new research questions about long-term recovery that US researchers are studying because of the unprecedented size and nature of these disasters' impacts. Mr. Mammen's paper reviews the long-term recovery processes observed at and around the World Trade Center site over the last six years. Ms. Johnson's paper provides a detailed account of the protracted reconstruction planning efforts in the city of New Orleans to illustrate a set of sufficient and necessary conditions for successful recovery.

All nine papers in this issue share a theoretical framework for long-term recovery processes which we developed based first upon the lessons learned from the Kobe earthquake and later expanded through observations made following other recent disasters in the world. The following sections provide a brief description of each paper as an introduction to this special issue.

1. The Need for Multiple Recovery Goals

After the 1995 Kobe earthquake, the long-term recovery process began with the formulation of disaster recovery plans by the City of Kobe - the most severely impacted municipality - and an overarching plan by Hyogo Prefecture which coordinated 20 impacted municipalities; this planning effort took six months. Before the Kobe earthquake, as indicated in Mr. Maki's paper in this issue, Japanese theories about, and approaches to, recovery focused mainly on physical recovery, particularly: the redevelopment plans for destroyed areas; the location and standards for housing and building reconstruction; and, the repair and rehabilitation of utility systems. But the lingering problems of some of the recent catastrophes in Japan and elsewhere indicate that there are multiple dimensions of recovery that must be considered.

We propose that two other key dimensions are economic recovery and life recovery. The goal of economic recovery is the revitalization of the local disaster impacted economy, including both major industries and small businesses. The goal of life recovery is the restoration of the livelihoods of disaster victims. The recovery plans formulated following the 1995 Kobe

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Fig. 1. Basic structure of recovery plans from the 1995 Kobe earthquake.

earthquake, including the City of Kobe's and Hyogo Prefecture's plans, all stressed these two dimensions in addition to physical recovery.

The basic structure of both the City of Kobe's and Hyogo Prefecture's recovery plans are summarized in **Fig. 1**. Each plan has three elements that work simultaneously. The first and most basic element of recovery is the restoration of damaged infrastructure. This helps both physical recovery and economic recovery. Once homes and work places are recovered, Life recovery of the impacted people can be achieved as the final goal of recovery.

Figure 2 provides a "recovery report card" of the progress made by 2006 – 11 years into Kobe's recovery. Infrastructure was restored in two years, which was probably the fastest infrastructure restoration ever, after such a major disaster; it astonished the world. Within five years, more than 140,000 housing units were constructed using a variety of financial means and ownership patterns, and exceeding the number of demolished housing units. Governments at all levels municipal, prefectural, and national - provided affordable public rental apartments. Private developers, both local and national, also built condominiums and apartments. Disaster victims themselves also invested a lot to reconstruct their homes. Eleven major redevelopment projects were undertaken and all were completed in 10 years. In sum, the physical recovery following the 1995 Kobe earthquake was extensive and has been viewed as a major success.

In contrast, economic recovery and life recovery are still underway more than 13 years later. Before the Kobe earthquake, Japan's policy approaches to recovery assumed that economic recovery and life recovery would be achieved by infusing ample amounts of public funding for physical recovery into the disaster area. Even though the City of Kobe's and Hyogo Prefecture's recovery plans set economic recovery and life recovery as key goals, there was not clear policy guidance to accomplish them. Without a clear articulation of the



Fig. 2. "Disaster recovery report card" of the progress made by 2006.

desired end-state, economic recovery programs for both large and small businesses were ill-timed and ill-matched to the needs of these businesses trying to recover amidst a prolonged slump in the overall Japanese economy that began in 1997. "Life recovery" programs implemented as part of Kobe's recovery were essentially social welfare programs for low-income and/or senior citizens.

2. Requirements for Successful Physical Recovery

Why was the physical recovery following the 1995 Kobe earthquake so successful in terms of infrastructure restoration, the replacement of damaged housing units, and completion of urban redevelopment projects? There are at least three key success factors that can be applied to other disaster recovery efforts: 1) citizen participation in recovery planning efforts, 2) strong local leadership, and 3) the establishment of numerical targets for recovery.

Citizen participation

As pointed out in the three papers on recovery planning processes by Mr. Maki, Mr. Mammen, and Ms. Johnson, citizen participation is one of the indispensable factors for successful recovery plans. Thousands of citizens participated in planning workshops organized by America Speaks as part of both the World Trade Center and City of New Orleans recovery planning efforts. Although no such workshops were held as part of the City of Kobe's recovery planning process, citizen participation had been part of the City of Kobe's general plan update that had occurred shortly before the earthquake. The City of Kobe's recovery plan is, in large part, an adaptation of the 1995-2005 general plan. On January 13 of 1995, the City of Kobe formally approved its new, 1995-2005 general plan which had been developed over the course of three years with full of citizen participation. City officials, responsible for

drafting the City of Kobe's recovery plan, have later admitted that they were able to prepare the city's recovery plan in six months because they had the preceding three years of planning for the new general plan with citizen participation. Based on this lesson, Odiya City compiled its recovery plan based on the recommendations obtained from a series of five stakeholder workshops after the 2004 Niigata Chuetsu earthquake.

Strong leadership

In the aftermath of the Kobe earthquake, local leadership had a defining role in the recovery process. Kobe's former Mayor, Mr. Yukitoshi Sasayama, was hired to work in Kobe City government as an urban planner, rebuilding Kobe following World War II. He knew the city intimately. When he saw damage in one area on his way to the City Hall right after the earthquake, he knew what levels of damage to expect in other parts of the city. It was he who called for the two-month moratorium on rebuilding in Kobe city on the day of the earthquake. The moratorium provided time for the city to formulate a vision and policies to guide the various levels of government, private investors, and residents in rebuilding. It was a quite unpopular policy when Mayor Sasayama announced it. Citizens expected the city to be focusing on shelters and mass care, not a ban on reconstruction. Based on his experience in rebuilding Kobe following WWII, he was determined not to allow haphazard reconstruction in the city. It took several years before Kobe citizens appreciated the moratorium.

Numerical targets

Former Governor Mr. Toshitami Kaihara provided some key numerical targets for recovery which were announced in the prefecture and municipal recovery plans. They were: 1) Hyogo Prefecture would rebuild all the damaged housing units in three years, 2) all the temporary housing would be removed within five years, and 3) physical recovery would be completed in ten years. All of these numerical targets were achieved. Having numerical targets was critical to directing and motivating all the stakeholders including the national government's investment, and it proved to be the foundation for Japan's fundamental approach to recovery following the 1995 earthquake.

3. Economic Recovery as the Prime Goal of Disaster Recovery

In Japan, it is the responsibility of the national government to supply the financial support to restore damaged infrastructure and public facilities in the impacted area as soon as possible. The long-term recovery following the Kobe earthquake is the first time, in Japan's modern history, that a major rebuilding effort occurred during a time when there was not also strong national economic growth. In contrast, between 1945 and 1990, Japan enjoyed a high level of national economic growth which helped facilitate the recoveries following WWII and other large fires.

In the first year after the Kobe earthquake, Japan's national government invested more than US\$ 80 billion in recovery. These funds went mainly towards the repair and reconstruction of infrastructure and public facilities. Now, looking back, we can also see that these investments also nearly crushed the local economy. Too much money flowed into the local economy over too short a period of time and it also did not have the "trickle-down" effect that might have been intended. To accomplish numerical targets for physical recovery, the national government awarded contracts to large companies from Osaka and Tokyo. But, these large out-of-town contractors also tended to have their own labor and supply chains already intact, and did not use local resources and labor, as might have been expected. Essentially, ten years of housing supply was completed in less than three years, which led to a significant local economic slump.

Large amounts of public investment for recovery are not necessarily a panacea for local businesses, and local economic recovery, as shown in the following two examples from the Kobe earthquake. A significant national investment was made to rebuild the Port of Kobe to a higher seismic standard, but both its foreign export and import trade never recovered to pre-disaster levels. While the Kobe Port was out of business, both the Yokohama Port and the Osaka Port increased their business, even though many economists initially predicted that the Kaohsiung Port in Chinese Taipei or the Pusan Port in Korea would capture this business. Business stayed at all of these ports even after the reopening of the Kobe Port. Similarly, the Hanshin Railway was severely damaged and it took half a year to resume its operation, but it never regained its pre-disaster readership. In this case, two other local railway services, the JR and Hankyu lines, maintained their increased readership even after the Hanshin railway resumed operation. As illustrated by these examples, pre-disaster customers who relied on previous economic output could not necessarily afford to wait for local industries to recover and may have had to take their business elsewhere.

Our research suggests that the significant recovery investment made by Japan's national government may have been a disincentive for new economic development in the impacted area. Government may have been the only significant financial risk-taker in the impacted area during the national economic slow-down. But, its focus was on restoring what had been lost rather than promoting new or emerging economic development. Thus, there may have been a missed opportunity to provide incentives or put pressure on major businesses and industries to develop new businesses and attract new customers in return for the public investment.

The significant recovery investment by Japan's national government may have also created an



Fig. 3. Integrated plan of disaster recovery.

over-reliance of individuals on public spending and government support. As indicated in Ms. Karatani's paper, individual savings of Kobe's residents has continued to rise since the earthquake and the number of individuals on social welfare has also decreased below pre-disaster levels.

Based on our research on economic recovery from the Kobe earthquake, at least two lessons emerge: 1) Successful economic recovery requires coordination among all three recovery goals – Economic, Physical and Life Recovery, and 2) "Recovery indices" are needed to better chart recovery progress in real-time and help ensure that the recovery investments are being used effectively.

Economic recovery as the prime goal of recovery

Physical recovery, especially the restoration of infrastructure and public facilities, may be the most direct and socially accepted provision of outside financial assistance into an impacted area. However, lessons learned from the Kobe earthquake suggest that the sheer amount of such assistance may not be effective as it should be. Thus, as shown in **Fig. 3**, economic recovery should be the top priority goal for recovery among the three goals and serve as a guiding force for physical recovery and life recovery.

Physical recovery can be a powerful facilitator of post-disaster economic development by upgrading social infrastructure and public facilities in compliance with economic recovery plans. In this way, it is possible to turn a disaster into an opportunity for future sustainable development. Life recovery may also be achieved with a healthy economic recovery that increases tax revenue in the impacted area. In order to achieve this coordination among all three recovery goals, municipalities in the impacted areas should have access to flexible forms of post-disaster financing.

The community development block grant program that has been used after several large disasters in the United States, provide impacted municipalities with a more flexible form of funding and the ability to better determine what to do and when. The participation of key stakeholders is also an indispensable element of success that enables block grant programs to transform local needs into concrete businesses. In sum, an effective economic recovery combines good coordination of national support to restore infrastructure and public facilities and local initiatives that promote community recovery.

Developing Recovery Indices

Long-term recovery takes time. As Mr. Tatsuki's paper explains, periodical social survey data indicates that it took ten years before the initial impacts of the Kobe earthquake were no longer affecting the well-being of disaster victims and the recovery was completed. In order to manage this long-term recovery process effectively, it is important to have some indices to visualize the recovery processes. In this issue, three papers by Mr. Takashima, Ms. Karatani, and Mr. Kimura define three different kinds of recovery indices that can be used to continually monitor the progress of the recovery.

Mr. Takashima focuses on electric power consumption in the impacted area as an index for impact and recovery. Chronological change in electric power consumption can be obtained from the monthly reports of power company branches. Daily estimates can also be made by tracking changes in city lights using a satellite called DMSP. Changes in city lights can be a very useful recovery measure especially at the early stages since it can be updated daily for anywhere in the world.

Ms. Karatani focuses on the chronological patterns of monthly macro-statistics that prefecture and city governments collect as part of their routine monitoring of services and operations. For researchers, it is extremely costly and virtually impossible to launch post-disaster projects that collect recovery data continuously for ten years. It is more practical for researchers to utilize data that is already being collected by local governments or other agencies and use this data to create disaster impact and recovery indices. Ms. Karatani found three basic patterns of disaster impact and recovery in the local government data that she studied: 1) Some activities increased soon after the disaster event and then slumped, such as housing construction; 2) Some activities reduced sharply for a period of time after the disaster and then rebounded to previous levels, such as grocery consumption; and 3) Some activities reduced sharply for a while and never returned to previous levels, such as the Kobe Port and Hanshin Railway.

Mr. Kimura focuses on the psychology of disaster victims. He developed a "recovery and reconstruction calendar" that clarifies the process that disaster victims undergo in rebuilding their shattered lives. His work is based on the results of random surveys. Despite differences in disaster size and locality, survey data from the 1995 Kobe earthquake and the 2004 Niigata-ken Chuetsu earthquake indicate that the recovery and reconstruction calendar is highly reliable and stable in clarifying the recovery and reconstruction process.



Fig. 4. Ethnographical meaning of "life recovery" obtained from the 5th year review of the Kobe earthquake by the City of Kobe.

4. Life Recovery as the Ultimate Goal of Disaster Recovery

Life recovery starts with the identification of the disaster victims. In Japan, local governments in the impacted area issue a "damage certificate" to disaster victims by household, recording the extent of each victim's housing damage. After the Kobe earthquake, a total of 500,000 certificates were issued. These certificates, in turn, were used by both public and private organizations to determine victim's eligibility for individual assistance programs. However, about 30% of those victims who received certificates after the Kobe earthquake were dissatisfied with the results of assessment. This caused long and severe disputes for more than three years. Based on the lessons learned from the Kobe earthquake, Mr. Horie's paper presents (1) a standardized procedure for building damage assessment and (2) an inspector training system. This system has been adopted as the official building damage assessment system for issuing damage certificates to victims of the 2004 Niigata-ken Chuetsu earthquake, the 2007 Noto-Peninsula earthquake, and the 2007 Niigata-ken Chuetsu Oki earthquake.

Personal and family recovery, which we term life recovery, was one of the explicit goals of the recovery plan from the Kobe earthquake, but it was unclear in both recovery theory and practice as to how this would be measured and accomplished. Now, after studying the recovery in Kobe and other regions, Ms. Tamura's paper proposes that there are seven elements that define the meaning of life recovery for disaster victims. She recently tested this model in a workshop with Kobe disaster victims. The seven elements and victims' rankings are shown in **Fig. 4**. Regaining housing and restoring social networks were, by far, the top recovery indicators for victims. Restoration of neighborhood character ranked third. Demographic shifts and



Fig. 5. Life recovery models of 2003 and 2005.

redevelopment plans implemented following the Kobe earthquake forced significant neighborhood changes upon many victims. Next in line were: having a sense of being better prepared and reducing their vulnerability to future disasters; regaining their physical and mental health; and restoration of their income, job, and the economy. The provision of government assistance also provided victims with a sense of life recovery.

Mr. Tatsuki's paper summarizes the results of four random-sample surveys of residents within the most severely impacted areas of Hyogo Prefecture. These surveys were conducted biannually since 1999,. Based on the results of survey data from 1999, 2001, 2003, and 2005, it is our conclusion that life recovery took ten years for victims in the area impacted significantly by the Kobe earthquake. Fig. 5 shows that by comparing the two structural equation models of disaster recovery (from 2003 and 2005), damage caused by the Kobe earthquake was no longer a determinant of life recovery in the 2005 model. It was still one of the major determinants in the 2003 model as it was in 1999 and 2001. This is the first time in the history of disaster research that the entire recovery process has been scientifically described. It can be utilized as a resource and provide benchmarks for monitoring the recovery from future disasters.



Fig. 6. A holistic recovery policy model.

6. The Need for an Integrated Recovery Plan

The recovery lessons from Kobe and other regions suggest that we need more integrated recovery plans that use physical recovery as a tool for economic recovery, which in turn helps disaster victims. Furthermore, we believe that economic recovery should be the top priority for recovery, and physical recovery should be regarded as a tool for stimulating economic recovery and upgrading social infrastructure (as shown in **Fig. 6**). With this approach, disaster recovery can help build the foundation for a long-lasting and sustainable community.

Figure 6 proposes a more detailed model for a more holistic recovery process. The ultimate goal of any recovery process should be achieving life recovery for all disaster victims. We believe that to get there, both direct and indirect approaches must be taken. Direct approaches include: the provision of funds and goods for victims, for physical and mental health care, and for housing reconstruction. Indirect approaches for life recovery are those which facilitate economic recovery, which also has both direct and indirect approaches. Direct approaches to economic recovery include: subsidies, loans, and tax exemptions. Indirect approaches to economic recovery include, most significantly, the direct projects to restore infrastructure and public buildings. More subtle approaches include: setting new regulations or deregulations, providing technical support, and creating new businesses.

A holistic recovery process needs to strategically combine all of these approaches, and there must be collaborative implementation by all the key stakeholders, including local governments, non-profit and non-governmental organizations (NPOs and NGOs), community-based organizations (CBOs), and the private Therefore, community and stakeholder sector. participation in the planning process is essential to achieve buy-in for the vision and desired outcomes of the recovery plan. Securing the required financial resources

is also critical to successful implementation.

In thinking of stakeholders, it is important to differentiate between supporting entities and operating agencies. Supporting entities are those organizations that supply the necessary funding for recovery. Both Japan's national government and the federal government in the U.S. are the prime supporting entities in the recovery from the 1995 Kobe earthquake and the 2001 World Trade Center recovery. In Taiwan, the Buddhist organization and the national government of Taiwan were major supporting entities in the recovery from the 1999 Chi-Chi earthquake.

Operating agencies are those organizations that implement various recovery measures. In Japan, local governments in the impacted area are operating agencies, while the national government is a supporting entity. In the United States, community development block grants provide an opportunity for many operating agencies to implement various recovery measures. As Mr. Mammen' paper describes, many NPOs, NGOs, and/or CBOs in addition to local governments have had major roles in implementing various kinds programs funded by block grants as part of the World Trade Center recovery. No one, single organization can provide effective help for all kinds of disaster victims individually or collectively. The needs of disaster victims may be conflicting with each other because of their diversity. Their divergent needs can be successfully met by the diversity of operating agencies that have responsibility for implementing recovery measures. In a similar context, block grants made to individual households, such as microfinance, has been a vital recovery mechanism for victims in Thailand who suffered from the 2004 Sumatra earthquake and tsunami disaster. Both disaster victims and government officers at all levels strongly supported the microfinance so that disaster victims themselves would become operating agencies for recovery. Empowering individuals in sustainable life recovery is indeed the ultimate goal of recovery.