

Comparing Hurricane Katrina to Japan's Kobe Earthquake in 1995: Sharing Policy and Institutional Lessons from Two Large Scale Natural Disasters in the United States and Japan

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Summary:

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Abbreviation

PM: Prime Minister

FEMA: Federal Emergency Management Agency

DHS: Department of Homeland Security

JSDF: Japan Self Defense Forces

HQs: Headquarters

DOD: Department of Defense

Summary:

Word count: 5415

Figures and Tables: 1 figures and 4 tables

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Introduction

People are often vulnerable to natural disasters, both in developing and developed countries. Although the US and Japan are developed countries with strong economies and established medical and public health systems, they both had difficulty responding to wide-scale natural disasters(1).

The failure of the US to respond to Hurricane Katrina in 2005 was shocking for Japanese people, who experienced the Great Hanshin-Awaji Earthquake, known elsewhere as the Kobe Earthquake, in 1995. On January 17, at 5:47 am, an earthquake with a magnitude of 7.3 on the Richter Scale occurred on the western mainland without any warning. The 1995 Kobe Earthquake was one of the most devastating earthquakes to ever hit Japan. More than 6,400 fatalities, 50,000 injuries, 50,000 destroyed buildings, and 100 billion dollars in damage were caused by this natural disaster in southern Hyogo prefecture, mostly in the city of Kobe, Japan's most important port(2-4). After reviewing the failure of the Kobe response, Japan made an effort to establish an appropriate emergency management system. Prior to the events of hurricane Katrina in the United States, the Japanese government thought that it could learn from the US's emergency management system. They considered this to be an important model both for management and disaster medicine. In fact, prior to Katrina many Japanese officials visited the Federal Emergency Management Agency (FEMA) for training(5-7).

On August 29, 2005, Hurricane Katrina, Saffir-Simpson Hurricane Scale Category 5, made landfall in southeast Louisiana (Category 3 at landfall). The storm surge caused major or catastrophic damage along the coastlines of Louisiana, Mississippi, and Alabama, including the cities of Mobile, Alabama, Biloxi and Gulfport, Mississippi, and Slidell, Louisiana. Levees separating Lake Pontchartrain from New Orleans, Louisiana were breached by the surge, ultimately flooding roughly 80% of the city and many areas of neighboring parishes. Severe wind damage was reported well inland. On August 30, the levees of New Orleans leaked, and then the city was flooded. The city was submerged and a lot of people could not escape by themselves. Katrina is estimated to be responsible for \$75 billion (2005 US dollars) in damages, making it the costliest hurricane in US history(8, 9). The storm killed at least 1,604 people, making it the deadliest US hurricane since **the 1928 Lake Okeechobee (Florida) Hurricane**.

Although earthquakes and hurricanes are completely different types of natural disasters and the consequences of these two disasters were also different(10), the Kobe Earthquake and

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Hurricane Katrina had similarly devastating impacts on society and government in Japan and the US. This study aims to identify the similarities in government response to two devastating natural disasters in order to learn about how society's and governments response while providing lessons for disaster preparedness, both in these nations and others. The public health activities for the response to large scale disaster are strongly influenced by the emergency response of the government, and understating the political and administrative issues in disasters are meaningful for public health preparedness.

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Methods:

This is a descriptive study based on public and official reports. The primary sources of the Kobe Earthquake are the official government reports shown on the website of the cabinet named "The Collection of Data Regarding the Lessons from the Great Hanshin-Awaji Earthquake Disaster" and that of Fire and Disaster Management Agency named "Database for the Great Hanshin-Awaji Earthquake(2, 3). The primary sources of Hurricane Katrina are the official reports, "A Failure of Initiative" published by the Congress and "The Federal Response to Hurricane Katrina: Lessons Learned" published by White House in February 2006(8, 9). Additionally, we collected all kinds of resources such as other government reports, academic papers, media information, books. Key information interviews were also done with officials involved in both disasters.

Based on the facts of the disaster responses from the standpoint of political and administrative perspective, we extracted the commonalities, and investigated the detail about each topic, [and provide the lessons for the future preparedness for Japan, US, and other countries.](#) ~~(Yes, but again, for what purpose? To provide lessons for future preparedness, both for Japan and other nations? We need to be clear on this.)~~

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Before we investigated the two natural disasters, the demographic characteristics and political systems for emergency management are described. Table 1 shows an overview of Japan and the US in national capacity and health care capabilities in 2005(11, 12), and the summary of the difference between the central/federal government emergency management systems in Japan and the US in 2005(13).

The difference of Japan and US in political system and emergency management

Although Japan and the US have different political systems, their decentralized political structures share some commonalities. The federal government in Washington, DC, is similar to the central government in Tokyo; the states in US is similar to the prefectures in Japan; and the municipalities (local) governments in the US are similar to the cities/towns (local) government in Japan.

Nevertheless, Japan is a country governed by a parliamentary cabinet system, which is widely used in European countries. The US, on the other hand, is a Presidential system. In the parliamentary cabinet system, the prime minister, the leader of the country, is appointed by the approval of the parliament, of which he is required to be a member. The Prime Minister acts as a representative of the cabinet members, and their full approval of the cabinet members is necessary in political decisions. In addition, the lower parliament has the power to

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remove Prime Minister by a designated procedure. The disagreement with more than two thirds of the all the congressmen in the lower parliament enables the request of the Prime Minister's resignation. Once the removal of Prime Minister is approved, he is obligated to resign his position or break up the lower parliament.

In the US, on the other hand, the presidential administration and Congress operate in a different manner and work independently. The President can make policy and military decisions independently **within the boundaries of laws and budgets passed by Congress.**

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However, the Congress and Senate reserve the right to impeach the president whenever they see fit. A full impeachment requires 2/3 of a vote in both houses, not just one, however. (For example, former President Bill Clinton was **charged** by the Congress in 1998 but not the Senate; and he was not found to be guilty.) Because of these institutional differences, it's fair to say that the leadership of the US President tends to be more stable than Japan's. This is because there are *two* legislative institutions, the Congress and Senate, that are required for Presidential impeachment, whereas only one institution, Parliament, is required in Japan.

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With regards to bureaucratic institutions, the central disaster preparedness bureaucracy in Japan has a lot of power in regulating social activities and making laws. It can also influence the prefecture and city/town levels. **[How does it do this?]** Japan's national strategies are created and managed by the bureaucracy, which means that in reality, Japan's disaster management system is governed by one large bureaucracy.

In contrast, historically bureaucracies in charge of disaster preparedness in the US tend to be fragmented and have no centralized authority and autonomy. More recently, the relationship between FEMA and the Department of Homeland Security (DHS) provides a good example. Since its inception in 2001, the DHS and FEMA have worked separately but on related emergency issues. Realizing the high degree of overlap, **in 2003 FEMA was officially integrated into DHS and was no longer an independent agency, but became a component of DHS.** Bureaucratic fragmentation also exists at the state- and local-level, as both levels of government have their own disaster response institutions. Often, there is very little cooperation between both levels of government, as mayors are often expected to respond first to natural disasters. They only call on the governors – and with sometimes great hesitation - when they feel too overwhelmed, as we saw with Katrina.

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In Japan, sub-national institutional designs are a bit different. The police belong to the prefecture (state government in the US), while the fire and EMS systems belong to the city/town. The EMS in Japan is a sub-sector of the fire system. There are two different types of command structures among police, fire and EMS in Japan. In case of emergency, people

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dial “110” for police and “119” for fire or EMS. As a result, the coordination of police and fire/EMS in the response to large scale disaster is not easy because two different command structures, the prefecture and city/towns, need to coordinate.

In contrast, the police, fire and EMS are defined as first responders in the US emergency management system, and these three groups belong to the mayors. In contrast to Japan, there is no confusion as to the role the police, fire departments and EMS play. The financing and administrative structures are managed by one authority: the mayor, while state governments may or may not provide additional financial support. In case of emergency, moreover, people only have to dial one number: “911”, for all three services to respond.

In Japan, local government leaders, such as the city/town mayor or prefecture governors, are responsible for responding to local disasters; however, because of the central government bureaucracy's [What's the name fo the bureaucracy?] high degree of influence and control [again, you need to explain precisely how the central bureaucracy controls local decisions? Does it delegate authority to local representatives? Does the Japanese constituton give the central bureaucracy the authority to do this?], the governor and mayors' leadership roles are relatively weak. In the US, on the other hand, the mayors are in charge of taking the initiative for reacting to disasters in their jurisdiction. Depending on their need, the mayors may then request the assistance of the Governor. The President or federal government may order FEMA and DHS to intervene *only* when the mayor and governor ask for their assistance.

Nevertheless, considering the failure of this system in response to Katrina, the President through the DHS is now considering changing the law to allow DHS to anticipate local disasters and intervene before the governors and mayors ask for assistance. Realizing that much of the Katrina disaster could have been avoided through anticipatory intervention, DHS has now created a new *Catastrophic Incident Annex* (White House, 2006). This Annex allows the government to bypass the Stafford Act (which has historically given municipal governments complete authority over disaster management) and intervene whenever it believes that municipal and state governments are not prepared to respond to a disaster. Currently, however, the Act is limited to the immediate deployment of resources for aid, such as vaccines, medical supplies, etc (White House, 2006). The Annex is only a proposal, however, and has not been formally adopted. Thus, the Stafford Act still holds.

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Result:

The response of the government assistance for the Kobe Earthquake is summarized in the table 2, and that of Hurricane Katrina in the tables 3a and 3b. The tables of Hurricane Katrina are applied from the article of New York Times on September 11, 2005(14).

Based on the facts of the two large natural disasters, we found six commonalities in terms of government responses: 1. the lack of political leadership; 2. delayed response of the central/federal government to the disaster; 3. the importance of the military response; 4. the effectiveness of non-governmental response; 5. **reluctant** communication system and 6., socially vulnerable people.

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1. the lack of political leadership

Both in the Kobe Earthquake and Hurricane Katrina, appropriate, strong political leadership was essentially now where to be seen. Shown †1 in table 2, Prime Minister (PM) Tomiichi Murayama set up the headquarters for the disaster response 4 hours after the earthquake. Nevertheless, he only realized the wider significance of the earthquake more than 6 hours (around noon) later and started to brief the media 8 hours later. Every action the PM took was too late, and he could not provide a clear strategic response during the parliamentary meetings for the first three days after the earthquake. Additionally, the PM declined President Bill Clinton's offer to send an aircraft carrier for evacuees in Japan on the third day after the earthquake. Similarly, as shown †1 in table 3a and 3b, President Bush, Secretary Chertoff, and Director Michael Brown did not take the initiatives progressively prior to the landfall, and even after the catastrophe, these leaders seemed reluctant for the action. A bit more needs to be said on delayed US presidential action here. I can say something if you like.

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2. delayed response of the central/federal governments

In the Kobe Earthquake, shown in †2 of the table 2, the time to set up the headquarters in the central government in Tokyo response was delayed more than 4 hours than Daiei, the Japanese Wal-Mart (details to come later). The government could not start working without information from Kobe, although the communication infrastructure between Tokyo and Kobe was completely destroyed.

In Hurricane Katrina, as shown in †2 of the table 3a and 3b, FEMA sent small scale units to the south prior to the hurricane, but it did not seem to be meaningful. Although Governor Blanco of Louisiana asked the federal government for help, the federal government committed the support after the hurricane gave devastating impact on the south.

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3. the importance of the military responses

The activities of Japan Self Defense Forces (JSDF) in the Kobe Earthquake was summarized in†3 of the table 2. Four hours after the Kobe Earthquake JSDF units around Kobe were deployed to the affected areas in response to the official request from the Hyogo prefecture Governor. According to JSDF Law No. 83-3, during natural disasters, the JSDF could be deployed if the governor officially asks for help, because the impact on Kobe overwhelmed the capacity of Hyogo prefecture. [Why isn't the central government responding and why must it wait on the governors to ask for help?]

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There were 250 soldiers on the day of the earthquake, 3,300 on the day after, and 9,000 on the third day. However, the number of active JSDF unit members increased gradually, and it was too late to rescue many casualties trapped in destroyed buildings. Since the earthquake, the JSDF had been involved in all kinds of humanitarian activities, including rescue, food and water delivery, and road reconstruction for about one hundred days, and all the people in Japan approved the effectiveness of JSDF(4).

The military response to Hurricane Katrina was shown in†3 of the table 3a and 3b.

The US Northern Command established a Joint Task Force (JTF) for Katrina based out of Camp Shelby, Mississippi, to act as the military's on-scene command on Sunday, August 28. Approximately 58,000 National Guard personnel were activated to deal with the storm's aftermath, with troops coming from all 50 states. The Department of Defense also activated volunteer members of the Civil Air Patrol, and the United States Coast Guard activated more than 400 reservists.

The deployment of the National Guard began gradually on August 30, and President Bush, Louisiana state governor Blanco, and the Department of Defense (DOD) secretary Rumsfeld made the decision to federalize the National Guard in order to unify the command structure.

[It's not clear what you mean by federalize the National Guard. Each state has always had it's own guard. I don't think that state guards gave into Rumsfeld and aquiesed to his command; this would have undone a long historic pact between the governors and the president. Please double check to make sure.] The coordination of DOD and National Guard was

comprehensive, but perceived as slow.

The rescue activities in New Orleans were quite difficult because the security of the city had largely collapsed and violence and looting were problems. The National Guard was in charge of not only rescue activities, but also keeping order in the city, and its soldiers had to aim their rifles at the evacuees. One third of the National Guard in Louisiana was already in Iraq. Even so, the National Guard played an important role in the response to Hurricane Katrina by representing more than 70% of the total military force.

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4. the effectiveness of non-governmental responses

Compared with the central government response, the response of business companies were very quick and effective in the Kobe Earthquake, as seen in †4 in table 3. The marketing company named “Daiei”, which is a Japanese Wal-Mart, was a typical example. [What do you mean by “marketing” here?] Daiei is one of the biggest Japanese supermarket companies with thousands of employees, hundreds of shops located in all areas, and more than one billion dollars in annual sales. On the day of the earthquake, Daiei took the immediate action toward the disaster response soon after the hit. [They started the operation continuing the business in order to provide food, water, and other daily materials. [What precisely did Daiei do?] Owing to the tremendous efforts, 22 among 47 Daiei supermarkets in Hyogo Prefecture opened and restarted their business 7 hours after the earthquake. Daiei also arranged the large scale logistic support for Kobe from all the stocks in Japan. On the third day, 36 Daiei supermarkets started the daily activities sales with the ordinal price. Daiei also suffered from the earthquake itself. 107 employees and their family members died, and more than 6 hundred million dollar economic loss was caused. Other non-governmental groups, for example, the COOP, NGOs, etc., were involved actively by themselves. To know that the daily products were provided, the people did not become panic(2, 3, 15).

Soon after the landfall of Hurricane Katrina, supplies were transported from all the states to the affected area. However, DHS and FEMA were overwhelmed with the logistic systems, and could not arrange the way of mass transport and distribution. Wal-Mart provided its trucks and mass transportation system voluntarily, and contributed to the initial response for the delivery, because Wal-Mart is operational 24 hours a day, 7days a week, and they were capable of doing this.

[Say something here about the importance of the private sector in helping governments (central in Japan, local in the US) respond quicker to disasters. Or should we save this for the conclusion?]

5. redundant communication system

In the Kobe Earthquake shown in†5, for six hours after the earthquake hit, the central government could not obtain any critical information. As a result, the central government response was delayed. There were several reasons to explain this situation. First, the agency of the Land [what’s this “agency of the land?” explain.] was the leader in the central government, and was in charge of collecting the information in Kobe from other agencies; however, the information was fragmented and separated by the other agencies, and could not be centralized by the agency of the Land. [This is a major issue, which actually contradicts your argument about their being a centralized bureaucracy. If the major agency, “agency of

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the land,” cannot control the spread of information, than this suggests that the central bureaucracy is either weak or fragmented, that is, with multiple carriers of information within this. To rectify for this, you need to explain why the central bureaucracy is powerful – control of resources, autonomy, policy- while saying that it is weak in controlling the flow of information. This is interesting and needs to be flushed out a bit more.] Second, the

infrastructure for information (cables, antenna, powers, etc) was completely destroyed in Kobe, and it was impossible to call, send fax, or email from Kobe to Tokyo. The TV news was the only sources even for the central government for a while. Although the government prepared for several scenario of the crisis prior to the Kobe Earthquake, they did not assume that the whole systems for information fell down(4).

Similarly, during Hurricane Katrina, all the information infrastructure, television and radio towers, power, internet, etc., were completely destroyed in Louisiana, Mississippi, and Alabama. As a result, the communication between affected area and state/federal agencies were lost. In the prior disaster preparation, they did not assume the situation that the information infrastructure was destroyed. Some radio systems, satellite phone, and back up system worked, but they could not compensate the defected system, and nor established the centralized information system. Lack of communication was also seen in federal, state and municipal level, and the command structure for the disaster response could not be established(16). As a result, the effective government response was delayed. Additionally, the communication between federal and local was not smooth. Shown in 6 of the table 3a, Governor Blanco declared a state of emergency on August 26, the Mayor on August 27, and President Bush on August 29.

6. socially vulnerable people

These are not described the in the table 2, 3a and 3b; however, the fact that socially vulnerable people were affected in both disaster.

Socially vulnerable people affected in the Kobe Earthquake

Based on the data of Hyogo prefecture police and Hyogo prefecture office, there were 3 main factors associated with fatalities: age, gender and quality of housing. To review the age distribution of the fatalities, the percentage of people aged 60 years old and over who died in the Kobe Earthquake was 53% of total fatalities, and the percentage of people over 70 years of age was 34%. These numbers were much higher compared with the age distribution of the people in the census. Aging could be the risk factor for death by earthquake. The gender difference of the fatalities in the Kobe Earthquake was also evident (male; 40%, female:60%)(4).

The earthquake hit areas where many people died in the Kobe Earthquake were located in

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old towns with a lot of old wooden structures. The result of the police death examination showed that about 76% of fatalities was caused by the direct impact of collapsed buildings, houses, or furniture. Most of these houses were built before WWII and they did not conform to building codes. These houses were not damaged the bomb dropped on the city by US Air Forces in WWII. What? WWII, Air Force? Irrelevant. Take out. Additionally there is one more peak of death in people between the ages of 20-24 years old; many college students who were not economically wealthy and lived in classic wooden housing or apartments were severely injured. However, there was no evidence to support that social inequality was associated with the increased number of deaths(4, 17).

In addition, the elderly people had hard time in the life of the shelters and temporary housings. Many of them lost family members and properties, and some of them were found dead there, probably because they were lost personal relationship and became alone(18).

Socially vulnerable people affected in Hurricane Katrina

Reports of Missing and Deceased showed that the ratio of male versus female was 53% versus 47% among 705 identified fatalities. 53% were African-American while 39% were Caucasian, and 68% were people aged 60 years old and over(19).

The survey of Hurricane Katrina evacuees in Houston investigated by Harvard School of Public Health, Kaiser Foundation, and Washington Post showed the detailed information about the socio-economical state(20). This Survey was based on a sample of 680 randomly selected adults ages 18 years old and over, staying in the certified shelters in Houston, Texas. Individual interviews were performed face-to-face during September 10-12, 2005. The result showed that 93% of the participants were African American, 32% had income less than 10,000 dollar, 77% did not graduate from high school, 52% did not have health insurance, and 41% had suffered from chronic diseases (heart disease, hypertension, diabetes, bronchial asthma, etc).

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Discussion:

Reviewing the Japan and U.S. government response to the Kobe Earthquake and Hurricane Katrina, we found several commonalities, 1. the lack of political leadership, 2. delayed response of the central/federal government to the disaster, 3. the importance of the military response, 4. the effectiveness of non-governmental response, 5. redundant communication system, 6. socially vulnerable people.

1. The lack of political leadership was seen in the Kobe Earthquake and Hurricane Katrina. In the case of large scale disaster, establishing the unified command is essential (21). The political leaders who are in charge of the response should take the initiatives, and then unify the command structure of the agencies. However, the initiatives of the political leaders could not be seen in the central, prefecture, city/town levels in the Kobe Earthquake, and in the federal, state, municipal levels in Hurricane Katrina. As a result, the response was not coordinated well, and the damage became serious.

[We should say something about “why” presidents do not respond as fast as they do? There are several possibilities: they are too busy; they are inexperienced; they are not seeking reelection, thus no electoral incentives; or they are surrounded by idiots – e.g., Bush administration. :) We need should say something here – albeit very briefly – about the reason why both presidents did not respond quickly and the lessons for other presidential democracies.]

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2. Delayed response of the central/federal government to the disaster and 5. redundant communication system are related to each other.

The implementation of governmental emergency management system in Japan

The Kobe Earthquake made 1995 a turning point for disaster preparedness in Japan. Many individuals, organizations, local governments and national governmental ministries and agencies began to consider mitigation and preparedness plans for future disasters(7, 13). The delayed response of the central government was caused by the lack of unified command structures in the government agencies, lack of the response system for the disaster or major incidence, fragmented responsibilities of the agencies, etc. Additionally, Japan experienced **Tokyo Subway Sarin Gas** attack about 8 weeks after the Kobe Earthquake, the terrorist occupation of Japan embassy in Peru in 1996, Russian Oil Tanker sunken and oil spill in 1997, etc. There was a lot of criticism regarding the central government's failure to respond immediately to not only the Kobe Earthquake but these major crises. As a result, the government was forced to establish effective emergency management system in the central government, and sent officials to FEMA to consider some other tactics in federal emergency

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management. The Japanese government also chose the US system as their model which enabled the government to respond to the disaster quickly and effectively, while simultaneously reviewing and proposing changes to Japan's bureaucratic infrastructure. Three government agencies who have the same role as FEMA in the US were established after the Kobe Earthquake: the Cabinet Crisis Management Office, the Central Disaster Management Council, and the Fire and Disaster Management Agency. The Cabinet Crisis Management Office plays the role of the coordinator and facilitator for the government agencies, and has more authority than other agencies. The Central Disaster Management Council is in charge of the task in mitigation and planning, and Fire and Disaster Management Agency, National Police agency, Director General for Disaster Management play the operation in the response (Figure 1).

The government also implemented the laws related with the disaster responses such as the Japan Self Defense Law, Disaster Countermeasure Basic Acts, and the Fire Department Acts. Owing to these effects, the response of the central government to the major natural disaster became much quicker than before. Table 4 shows the responding time to the two large-scale earthquakes, the Kobe Earthquake in 1995, and the Mid Nigata Prefecture Earthquake in 2004, which occurred in the northern part of Japan with a 6.8 on the Richter Scale(22). In the Mid Nigata Prefecture Earthquake, more than 60 died, 4,800 were injured, and 103,000 were evacuated. The table shows the improved response to the earthquake by the central government; however, there are still lots of room to improve in the system, and the reason to be improved in each time point(13).

The federal emergency management system in US

Nevertheless, considering the failure of this system in response to Katrina, the President through **the DHS is now considering changing the law to allow DHS to anticipate local disasters and intervene before the governors and mayors ask for assistance.** Realizing that much of the Katrina disaster could have been avoided through anticipatory intervention, DHS has now created a new *Catastrophic Incident Annex* (White House, 2006). This Annex now allows the government to bypass the Stafford Act (which has historically given municipal governments complete authority over disaster management) and intervene whenever it believes that municipal and state governments are not prepared to respond to a disaster. Currently, however, the Act is limited to the immediate deployment of resources for aid, such as vaccines, medical supplies, etc (White House, 2006). The Annex is only a proposal, however, and has not been formally adopted. Thus the Stafford Act still holds.

Perhaps we should have a concluding note here on how disasters lead to institutional change.

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Should we expect them to? And now that we know this, should other governments try to reform their bureaucracies 'before' another nature disaster arises – eg., South East Asia, as it prepares for future Tsunami's? It would be good to conclude with something insightful here.]

3. The importance of the military response

The effectiveness of the military for the response to disaster was evident in the Kobe Earthquake and Hurricane Katrina. The capabilities of the military, independent transport and logistics, strong command structure, and the equipment are ideal for disaster response; however, the priority of the military is to fight against the military enemy, not natural disaster, and as a result, using military in disaster is controversy.

The reason why the Hyogo prefecture asked the JSDF for help so late was spending time for processing in an official way. The law addressed that the request to the JSDF should be done by the official document. Yet, the officers in Hyogo prefecture found difficulties doing this because the building was collapsed and there were few available functions. Some say that the reason the JSDF was not used properly might be an ideological issue regarding the military in Japan. After World War II, the US forced the Japanese military to disband and take an oath never to fight in a war again. This was written into Japan's constitution. However, during the Korean and Cold Wars, Japan felt the need to re-establish an organization for national defense, and as a result, the Japan Self Defense Forces was created. The equipment, training, and the command structure are the same as a military, but the invasion and attack of foreign countries are strongly prohibited. Under civilian control, the JSDF was rigidly managed. The validity of the JSDF has been debated for a long time, even when the JSDF responds to the requests of help in large-scale natural disasters. The attitude toward the military was also seen in the decline of PM Tomiichi Murayama about the President Clinton support by aircraft carrier.

In the US, on the other hand, the 127-year-old law, *Posse Comitatus* Act, prohibits federal troops from working in a domestic law enforcement capacity. Another reason for the delayed military response was lingering sensitivities in the Southern states over the Civil War and the federal government's interventions during the Civil Rights Movement of the 1960s.

[Should we say something about the future importance of the military in responding to disasters? The US government is currently divided over this issue. While the DOD does not want to do this, the federal government is more open to this possibility (I interviewed congressional staff on this very issue.)] How about Japan? Perhaps we should say something here the division in political and military opinion in the US and how this will challenge the use of military force in the future. Just an idea ...]

4. The effectiveness of non-governmental response

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There were several reasons of Daiei successful response in the Kobe Earthquake. First, they shared the lessons and experiences from the disasters in other areas prior to the Kobe Earthquake in the group. Second, the command structure of Daiei was simple and the president had a strong leadership. Third, the government recognized its limitation for the response and supported Daiei activities. Forth, Daiei started the business in Kobe, and they had a special adhesion to this place. However, there were several conflicts caused by the regulations of the government, and some other companies tried to gain the profits by unfair business(2, 3, 15).

[comment on Wal-Mart]

Compared with the bureaucracy, business companies are more flexible to the emergency situation, probably because the bureaucracy generally works in a scheduled setting with sufficient leading time. The possibilities of non-governmental response are very important, and we should consider their role in the disaster plan.

[Yes! I couldn't agree more. What was it like in Louisanna, I wonder? Paul? Good summary here. A big lesson that we learned here is that federal and especially state governments should engage in strong partnersips for disaster preparedness. There should be well defined guidelines and mutually understood responsibilities between governments and the private sector. DHS currently recognizes the importance of the private sector. But I'm not sure to what extent it has formally incorporated it into is disaster preparedness scheme. Also, future governments may want to conduct exercises with the private sector, in prep for another disaster. Paul have you done work on this in Maine? Please add something here if you have.]

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6. Socially vulnerable people

It is an astonishing fact that in the case of large scale natural disasters like the Kobe Earthquake or Hurricane Katrina, socially vulnerable people such as elderly, female, low-income, poor health condition, can be more affected even in the developed countries. On the other hand, in the cases of 911 terrorism or Tokyo sarin gas attack, the majorities of the casualties were people in working age(need the evidence). The patterns of the casualties are different according to the type of disaster even if they are large scale ones. We should keep in mind this lesson when we will prepare for the disaster in the future.

[Do you think a brief note on how disasters magnify the levels of social and income inequalities in these developed nations should be discussed? My own work addresses this issue, but more for health epidemics in the US and Brasil. The same can be easily said, however, for natural disasters. Just an idea)

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Titled this section: "Conclusion" or "Lessons Learned"

The comparison of the emergency management system in Japan and US is important is for both countries. More than 10 years ago, Japan learned the lessons from the Kobe Earthquake, improved the system using the model and experience of US and established the better one. Now U.S. should learn the lessons from Hurricane Katrina and the process Japan learned from US in the last ten years. Also Japan should also learn the lessons of Hurricane Katrina seriously.

[Perhaps something here on how disasters lead to institutional 'learning.' This is a very important point. Well done. Now, the next issue is the following: Given the fact that nations learn, ex-post, from disasters, should they, in the future, anticipate this and reform institutions (bureaucracy) before disasters arise. I hope that there will be the political interest and commitment to do this. Should we say something on this here? And can we think of any good examples elsewhere in the world?]

Our study is the first challenge to describe the disaster responses to the Kobe Earthquake and Hurricane Katrina. There were very few reports comparing the Japan and US emergency management systems in the past, mainly because most of the documents about the disaster responses in Japan were written in Japanese and were not widely available.

Leo Bosner, the veteran emergency management officer in FEMA, visited Japan for one year (from 2000 to 2001) to observe the detailed situation of emergency management system in Japan as a fellow of Mike Mansfield Fellowship Program. Based on this experience, Mr. Bosner wrote two personal perspective reports, Emergency Management in Japan and Emergency Management in Tokyo. He mentioned in his reports that "Japan has made significant efforts to address its disaster problems, especially since 1995, but the efforts still do not seem to be well-coordinated with each other. Thus, individual government agencies continue to ask the question: "What should my agency do for disaster management" when the much more important question is: "What is needed to manage this disaster?" ", which means that the emergency management system in Japan becomes better but at the same time the fragmentation of the government authority has not been solved(5, 6). Japan realizes this issue and still makes efforts to make "Kaizen" in emergency management for disaster.

In 2006, the corresponding author, Takashi Nagata, met with Mr. Leo Bonser and James Lee Witt, the former director of FEMA in Clinton administration, and asked them "What should we Japanese learn the lesson from Hurricane Katrina?", and interestingly, they gave the same answer, "Leadership". We think we should keep in mind to review the failure of Hurricane

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Katrina.

[A lack of leadership was certainly an issue in both cases. We should try to say more about leadership and the reasons why it was absent. I already addressed this issue above. But we should say something again here.]

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There are some limitations in this study. First, we should consider the validity of comparing two different types of natural disaster, earthquake and hurricane. Second, we also consider the validity of comparing two different emergency management systems with different cultural, political backgrounds. Third, we think the interval of 10 years between the Kobe Earthquake and Hurricane Katrina.

[I don't see the purpose of this section here? If anything, it will take away from the argument. Moreover, many have lumped together earthquakes and floods as similar types of "natural" disasters, in that both are "natural," not intentional (biological/terror) or health (AIDS). Second, the actual strength of the argument is that we find similar underlying causal problems despite differences in cultural and political backgrounds. This is actually a strong point, since we are striving for causal generalizability and lessons that can be applied to other nations.]

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Earthquake and hurricane are different in many aspects, but the Kobe Earthquake and Hurricane Katrina gave devastating impacts in a wide area of the country, and the baseline can be said same in this meaning. Japan and US are different countries, but the relations of these countries are strongly tied and affected each others not only in emergency management but other areas such as culture, economics, etc. Ten years interval between the Kobe Earthquake and Hurricane Katrina does not matter in our study, because we contained the process of this 10 year interval as an important factor.

Natural and human-generated disasters will become more frequent, more intense, and will become a big threat to the people in all over the world. Lessons learned from the Kobe Earthquake and Hurricane Katrina are meaningful for implementing the emergency management system not only for Japan and US, but for other countries. It is also true in the public health perspective. We should continue making efforts to learn the lessons interactively and preparing for the large scale disasters in the future.

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	Japan	US
Population	127,611,000	293,027,571
Land area	377,000 km ²	9,631,418 km ²
Population density	336 /km ²	30 /km ²
Race	Asian: 98.5% Others: 1.5%	Caucasian: 71% African: 12% Hispanic: 9% Asian, others: 8%
crude birth rate (per 1,000 population)	9.2	14.0
Infant Mortality Rate	3.1	6.9
Population growth rate per year	0.05%	2.53%
Life Expectancy at birth	Male: 78.6 years Female: 85.6 years	Male: 74.4 years Female: 79.8 years
Total adult literacy rate	99.8%	97%
GDP per Capita	\$ 33,800	\$ 37,600
GDP growth per year	2.7%	2.0%
Inflation rate	-0.3%	0.3%
Expenditure for health	7.8% of GDP	15% of GDP
Political system	Parliamentary cabinet system	Presidential system
Disaster preparedness bureaucracy	Very strong	Weak
Transparency of political decision making	High	High
Leadership of Prime Minister (Japan)/President (US)	Weak	Strong
Use of the military in disasters	Japan Self Defense Force is available for all kinds of disaster	National guard is available, but the federal military units are not
Person responsible for disaster response	City/Town major or Prefecture governor	Mayor, first, then Governor
Who budgets for emergency management	Central government	State government

Table 1. Demographic Information of Japan and U.S.

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	17-Jan	18-Jan	19-Jan	20-Jan	21-Jan
	05:46 The earthquake occurred with the 7.2 Richter scale.				
Prime Minister Tomiichi Murayama	06:00 PM knew the earthquake by TV. 06:30 ordered the secretary to collect the information. 07:30 received the notice (no critical information was collected). 08:26 started the routine work. 08:53 set up the HQs in the cabinet, and the designated minister 09:20 arrived at the office and started the meeting.	09:46 The urgent meeting in the cabinet was done.	PM visited Kobe and became in charge of the HQs. PM refused the proposal of President Clinton. †1	PM announced the government would do the best for the recovery.	PM mentioned in the parliament "This was my first experience. We did everything we could." †1
Hyogo prefecture Governor Toshimichi Kaibara	10:00 called JSDF officially for help †3				
Central government in Tokyo	10:00 The official death toll was 22. 10:04 HQs started the initial meeting without real information. 11:30 The death toll was reported 98. 10, 500 police officers in total were in duty. †2	arranged 40,000 officers including police, JSDF, firefighters to be sent. †2	16000 police officers were in duty.	New minister in charge of disaster response was appointed.	
Japan Self Defense Forces on active duty in Kobe	08:00 250 troops were deployed voluntarily. 10:00 The official request from Hyogo Prefecture was received. 18:00 3,300 troops in Tokyo were sent. †3	9,000 troops were in active duty in total. †3	13,000 troops in total. †3	15,000 troops in total. †3	
Daiei †4	05:50 The initial notice was informed to Tokyo HQs 06:00 The president knew the earthquake. 07:00 The HQs for disaster response set up in Tokyo 10:45 The main members were sent to Kobe. 14:00 22 Daiei shops in Kobe started the business	05:00 Some Daiei shops were repaired. 07:30 Daiei shops in Kobe opened. 12:00 The food and materials carried by ferries arrived in Kobe	36 out of 47 Daiei shops in Hyogo opened. The president visited Kobe.	The supplies were sent by ship and air continuously.	Raincoat and umbrellas were sold. The open time was extended by 11pm.

Table 2. The response toward the Kobe Earthquake in the first 5 days

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		26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug
the situation of Hurricane Katrina		Hurricane Katrina passes into the Gulf of Mexico	New Orleans residents board up their homes	Lines form at Superdome	Hurricane Katrina make landfall, levees breached	Widespread looting; most of the city is underwater	Police tries to halt looting. Food and Water dwindled
State and Local response	Gov. Kathleen Babuabeaux Blanco of Louisiana	Declare a state of emergency and requested additional forces from the federal government ¶6	Ask the federal gov to declare an emergency for the state and helped save lives and property	Speak with President Bush. Urge reidents of New Orleans and surrounding areas to heed mandatory evacuation orders	Repeat a warning for people not to re-enter the city. Told the president, "I need everything you have got."	Says everyone must be evacuated from the Superdome.	With looting and violence escalating, she and her staffs search for buses to evacuate people from the city. Calls for a day of prayer.
	National Guard		The state National Guard in the process of deploying 4000 troops to prepare for the storm.	Assists state police with evacuations, conducts security and screening at the Superdome	Assists with rescues, relocates its headquarters to the Superdome because of flooding	Governors from Louisiana, Alabama and Mississippi have called up 7500 National Guard Troops.	Additional forces arrive in the area.
	Mayor C. Ray Nagin of New Orleans		Declare a state of emergency and issues a voluntary evacuation order ¶6	Order a mandatory evacuation and opens 10 "refuges of last resort." City buses bring some to shelters. ¶1	Has police begin search and rescue operations in heavily flooded areas	Evacuates the city government to Baton Rouge. Camps out in a hotel and remains in New Orleans.	Calls for a total evacuation. Says that some sick or ill people may be moved to the conveninet center.
Number of the people inside the Superdome in New Orleans				100000	100000	12000	20000
National Guard troops on active duty in Louisiana ¶3				3500	3500	3800	4700
Federal Response	President Bush	on vacation	Declare a state of emergency in Louisiana, authorized FEMA to provide aid.	Urges people to heed evacuation orders. Holds a teleconference with disaster manaeement officials and speaks with Governor	Declare a major disaster in Louisiana, releasing federal funds to supplement local and state aid. ¶6	Cuts his vacation short ¶1	Flies over New Orleans on his way to Washington. Convenes a federal task force and authorize Mr. Chertoff to coordinate the response.
	Secretary Michael Chertoff, Department of Homeland Security			Participates in a daily video teleconference on the approaching hurricane	Monitors the impact of the storm. ¶2	Declares an "incident of national significance" and activates the National Response Plan. ¶1,¶2	Holds a news conference, says he is "extremely pleased with the response" of the federal governmnet ¶1,¶2
	Director Michael Brown, Federal Emergency Management Agency		Urges those on the coast to heed warning and prepare for the storm. Dispatches teams to Louisiana.	Positions water, ice, food and rescue teams to move into stricken areas as soon as it is safe. ¶2	Arrives in Baton Rouge. FEMA teams wait to enter New Orleans. ¶1, ¶2	Sends more supplies to the regions.	Has deployed 39 DMATs and 1700 trucks of supplies to the region ¶2
	Coarst Guard ¶3			Closes ports and waterways. Positions boats and helicopters for rescue	Begins rescuing people from rooftops with its helicopters and boats	Has resuced more than 1000 people	Has rescued 1250 people.
	Department of Defense ¶3			Activates an Army crisis action team, begins to coordinate with FEMA and civil authorities. ¶3		Continues to assist FEMA. Orders five ships to the region.	Establishes Joint Task Force Katrina at Camp Shelby, Miss., led by Gen. Russel L. Honore.

Table 4. The response toward Hurricane Katrina before the levee destruction

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		1-Sep	2-Sep	3-Sep	4-Sep	5-Sep
the situation of Hurricane Katrina		Violent lawlessness in New Orleans	Military vehicles bring food and supplies	Evacuation from New Orleans speeds up.	Troops patrol the streets, regained control of the city	Two levees are fixed; Mr. Bush returns to the region.
State and Local response	Gov. Kathleen Babuabeaux Blanco of Louisiana	Says death toll is in the thousands. Call for 40000 troops. †1	Meets with President Bush, who proposes to assume control of the state's National Guard Forces.	Rejects the White House proposal. Asks the National Guard to focus on security. Says she has hired James Lee Witts, a former FEMA director.	Her staff chides the White House: "They wanted to negotiate an organizational chart," while the state was waiting for emergency aid.	Is surprised to learn of Mr. Bush's visit while preparing to leave for Houston.
	National Guard	Assists with the evacuation of the Superdome and helps curtail lawlessness.	Secures the convention center. Brings convoys of food and water to the city.	Has evacuated tens of thousands of people from the city by land and air.	Assists police officers who begin to urge holdouts to leave the city.	With looting and violence subsiding, National Guard officials declare New Orleans secure.
	Mayor C. Ray Nagin of New Orleans	Lashes out at the federal response: "They're thinking small, man. And this is a major, major, major deal."	Meets with President Bush.	Reports that two city police officers have committed suicide, including the department spokesman.	Begins offering five-day vacations to city emergency workers.	Estimates that "it wouldn't be unreasonable to have 10000 dead in the city
Number of the people inside the Superdome in New Orleans		20000	1500			
National Guard troops on active duty in Louisiana †3		7400	8600	12000	12000	16000
Federal Response	President Bush	Asks Congress for \$10.5 billion in relief funds. Appoints his father and former President Bill Clinton to lead a fund-raising effort.	Flies to the region, speaks at the New Orleans airport and visits the 17th Street Canal breach. Meets with Gov. Blanco and Mayor Nagin. †1	Orders more than 7000 active-duty troops to the region.	Visits a Red Cross center, orders American flags around the world flown at half-staff until Sep. 20.	Flies to Baton Rouge and visits evacuees. Meets with Gov. Blanco. †1
	Secretary Michael Chertoff, Department of Homeland Security	Starts National Preparedness Month. Holds a second news conference. †2			Appears on Sunday talk shows to give status reports. †1	
	Director Michael Brown, Federal Emergency Management Agency	First hears about conditions at the convention center. FEMA has rescued 350 people across the city. †2	Is praised by President Bush. Urges patience. †1	Sets up a morgue outside Baton Rouge. †2	Announces that the Superdome has been evacuated, and 5900 FEMA personnel have been deployed. †2	Releases an official death count: 71
	Coast Guard †3	Has rescued 2900 people.	Has rescued 4000 people.			Says it has rescued more than 18000 people from flooded areas of New Orleans.
	Department of Defense †3	Begins assembling active-duty troops for Joint Task Force Katrina		4600 active-duty troops arrive in the region by Saturday morning.	Defense Secretary Donald H. Ramsfeld visits New Orleans.	More than 7000 active-duty troops are in the region.

Table 5. The response toward Hurricane Katrina after levee destruction

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中央省庁及び内閣府 (防災) 組織図
 Organization of Central Government and Cabinet Office (Disaster Management)

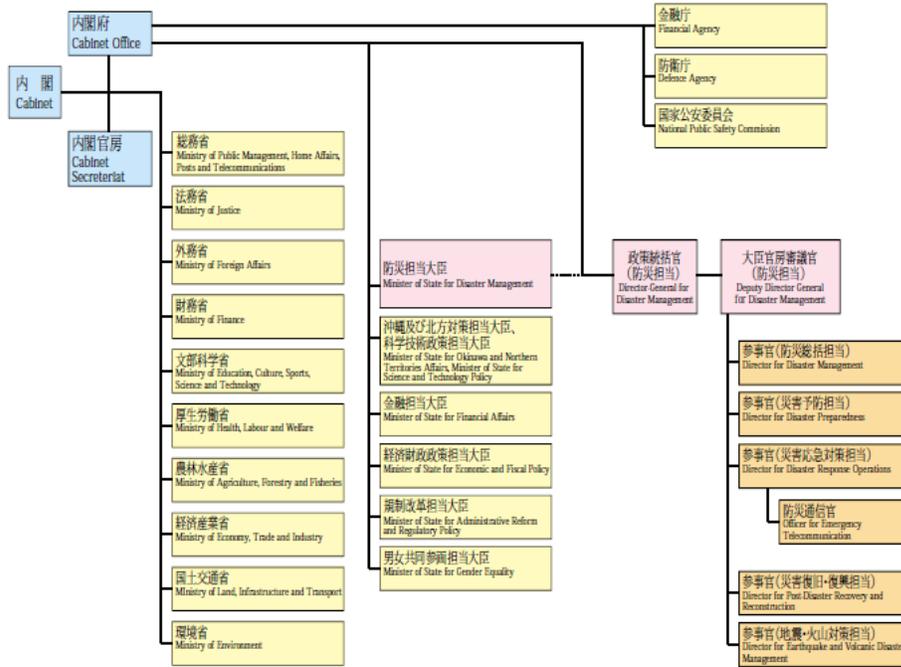


Figure 1. The Organization of Central Government and Cabinet Office in Japan after 1995.

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The action of the central government agencies	The Kobe Earthquake in 1995	The Mid Niigata Prefecture Earthquake in 2004	
Setting up the headquarters in the designated agency	3hours 14minutes	0 minute	*1
Setting up the headquarters in the cabinet	4hours 14h	4 minutes	*2
The scouting by the JSDF	1hours 28 minutes	36 minutes	*3
The initial meeting in the cabinet	12hours 44 minutes	1hour 4 minutes	*4
The initial media briefing	10 hours 14minutes	1hours 24minutes	*5
The government mission group departure	8hours 44 minutes	3hours 18minutes	*6

Table 4. The response time of the central government to the two earthquakes in

*1: In Fire Disaster Management Agency, staffs are always stand-by for disaster.

*2: The central government has a special protocol for large scale earthquake.

*3: The law for JSDF was implemented, and JSDF could move easily and quickly.

*4: The cabinet was designated to be a lead agency, and organize the meeting.

*5: The central government promotes the media to provide quick information about disaster.

*6: The central government intends to send the mission group to collect the information especially in the case of large disaster.

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