

The 2011 Earthquake, Tsunami, and Nuclear Accident in Japan: Coordinating the U.S. Government Response



A Banyan Analytics Case Study
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Executive Summary

This case study examines the interagency and international coordination of the U.S. Government response to the March 11, 2011, earthquake, tsunami, and nuclear disaster in Japan. This “triple disaster” represented the first need for a U.S. Government response to a large-scale natural disaster combined with a nuclear accident. We describe the U.S. Government response and assistance to the Government of Japan during the emergency phase of the disaster response and assess the key factors affecting response coordination. We identify successes and evaluate the impacts of coordination challenges and shortfalls.

This work complements existing analyses focusing primarily on the Japanese response, the U.S. military response, and select aspects of the U.S.-Japan coordination. We conducted research and interviews with senior U.S. Government stakeholders who participated in the U.S. Government response to identify opportunities and insights that may help the U.S. Government improve its response coordination for future complex natural disasters and chemical, biological, radiological, or nuclear (CBRN)

emergencies abroad. Based on their experiences, stakeholders identified three challenges that if addressed, will better prepare the U.S. to respond to future foreign disasters:

- Adapting existing coordination mechanisms to meet international response needs,
- Coordination of technical expertise and resources to address the radiological hazard, and
- Management of funding authorities and constraints to meet resourcing challenges.

This case study is organized around these factors. The first section of the study focuses on coordination challenges and the adaptations used to overcome them. The second section looks at how the U.S. Government managed its response to the radiological hazard through ad hoc combinations and applications of domestic and international response capabilities. The third section examines gaps and challenges in the U.S. Government’s ability to adequately fund and receive reimbursement for domestic agencies that operated in Japan.

While the U.S. Government successfully protected American citizens and provided rapid, highly capable assistance to Japan, the response revealed gaps and inefficiencies which should be addressed and improved. Our findings:

Current coordination systems are inadequate to manage a full U.S. Government response to a complex foreign disaster.

Many levels of responders augmented or created new coordination bodies ad hoc because key relationships or mechanisms were missing. While effective, they were tailored to the disaster in Japan. Although these adaptations may not necessarily be models for future responses or for a formal framework, the widespread use of coordination bodies highlights the need for effective, adaptable mechanisms that address the specific needs and attributes of the host nation. The ad hoc coordination mechanisms used in the Japan response highlight gaps a future response framework could address.

The U.S. Government lacks a comprehensive plan to address response to CBRN hazards abroad.

The risks, timelines, and technical difficulties associated with responding to the Fukushima meltdown demonstrated that cascading infrastructure failures coinciding with a catastrophic natural disaster can overwhelm even a wealthy industrialized nation such as Japan. Responding to a CBRN event requires specialized knowledge, analysis tools, and detailed information describing the specific characteristics of the nuclear situation plus effective risk communications capabilities. This disaster highlighted design and operational differences across the nuclear safety community. Lack of agreement resulted in conflicts in exclusion zones, planning, leadership, and decision making. If a large-scale disaster, especially

one with a CBRN hazard, occurs in the near future, it is likely that U.S. response operations will encounter similar challenges.

A more organized system for managing humanitarian aid and foreign consequence management (FCM) money would improve foreign response and interagency cooperation.

The U.S. Government response to the disaster in Japan was hampered by a funding and reimbursement system that was inadequate in both scope and structure. Mechanisms are in place—including disaster declarations and coordination through the Federal Emergency Management Agency (FEMA)—to quickly release funding to support domestic disaster response. However, mechanisms supporting international disaster response—primarily the U.S. Agency for International Development’s (USAID), Office of U.S. Foreign Disaster Assistance (OFDA), Disaster Assistance Response Teams (DARTs), and Department of Defense (DoD) humanitarian assistance and disaster relief (HA/DR) capabilities and funding—are resourced at relatively low levels. The current response process requires individual agencies to request supplemental funding from Congress to pay for large disaster response operations. As a result, issues appeared repeatedly in the following areas:

- Baseline funding is insufficient to respond to major disasters. The process for adding supplemental funding to agency budgets is time-consuming and challenges disaster response,
- The nuclear hazard required the use of FCM funding streams and authorities, which were not harmonized with humanitarian response funding and authorities. The existence of these

two separate funding streams and authorities will complicate the designation of a lead agency and its authority in future CBRN disaster responses,

- Political dynamics influenced funding and reimbursement decisions, and
- The existing aid and funding structures and models did not adequately meet the needs of the Japanese triple disaster response. It may be possible to address a variety of issues and deficiencies by addressing the inherent mismatch between these structures and models and their applicability to large-scale complex disasters.

Unlike domestic disasters, international disasters do not have clear and comprehensive interagency coordination guidelines. The absence of a clear set of

guidelines or a framework overburdened real-time interagency coordination and impeded adequate disaster planning. The net result in this case was the less-than-optimal delivery or execution of disaster assistance to Japan, a waste of valuable resources, lost time during critical phases of the disaster, and increased confusion that hampered response effectiveness. If unaddressed, the structural problems and existing aid and funding models underpinning these issues will impede any future international disaster response.

The areas of opportunity highlighted in this case study could contribute to consideration of a formally developed and approved framework for U.S. Government response to foreign disasters.

USG HUMANITARIAN ASSISTANCE TO JAPAN FOR THE EARTHQUAKE AND TSUNAMI

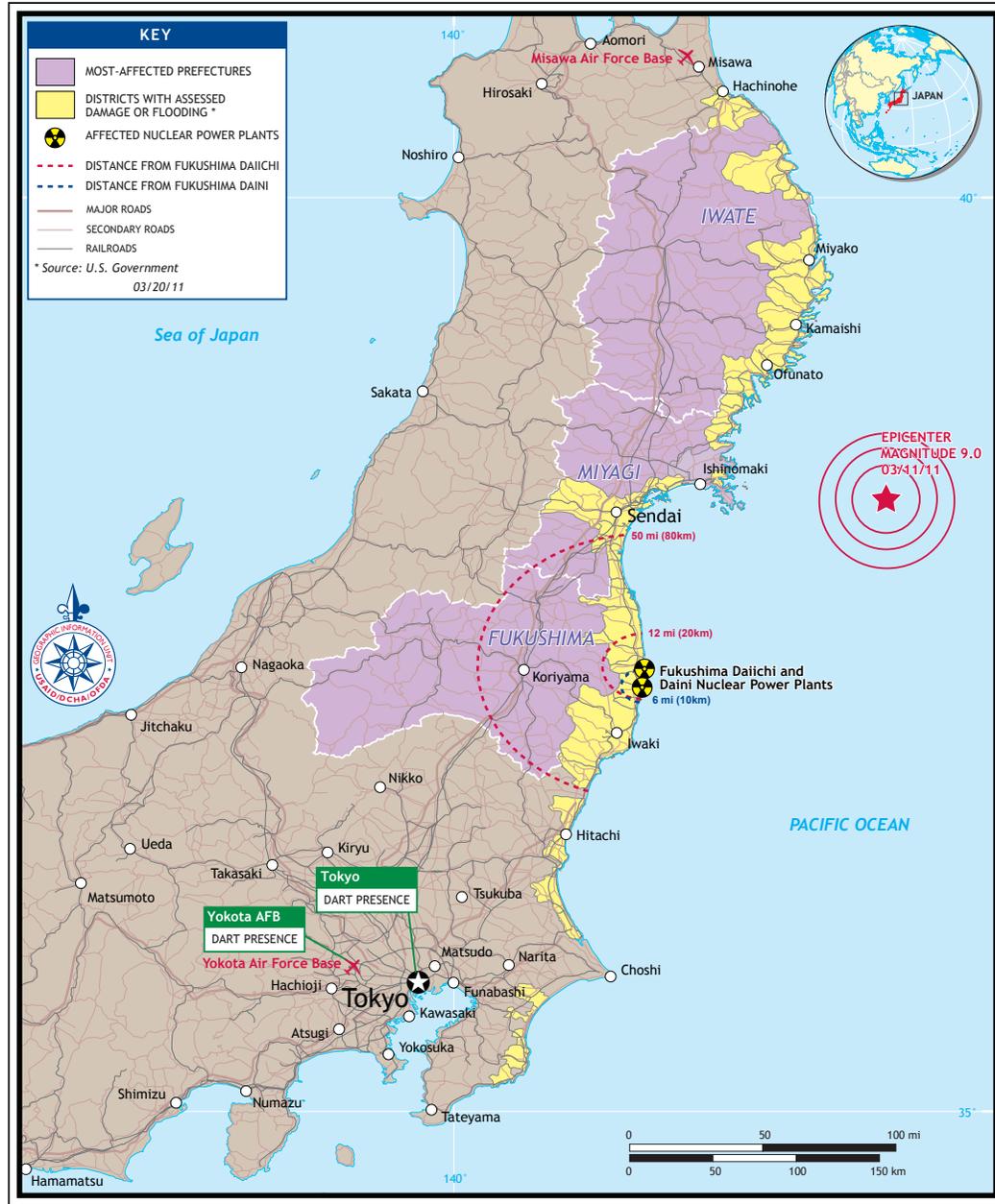


Figure 1: USAID map of the disaster area

I. Introduction

On March 11, 2011, a magnitude 9.0 earthquake struck off the eastern coast of Japan, producing a large-scale tsunami that killed more than 14,000 people, left more than 12,000 missing, and damaged or destroyed more than 300,000 buildings.¹ The earthquake disconnected main power lines, and the tsunami flooded backup plant generators at the Fukushima Daiichi nuclear power facility, located on the Pacific coast, 150 miles northeast of Tokyo (Figure 1). With a total loss of main and backup power, the plant was unable to maintain its core cooling system, resulting in a core meltdown and release of radiological material.²

The introduction of a nuclear emergency to the ongoing natural disaster response compelled Japanese and American responders to coordinate and react in unprecedented ways. U.S. Government assistance involved more than fourteen agencies as well as a significant amount of resources, and it represented the first large-scale U.S. Government response to a

complex disaster involving a CBRN hazard. The need to respond to the disaster's nuclear elements added an untested layer of complexity, which challenged the traditional response roles and responsibilities of the U.S. Government agencies involved.³ The challenges would be similar for any complex disaster with CBRN components. While CBRN disasters have been discussed as consequences of accidents and terrorist attacks,⁴ they have not been widely exercised⁵ or experienced.

While the response was largely successful in supporting Japan and protecting U.S. citizens in the country, gaps emerged in the U.S. Government's ability to execute and coordinate a response to Japan's "triple disaster" among the interagency stakeholders shown in Figure 2. These stakeholders, not all of which respond to foreign disasters, adapted known processes or developed new ones to fill these gaps.

The overarching theme echoed by the stakeholders interviewed for this case study is that the U.S.

¹ U.S. Agency for International Development, "Japan—Earthquake and Tsunami," Fact Sheet #17, April 22, 2011, <http://www.hSDL.org/?view&did=6627>.

² The Fukushima Nuclear Accident and Crisis Management: Lessons for Japan-U.S. Alliance Cooperation, Sasakawa Peace Foundation, September 2012, 11-12, http://www.spf.org/jpus/img/investigation/book_fukushima.pdf.

³ Ibid.

⁴ For example, during the 2012 Nuclear Security Summit. This was the second Nuclear Security Summit and was intended to address the nexus of nuclear safety and security in a post-Fukushima era (retrieved on November 8, 2013, from <http://www.cnas.org/blogs/naturalsecurity/2012/03/primer-2012-nuclear-security-summit.html>).

⁵ From multiple stakeholder interviews.



Figure 2: U.S. Government stakeholders responding to the triple disaster in Japan.

Government can and should be better organized and prepared to respond to large-scale, complex natural disasters and CBRN emergencies abroad. Many of their recommendations to improve the current response process (expressed in the following excerpts) reflect similar concerns and gaps that need to be addressed. Of the stakeholders shown in Figure 2, the White House, Department of State (DoS), DoD, and USAID and their equities factor into most or all international disaster responses. Many stakeholders interviewed felt that a strong, coordinated interagency framework would enhance U.S. Government coordination and improve the success of response operations abroad.

“You would think there would be a very clear system in place where everybody (embassy, USFJ,⁶ USPACOM⁷) gets together in one place and works stuff out but it didn’t really work that way, it was ad hoc.”

Former State Department official

⁶ U.S. Forces, Japan.

⁷ U.S. Pacific Command.

“The biggest issue was the fact that this event occurred in a foreign country and we had to make up the playbook as we went along; we just essentially duplicated what would have been the U.S. disaster response structure.”

Former nuclear safety official

“In the NRF,⁸ there is a system whereby, in a nuclear event, NRC⁹ would have authority within the fence and DoD outside. There was no such thing in an international response so that part of it was picked up on the fly.”

Mark Bartolini, former Director,
USAID¹⁰ / OFDA

USPACOM and USFJ leadership were simultaneously saturated with information and lacked the unified RCMT¹¹ recommendations needed to support their decisions.

Northern Command responding official

Purpose

The overarching purpose of this work is to identify opportunities and insights that may help U.S. Government stakeholders improve response coordination for future complex international disasters. To achieve this goal, the case study explores the interagency coordination among U.S. Government stakeholders and their Japanese counterparts as they worked together to save lives and provide assistance. It identifies opportunities that may help the U.S. Government organize itself more effectively to respond to future natural disasters or CBRN emergencies in the Asia-Pacific and around the globe. Banyan Analytics hopes that the results of this work will inform interagency conversations about how to improve response planning, preparation, and coordination for complex international disasters.

Scope

In this case study, we examine the interagency and international coordination of the U.S. Government response to the March 11, 2011, earthquake, tsunami, and nuclear disaster in Japan. We describe the U.S. Government response and assistance to the Government of Japan during the emergency phase of the disaster and assess the key factors affecting response coordination. We identify successes and evaluate the impacts of coordination challenges and shortfalls.

During the course of this case study, we reviewed the following Fukushima assessments:

- Japanese studies that catalogued gaps in nuclear preparedness and response of the Tokyo Electric Power Company (TEPCO), regulators, and the Japanese government:
 - Japanese government public study,
 - Japanese legislature public study,
 - Independent Investigation Commission Public Study chartered by Japan’s legislature,
- Sasakawa Peace Foundation study report authored by five Japanese security and nuclear experts, which assessed the Japan-U.S. response

⁸ National Response Framework

⁹ Nuclear Regulatory Commission

¹⁰ U.S. Agency for International Development.

¹¹ Radiological Consequence Management Team

- to the Fukushima nuclear crisis,
- Rebuild Japan Initiative Foundation independent investigation panel, which found that the Japanese government, TEPCO, and others were thoroughly unprepared for the nuclear disaster and that the tsunami could and should have been anticipated,
- RAND study commissioned by DoD to examine the U.S. military response, and
- Peace Winds America study analyzing the HA/DR details of the disaster.

Highlights of these study efforts are included in Appendix A.

Our focus on interagency coordination is intended to complement the assessments listed above. This case study illustrates the U.S. Government’s challenges when responding to a foreign disaster. We believe our findings are potentially relevant under the following circumstances:

- A natural disaster or accident, not an event resulting from adversary attacks,
- An event that may include CBRN hazards,
- An event that occurs overseas and requires a U.S. international response (not a domestic event and response),
- An event that requires a coordinated U.S. interagency response—the type and/or scale of the disaster exceeds the abilities of any single responding agency.

The case study focuses on the activities and coordination between the governments of the United States and Japan during the disaster response phase and does not include recovery. It does not explore the activities of the United Nations or other responding countries. In addition to disaster coordination, the activities of U.S. interagency responders may include executing one or more of the following missions:

- HA/DR,¹²
- FCM,¹³ and
- Urban search and rescue.¹⁴

This study is primarily a narrative description of stakeholders’ perspectives on responding to the triple disaster on March 11, 2011, that reveals gaps and inefficiencies in the current system of response. It is not intended to be a full after-action report that incorporates a comprehensive root-cause analysis or a full set of recommendations.

¹² HA/DR is led by the DoS, coordinated by USAID/OFDA, supported by DoD, and defined as a multiagency effort to save lives, alleviate suffering, and enhance security and stability in affected nations. (From multiple sources including the U.S. Southern Command Website, Contingency Response, Disaster Response, and Humanitarian Assistance, Retrieved on December 31, 2013 from <http://southcom.mil/ourmissions/Pages/Contingency-Response--Disaster-Relief--Humanitarian-Assistance-.aspx> and The Office of the Assistant Secretary of Defense (Health Affairs), U.S. Department of Defense, Guide to Nongovernmental Organizations for the Military: A primer for the military about private, voluntary, and nongovernmental organizations operating in humanitarian emergencies globally, edited by Lynn Lawry MD, MSPH, MSc, Summer 2009.)

¹³ FCM is typically executed by DoD, DoS, the National Security Council, and USAID/OFDA and supported by specialists from relevant U.S. Government agencies. U.S. Government FCM definitions differ depending on the types of incidents that are considered FCM as well as the location of the incident. The DoS defines FCM as any international event involving contamination from a CBRN source and excludes events involving high-yield explosives (the DoD definition—CBRNE—includes high-yield explosives). DoS does not distinguish the location of the incident in its definition of FCM, other than requiring the incident to be an “international” event, but DoD excludes certain overseas localities from its FCM definition (more details are available in the FCM Legal Deskbook, Defense Threat Reduction Agency, January 2007, 2-4. <http://www.dtra.mil/documents/business/current/FCMLegalDeskbook.pdf>).

¹⁴ Urban search and rescue is defined as “the location, rescue (extrication), and initial medical stabilization of victims trapped in confined spaces. . . . Urban search-and-rescue is considered a ‘multi-hazard’ discipline, as it may be needed for a variety of emergencies or disasters, including earthquakes, hurricanes, typhoons, storms and tornadoes, floods, dam failures, technological accidents, terrorist activities, and hazardous materials releases.” <http://www.fema.gov/urban-search-rescue>.

Approach

This study reviews and assesses existing research, reports, and event transcripts examining the March 11, 2011, disaster in Japan. It includes information from firsthand interviews with over a dozen senior officials (current and former) who were directly involved with the U.S. Government response. Many of the interviews were conducted on a non-attribution basis to facilitate free discussion of the issues. These conversations complemented and enriched the background research by painting a vivid and broad picture of the U.S. Government response. They uncovered challenges and key themes worthy of closer examination. The study concludes by suggesting areas for further research intended to help the U.S. Government prepare better for future emergencies abroad. While some of the suggestions are not new, the study attempts to more fully develop ideas that have not been previously addressed due to their scope and complexity.

Factors Affecting U.S. Government Coordination

Based on the Fukushima example, several factors affect how the U.S. responds to a complex, international disaster:

- The disaster scale and type of hazards,
- Situational awareness of disaster effects and consequences,
- U.S. equities,
- Host-nation equities, and
- The response framework employed.

These factors and their interdependencies are shown in Figure 3.

The response is triggered by a disaster and shaped by its characteristics (shown in the red oval). In the case of the Japanese triple disaster, the large scale, complexity, and presence of radiological hazards were significant. A disaster threatens U.S. equities (shown in the center blue oval), and these equities influence

U.S. Government decisions about the response framework to be employed (shown in the gold oval at the right of the figure). The disaster needs, response capacity, culture, and national sovereignty of the disaster nation (shown as Japanese equities in the blue oval at the upper right of the diagram) influence the response framework, which may incorporate a variety of preexisting relationships with the disaster nation (the gray oval shown within the response framework oval).

The nature of the disaster also influences the ability of the stricken nation and responders to build and maintain situational awareness (shown in the gold oval at the lower left). For example, the disaster and related loss of power and communications infrastructure may impede data collection capabilities (as was the case within the Fukushima Daiichi plant) and information sharing. The presence of a radiological hazard changes the factors that must be included in risk assessments and their technical complexity. The attributes of the disaster influence the information-sharing and communications channels that will be used and the stakeholders who need to be kept informed. Information sharing is also influenced by preexisting sharing relationships and by cultures and policies that might restrict sharing (not diagrammed).

The disaster and situational awareness of its changing effects and consequences inform the U.S. Government's understanding of U.S. equities at stake in the disaster area. These equities include U.S. citizens and assets that need to be assisted and/or evacuated; U.S. strategic objectives in the region, for example by supporting Japan as an ally nation in its time of need; and concerns about the environmental hazards posed by the radiation leak and its potential impacts on materials coming into the U.S. through trade, for example by food and other cargo. The range of equities influences U.S. Government decisions about the response framework to be employed, particularly the type and number of stakeholders involved. The response framework also includes the type of aid model (donor aid or mutual

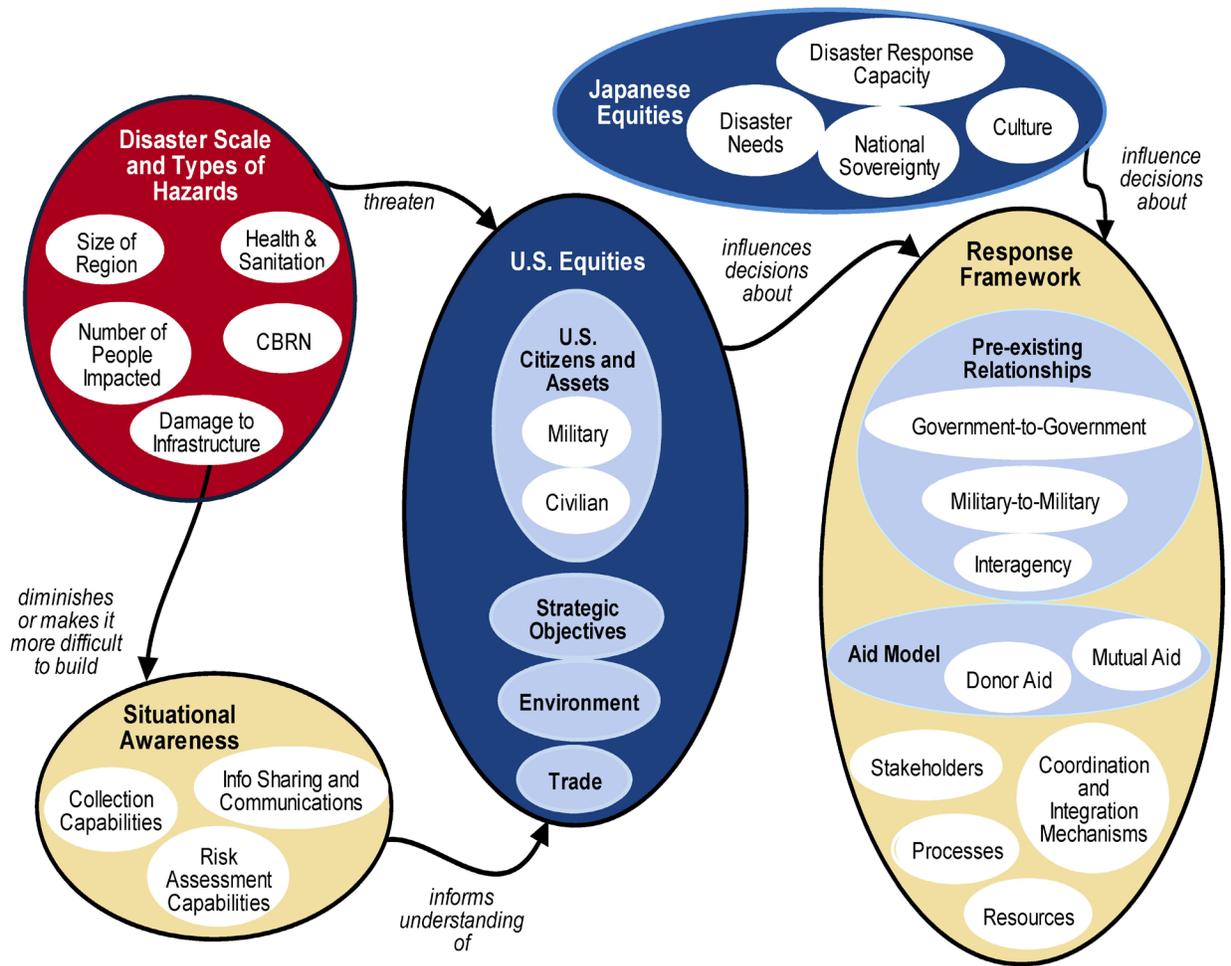


Figure 3: Factors affecting U.S. Government coordination and response to complex disasters.

aid) and response processes to be used, the resources needed and available, and the response coordination and integration mechanisms to be used.

Taken together, these factors describe the context within which the U.S. Government coordinated its response to the Japanese triple disaster. Three challenges made coordination and response particularly difficult:

- Efforts to adapt existing coordination mechanisms to meet international response needs,

- Coordination of technical expertise and resources to address the radiological hazard, and
- Management of various funding authorities and constraints.

These factors are discussed in detail in the following sections.

II. Adapting Existing Coordination Mechanisms to Meet the International Response Needs

The scope and complexity of the Japan disaster tested the ability of the U.S. Government to coordinate an effective response. Where authorities or relationships did not already exist, agencies adapted or created coordination mechanisms to meet response needs. Stakeholders agreed that some of the most noteworthy efforts included coordination within the U.S. Embassy in Tokyo and the White House National Security Staff (NSS) in Washington, as well between the two governments and their militaries.

Interagency Coordination: National Security Staff Mobilization

The NSS quickly mobilized the U.S. interagency process to determine the political and foreign implications of the disaster and ensure the safety of U.S. citizens in Japan and around the globe. In the first few hours, the Asia Directorate at NSS reached

out to relevant agencies to gather information and inform the President, and thereafter these agencies met daily under the White House Deputy National Security Advisor.¹⁵ DoS in Washington immediately set up a 24/7 task force to coordinate the government response within the department and with the interagency. The task force coordinated assistance for U.S. citizens in Japan and worked with the White House to manage political and foreign policy implications.¹⁶ As the nuclear accident developed into a crisis, the interagency team grew to accommodate additional agencies to address the evolving threat. The communication and coordination challenge was enormous, but the NSS, DoS, and OFDA worked in concert with all the relevant agencies to manage the crisis and respond as needed.

¹⁵ Interview with a former government official by Eric Weiner, June 11, 2013.

¹⁶ Interview with a former DoS official by Eric Weiner, July 2, 2013.



Figure 4: U.S. Government's traditionally domestically focused agencies that participated in the response to the Fukushima nuclear disaster.

Presidential Policy Directive-1¹⁷ organizes the National Security Council System and guides the management of the interagency community to assist presidential decision making. The NSS coordinated U.S. capabilities and synchronized policy, plans, and procedures to address problems in Japan through daily meetings of the Deputies Committee, Principals Committee, and Interagency Policy Committee.¹⁸ While successful, this coordination also disrupted resources and personnel needed for ongoing NSS

efforts elsewhere in the world.¹⁹ The NSS decision making and coordinating apparatus was stretched thin, leaving limited bandwidth to simultaneously address multiple global crises. The process would benefit from further institutionalization of NSS efforts, so that the U.S. Government will not have to reinvent a response plan for future complex disasters, as many have indicated they did for Fukushima. Such an effort may help mitigate the difficulties and disruption inherent in managing several contingencies simultaneously.

¹⁷ Presidential Policy Directive-1, February 13, 2009. <http://www.fas.org/irp/offdocs/ppd/ppd-1.pdf>.

¹⁸ Interview with Richard Reed, former White House Deputy Assistant to the President for Homeland Security during Fukushima, by Eric Weiner, July 3, 2013.

¹⁹ During this same period in March, the NSS was simultaneously managing the U.S. Government response to the Arab Spring protests in Egypt, Bahrain, and Syria; the U.S. military intervention in Libya; and the Japan disaster.

Regarding the potential impacts of the Fukushima nuclear disaster on the U.S. homeland, the U.S. Government coordinated quickly and successfully to monitor and mitigate any problems. Thirteen agencies (illustrated in Figure 4) with nuclear and radiological issue expertise across the Federal Government responded with efforts to ensure the safety of international aviation routes, the global food supply, the ocean, and air. Fortunately, the immediate global impact on the U.S. homeland was minimal, and a White House interagency team quickly established procedures for vetting food imports, cargo, and passengers traveling from Japan to the U.S.²⁰ Organizing the U.S. Government to mitigate the effects of the radiation on the U.S. homeland proved not to be nearly as challenging as coordinating and responding to the nuclear accident in Japan.

A Merging of International and Domestic Response Tools

The U.S. Government has a well-developed and proven system for responding to natural disasters abroad through the USAID and OFDA, which acts as the lead coordinator and operational-level lead Federal agency for disaster relief operations.²¹ OFDA organizes its responses to foreign disasters using a Response Management Team from Fairfax County, Virginia, and deployed DARTs.²² Regional advisors who live and work in their geographic area of responsibility lead the DARTs. These advisors are familiar with the physical and political environment, governments, and any other issues that may affect disaster responses in their regions.²³

While DARTs have proven to be highly efficient mechanisms to coordinate the U.S. response to many international disasters, recent large, complex disasters in Japan and Haiti have stretched OFDA's

ability to effectively coordinate and fund foreign disaster relief efforts. These disaster response efforts involved a large number and variety of public and private-sector stakeholders including the military, U.S. and foreign government agencies, non-governmental organizations (NGOs), and humanitarian organizations.

Domestic emergency management constructs, such as the Incident Command System and the National Response Framework (NRF), promote “scalable, flexible, and adaptable coordinating structures” to guide and control the responses of U.S. entities to disasters occurring inside the U.S. and ranging in scale from local level to “catastrophic natural disasters.”²⁴ While the OFDA/DART model shares some organizing principles with these domestic constructs, it has not been sufficiently scalable, flexible, or adaptable for disasters of the magnitude and complexity of Haiti and Japan. During the response in Japan, the U.S. Government augmented its foreign response efforts by drawing on domestic disaster response capabilities and certain organizing principles within the existing NRF. Since the NRF was not designed to guide complex international CBRN disaster response operations, decision makers used different (and sometimes uncharted) applications of U.S. Government capabilities to manage the response. This extension of the NRF was problematic: there was a significant disconnect between domestic response agencies that do not usually deploy personnel overseas (Figure 4) and the foreign response community since these agencies were not familiar with each other's plans, procedures, or policies.²⁵

²⁰ Jeffrey A. Bader, “Inside the White House During Fukushima: Managing Multiple Crises,” *Foreign Affairs*, March 8, 2012, 2. <http://www.foreignaffairs.com/articles/137320/jeffrey-a-bader/inside-the-white-house-during-fukushima>.

²¹ Suzanne Basalla, William Berger, and C. Spencer Abbot, “The U.S. Government Response to Japan's ‘Triple Disaster’: Managing Foreign Assistance in a CBRN Emergency,” *Joint Force Quarterly*, issue 68, 1st quarter 2013, 26. <http://www.hsdl.org/?view&did=729151>.

²² *Ibid.*, 27.

²³ *Ibid.*, 26.

²⁴ Department of Homeland Security, “National Response Framework.” www.fema.gov/pdf/emergency/nrf/nrf-core.pdf.

²⁵ Suzanne Basalla, William Berger, C. Spencer Abbot, “The U.S. Government Response to Japan's ‘Triple Disaster,’” 31.

Interagency Coordination: U.S. Embassy Surge Support

U.S. officials engaged in the response within Japan found that existing guidance on interagency coordination was vague and undefined. Coordinating and absorbing additional U.S. Government personnel at the U.S. Embassy in Tokyo proved particularly challenging. In contrast to DoD's joint task force structure, the U.S. Embassy did not have a construct to manage, organize, and accommodate additional CBRN-qualified personnel and resources "to support crisis management in the case of a CBRN emergency that affects Americans abroad and/or has domestic impacts."²⁶ The embassy received 145 additional personnel, in addition to visiting U.S. civilian and military officials.²⁷ One former government official who was part of the staff augmentation said the U.S. Embassy in Tokyo was "bursting at the seams" with Department of Energy (DOE), NRC, Health and Human Services (HHS), military, and temporary duty officers coming in from the U.S. and embassies around the region. Another official described the initial scene at the embassy as "chaos." When discussing NRC's participation with stakeholders, interviewees often referred to the fact that the NRC was set up in the basement of the embassy.

These recollections paint a vivid picture of an embassy overcrowded with U.S. personnel, who occupied areas of the building not typically used for such purposes. It also reflects the tremendous stress and confusion at the Embassy as it attempted to simultaneously coordinate the activities of U.S. Government personnel while also coordinating with the Japanese government. The scale, complexity, and added technical requirements of the CBRN hazard required an extraordinary surge in manpower. If a similar disaster happens in the future, the embassy in the affected country will likely accommodate and coordinate the extra resources ad hoc; however, prior planning and training guided by a framework would facilitate this process and enable the new staff to work more efficiently.

²⁶ Ibid, 30.

²⁷ Ibid, 29.

Government-to-Government Coordination: The Hosono Process

By all accounts, the initial phase of the response to the March 11 disaster was confusing and highly disorganized. The severity of the disaster made it difficult for the Japanese government to measure threats and share information with its American counterparts, and systemic failures impeded the flow of information. In particular, TEPCO's²⁸ failure to make prompt organizational decisions and convey information to the Kantei²⁹ (the office of the Japanese Prime Minister) made it difficult for anyone to assess the radiological hazards associated with the disaster. The Kantei's poor coordination at the policymaking level compounded issues resulting from the lack of information sharing. The Japanese Government's agency-to-agency attempts to coordinate support requests with the U.S. were also problematic.

Ten days into the crisis, Japanese and U.S. officials addressed this issue by establishing the government-to-government "Hosono Process" (named after the special advisor to the Japanese Prime Minister, Goshi Hosono, and formally known as the Joint Crisis Management Coordination Group) to structure, consolidate, and enhance the information channels between the U.S. and Japanese governments.³⁰ The Hosono Process greatly improved communication, coordination, and information sharing between U.S. and Japanese government agencies.³¹ It gathered all of the relevant U.S. and Japanese government agency heads together to streamline the flow of information.³²

Organization and communication quickly improved with the nightly Hosono meetings. The Japanese Government submitted requests to Goshi Hosono,

²⁸ TEPCO was the electric utility servicing Fukushima Daiichi.

²⁹ Yoichi Funabashi and Kay Kitazawa, "Fukushima in Review: A Complex Disaster, a Disastrous Response," *Bulletin of the Atomic Scientists* 68, no. 9 (2012): 12.

³⁰ Suzanne Basalla, William Berger, and C. Spencer Abbot, "The U.S. Government Response to Japan's 'Triple Disaster,'" 29.

³¹ Interview with a former NRC official by Eric Weiner, July 12, 2013.

³² Physically around a table and virtually using tele/video conferencing.



Figure 5: U.S. Marines and Japan Self Defense Force personnel cleaning the Minato Elementary School during Operation Tomodachi.

who approved them and relayed the requirements to his U.S. counterpart, who was able to organize Japanese requests into a prioritized matrix of needs that could then be passed to the relevant U.S. agency. Technical assistance was coordinated through the Hosono Process as well.³³

While the creation of the Hosono Process improved overall response efforts, the lack of such a mechanism during the first ten days deserves more attention. Using this process as a baseline, the U.S. Government would benefit from formalizing a system for receiving, processing, and coordinating requests for assistance from the host country. While building this system, the Government should develop criteria to better understand when and where such methods of communication and coordination will be needed—for example, whether the system should apply to all host nations, or only to industrialized donor nations, and whether it would be needed for

responding to every CBRN disaster. Such a system was clearly needed to address the communication and coordination challenges in the large scale complex triple disaster response; it may also be helpful in smaller-scale incidents.

Military-to-Military Coordination: U.S. Forces Japan and the Japan Self Defense Force

Thanks to joint training, planning, and operations, the U.S. military response (called Operation Tomodachi) successfully protected American citizens while providing rapid, highly capable, coordinated assistance to Japan. While government-to-government communication and information sharing were challenging during the initial phase of the disaster (as previously described), preexisting relationships and lines of communication between the U.S. military and the Japan Self Defense Force (JSDF) provided much-needed information sharing and coordination.

³³ Interview with a former NRC official by Eric Weiner, July 12, 2013.

OFDA is typically responsible for coordinating U.S. humanitarian disaster response efforts overseas, but due to the large, forward-deployed U.S. military presence in Japan and the preexisting relationships between the U.S. military and the JSDF, OFDA stepped back and did not execute its role requesting military assets as aggressively as it might have in a normal crisis. OFDA was satisfied with the level of DoD coordination with its counterparts in the JSDF.³⁴

While the numerous competing communication channels between the services and the JSDF caused confusion and redundancy at times, these preexisting military-to-military relationships helped avert protracted communication and coordination challenges during the initial phase of the response. DoD experienced some internal challenges with offering assistance due to chain-of-command issues between DoD, U.S. Pacific Command (USPACOM), and USFJ, but in the end, the military response worked very well in Japan irrespective of who was in charge because the USFJ and the JSDF had strong relationships at the working level.³⁵

³⁴ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

³⁵ Interview with former DoS official by Eric Weiner, July 2, 2013.

Conclusions Regarding the Coordination of the U.S. Government Response

The coordination bodies described above were created or augmented because essential relationships or mechanisms were missing. While these ad hoc bodies were effective, they are not necessarily models for future responses or for a framework that guides foreign disaster response. Rather, they highlight the need for effective formal coordination mechanisms. The ad hoc coordination mechanisms used in the Japan response highlight gaps a future response framework could address.

III. CBRN Response: Coordination of Technical Expertise and Resources to Address the Radiological Hazard

The Fukushima incident in Japan represented the first U.S. Government response to a large-scale foreign disaster involving a radiological hazard. Dealing with the emerging effects of the damaged Fukushima nuclear power plant required specialized disaster response and consequence management. It required the U.S. Government to mobilize the full spectrum of its radiological response capabilities, which included no fewer than nine entities. However, the application of these resources was ad hoc and difficult in the absence of either experience with or a government-wide plan for a CBRN response.

Overview of Radiological Response Decision Making

Figure 6 illustrates the factors that influence coordination of the radiological elements of a complex disaster response and how they relate to each other. Starting in the upper left of this figure, human error may contribute to a nuclear accident triggered by environmental conditions, as was the case at Fukushima. Sensor systems collect information about the environment and contaminant dispersal (which has been shaped by environmental

conditions). The characteristics of the nuclear system, the nature of the nuclear accident, and contaminant dispersal determine the radiological hazards (shown as a red oval). The radiological hazards influence the governance elements of the response (shown at the upper right), and the hazard prediction and risk models (shown at the lower left) used to estimate risks to human health and safety.

Following the thread shown in the center of the diagram, the characteristics of the nuclear system also inform the development of standards for acceptable levels of contamination and safety. These standards set thresholds for acceptable risk, which provide a basis for evaluating the estimated risks to human health and safety. These risk estimates

inform stakeholder decision making during multi-stakeholder coordination (shown within the gold oval at the lower right). The actual and projected timelines resulting from situational awareness of the developing radiological hazards, and guided and controlled by the governance elements, influence these decisions. The following paragraphs discuss the impact of these factors during the Fukushima response.

In the Fukushima disaster, the type and extent of contaminant dispersal were a major concern because of the potential health and safety impacts on people and animals living in the area, on disaster responders, on U.S. citizens in Japan, and on the U.S. directly, either through environmental contamination or through shipping.

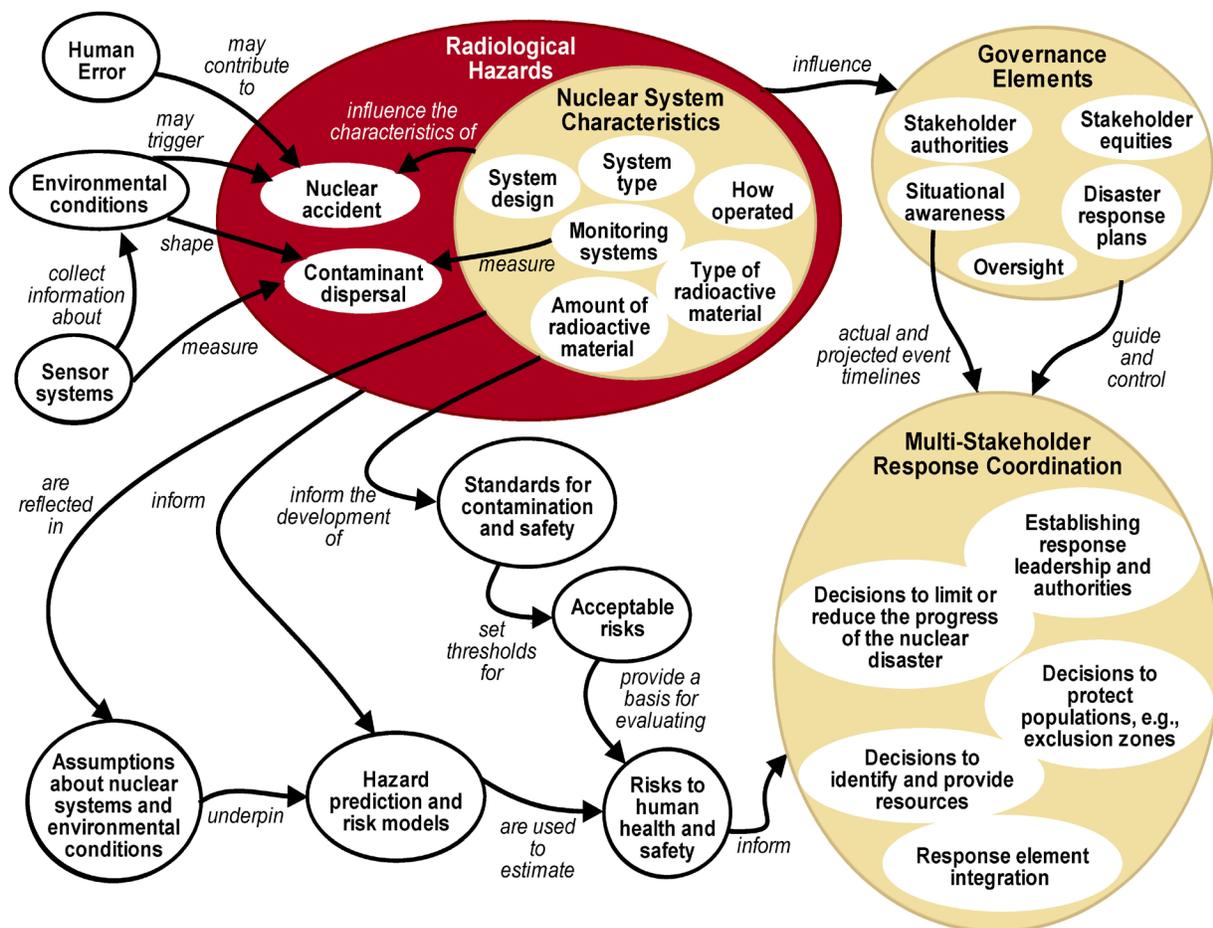


Figure 6: Factors influencing radiological response coordination.

Contaminant types and concentrations are direct results of the characteristics of the nuclear system (shown within the upper center gold oval) interacting with environmental conditions. Environmental conditions included the earthquake and tsunami that damaged the nuclear power plant and its supporting power infrastructure, plus weather conditions that affect the spread of contaminants in air, land, and water.

The type of nuclear system (in this case, a commercial power plant), its design, its operations, and the type and amount of nuclear materials on site all influence the types and amounts of radiological contaminants and the assumptions about the nuclear system underpinning available hazard prediction models. The differences in nuclear power plant designs in Japan and the U.S. meant that U.S. models would not accurately predict the effects of a Japanese accident. These differences were compounded by different safety standards. As a result, given equivalent and accurate risk modeling results, U.S. and Japanese decision makers would draw different conclusions and make different recommendations about how to respond to the same accident. Similar differences existed between the U.S. commercial and military nuclear communities.

The on-site monitoring systems would ideally provide data about conditions inside and around the reactors. During this disaster, damage from the tsunami took these systems off-line. Most of the information available to provide situational awareness to inform the governance elements of the response came from external sensors on reconnaissance satellites and aircraft.

This same information about the nuclear plant and conditions on-site was used to inform hazard prediction and risk models (shown at the lower left of Figure 6). The available risk models had been built for different applications using different assumptions but were all used to estimate the risks to human health and safety. Differences in their results complicated decision making and drove differences in recommended exclusion zones discussed later in this section.

Nuclear system characteristics also inform contamination standards. There is no single standard for nuclear power plant safety, and hazards to the general public from commercial nuclear power plants are different from hazards to military personnel from nuclear reactors operated in confined environments on board ships and submarines. These standards set the thresholds for acceptable levels of risk (as shown in the middle of Figure 6) and provide a basis for evaluating risks to human health and safety. This information and related analyses support the decisions about how to limit the progress of the nuclear disaster, how to protect local populations, and how to resource the response (as shown in the gold oval at the lower right).

Stakeholder authorities and equities, combined with available disaster response plans, guide and control response coordination across the multiple stakeholders responding to the event (as shown on the right side of the diagram). In particular, they influence how responders establish leadership and authorities for different elements of the response. Situational awareness informs development of actual and projected event timelines—what has happened and when, and what is expected to happen in the coming hours, days, and weeks.

This overview explores some of the interdependencies that can complicate the coordination of response to a nuclear accident. The following sections illustrate the resulting challenges experienced by U.S. Government agencies during the Fukushima response.

Competing Nuclear Safety Standards

Within hours of receiving reports of the damage caused by the earthquake and tsunami in Japan, the OFDA deployed a DART to the U.S. Embassy in Tokyo, where the team acted under the authority of the U.S. Ambassador to Japan, John Roos. Word of the radiological hazard came shortly after the DART left for Japan. The White House convened a meeting in the situation room to discuss how to address the lack of personnel with nuclear safety expertise at the

U.S. Embassy in Tokyo, and concerns about the lack of information coming in from the Government of Japan on the nuclear situation.³⁶ The NRC did not have a presence in Tokyo. The DOE had only a small presence focused primarily on the promotion of U.S. nuclear energy interests. These DOE representatives were not well versed in nuclear safety and regulatory issues and were therefore ill equipped to respond to a nuclear incident.³⁷ Meeting participants agreed they needed personnel from both the NRC and the DOE as technical consultants on the DART team.³⁸

While the NRC was mobilizing staff to send to the embassy in Tokyo, personnel from the Office of Naval Reactors reached out to offer assistance.³⁹ This office is part of the Naval Nuclear Propulsion Program under the National Nuclear Security Administration and is responsible for reactor safety and for radiation controls, regulations, and standards to protect the environment and the public. The administration's mission includes responding to emergencies involving DOE and its own facilities and to be "the premier technical leader in responding to and successfully resolving nuclear and radiological threats worldwide."⁴⁰ The Office of Naval Reactors maintains a large presence in Japan because of the significant forward-deployed military presence there.⁴¹

It should be noted that the Naval Nuclear Propulsion Program is carried out jointly by the Department of the Navy and DOE and focuses on the use of nuclear power by the Navy and government nuclear labs, not commercial nuclear facilities.⁴² From this perspective, the Office of Naval Reactors was not well suited for responding to commercial nuclear plant accidents because their detection standards

differ from those used by the NRC and DOE.⁴³ Naval Reactors has a "zero tolerance" standard because its reactors are located on ships and submarines where any radiation leak could be catastrophic.⁴⁴ The NRC standard is more tolerant in that it accounts for exposure, distance from the source, and the level of shielding to establish individual hourly and annual dose limits.⁴⁵ The disparity between the two agencies' standards was problematic because the administration was unable to resolve their differences or find an authoritative standard to use as a basis for projecting future risk in a timely manner. The absence of clear nuclear agency leadership or authority in an international nuclear response situation made it more difficult to resolve these differences.

This disparity in nuclear safety standards was particularly problematic when determining a travel advisory for U.S. citizens in Tokyo, the most extreme being an evacuation order. In this case, the determination depended upon the radiation plume threat to Tokyo, but Ambassador Roos felt that he was getting different threat level recommendations from the NRC and Naval Reactors.⁴⁶ The Office of Naval Reactors' measurements indicated an imminent threat to Tokyo, and the office recommended evacuation. Meanwhile, the NRC and DOE⁴⁷ were waiting for their own plume-modeling results before making a determination. The interagency was caught in the middle, unsure of what to do.⁴⁸ Only moments before a decision had to be made on whether it was necessary to evacuate U.S. citizens from Tokyo, the NRC, DOE, and Naval Reactors were able to present a coordinated position on radiation plume models to the White House, signaling that Tokyo was not at risk. U.S. citizens were nearly evacuated unnecessarily

³⁶ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

³⁷ Interview with a former NRC official by Eric Weiner, July 12, 2013.

³⁸ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

³⁹ Interview with a former NRC official by Eric Weiner, July 12, 2013.

⁴⁰ National Nuclear Security Administration, "Responding to Emergencies." <http://www.nnsa.energy.gov/about/ourprograms/emergencyoperationscounterterrorism/respondingtoemergencies>.

⁴¹ Interview with a former NRC official by Eric Weiner, July 12, 2013.

⁴² Executive Order 12344—Naval Nuclear Propulsion Program, February 1, 1982. <http://www.archives.gov/federal-register/codification/executive-order/12344.html>.

⁴³ Ibid.

⁴⁴ Interview with a former DoS official by Eric Weiner, July 2, 2013.

⁴⁵ Reactor Concepts Manual: "Dose Standards and Methods for Protection Against Radiation and Contamination," NRC Technical Training Center, Rev. 06032-4, 2-4. <http://www.nrc.gov/reading-rm/basic-ref/teachers/08.pdf>.

⁴⁶ NRC conference call transcripts on Japan's Fukushima Daiichi, March 16, 2011, 129-145. <http://pbadupws.nrc.gov/docs/ML1205/ML12052A108.pdf>.

⁴⁷ DOE was primarily responsible for radiation dose monitoring. This agency required prior review by its chain of command to share the raw data with the NRC. (Interview with a former DoS official by Eric Weiner, July 2, 2013).

⁴⁸ Interview with a former DoS official by Eric Weiner, July 2, 2013.

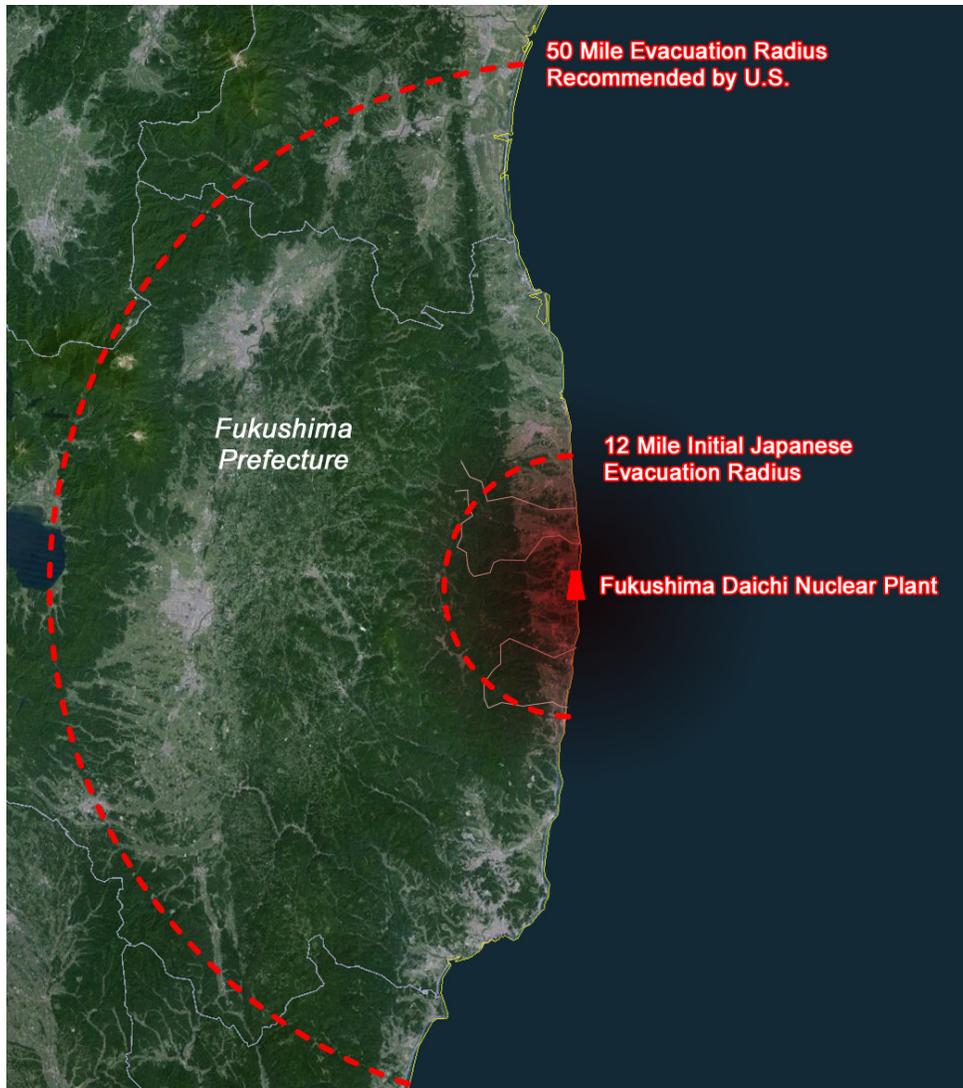


Figure 7: The 50-mile evacuation radius established by U.S. government and the 12-mile radius established by the Japanese government impacted significantly different geographic areas.

from Tokyo due to a lack of coordination between Naval Reactors, the NRC, and DOE.⁴⁹

The lack of common nuclear safety criteria and the application of competing radiological detection standards by the NRC and Naval Reactors led to significant confusion during the initial phase of the response to the Fukushima nuclear accident. No single authoritative source existed for developing risk assessments or a best-fit match between models and conditions on the ground.

⁴⁹ Ibid.

Competing Nuclear Exclusion Zones

Once Tokyo was deemed safe, U.S. stakeholders agreed to instruct the ambassador to recommend that U.S. citizens avoid travel within the 50-mile radius of the Fukushima plant and that U.S. citizens within the radius evacuate or shelter in place.⁵⁰ As shown in Figure 7, the nuclear exclusion zone (evacuation

⁵⁰ NRC conference call transcripts on Japan's Fukushima Daiichi, March 16, 2011, 129-145. <http://pbadupws.nrc.gov/docs/ML1205/ML12052A108.pdf>.

radius) recommended by the U.S. exceeded the 12-mile zone previously established by Japan, in part because the U.S. and Japan used different nuclear safety standards to determine risk. The difference was problematic for the U.S. and Japanese governments: while the decision to establish a 50-mile radius may have appropriately considered the safety of U.S. citizens, it also undermined Japanese government authority, increased Japanese public distrust and confusion, and sent the country into further panic.

The U.S. Government struggled to manage radiation threat information coming in from U.S. agencies, the Government of Japan, and the media; it was difficult to achieve ground truth on radiation to determine what measures Americans should take. The U.S. Government found it challenging to synchronize interagency risk communications and related public messaging while also consulting with the Government of Japan. It ultimately made decisions based on U.S. Government knowledge and tried to be helpful to the Japanese in public without undermining them in private.⁵¹

Discrepancies between White House and DoS accounts make it unclear how much of NRC decision making was based on science and how much was based on politics and fear.⁵² According to Jeff Bader, Senior Director for East Asian Affairs on the White House National Security Council at the time of the disaster, modeling results from the NRC and the DOE indicated that an evacuation zone of 50 miles would be more consistent with U.S. standards than the Japanese zone of 12 miles; based on this information, the administration recommended that all U.S. citizens in the 50-mile zone evacuate.⁵³ A former DoS official criticized the NRC decision, saying that the 50-mile evacuation radius far exceeded the radius that U.S. nuclear plant operators are expected to plan for in case of an emergency.⁵⁴

⁵¹ Interview with a former government official by Eric Weiner, June 11, 2013.

⁵² Based on stakeholder interviews.

⁵³ Jeffrey A. Bader, "Inside the White House During Fukushima."

⁵⁴ Interview with a former DoS official by Eric Weiner, July 2, 2013.

This situation highlights the critical role that risk communication and public messaging play in a coordinated response to a nuclear incident in another country. It demonstrates that during CBRN disasters in particular, the safety of U.S. citizens must be balanced against the sovereignty of the host nation and all the political and societal sensitivities that go along with it.

Planning, Leadership, and Decision Making

Several of the stakeholder interviews identified the lack of an international nuclear response plan as a problem. While domestic incidents have clear authorities outlined in the NRF, no similar framework designates authorities for international response.⁵⁵ The NRC lacked an international response plan, and no specific document within the U.S. Government indicated that the NRC would act as the lead nuclear safety agency in a foreign CBRN event.⁵⁶ The NRC improvised its decision making by duplicating the U.S. domestic response structure, and Ambassador Roos settled the leadership disagreement by putting the NRC in charge of the nuclear elements of the Fukushima response.⁵⁷

DoD Handling of the Radiological Response

The lack of common nuclear safety standards and expertise created additional challenges for the DoD response. USPACOM and USFJ in particular were unprepared for any type of CBRN event. The USPACOM Commander, Admiral Robert Willard, specifically requested the assistance of Joint Task Force Civil Support (JTF-CS) to address the radiological threat.⁵⁸ It is America's only standing CBRN joint task force and is staffed by specialized consequence management troops from all the services.⁵⁹ The

⁵⁵ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

⁵⁶ Interview with a former nuclear safety official by Eric Weiner, July 20, 2013.

⁵⁷ Ibid.

⁵⁸ Unclassified U.S. Northern Command after-action briefing on Operation Tomodachi.

⁵⁹ "Joint Task Force Civil Support." <http://www.jtfc.northcom.mil/JTFCS.aspx>.



Figure 8: Air Force Radiation Assessment Team field radio analytical lab used during Operation Tomodachi for radiation reconnaissance and monitoring.

JTF-CS team had just concluded an FCM concept of operations exercise prior to the Fukushima disaster. Admiral Willard's request was significant because the JTF-CS is assigned to U.S. Northern Command and conducts domestic CBRN response operations planning and preparedness under the NRF. Thus, specialized domestic CBRN assets were mobilized to address an international emergency while USPACOM's available CBRN assets in Hawaii were not used.⁶⁰

The JTF-CS team arrived in Japan to find that the USPACOM leadership was not getting the radiological hazard information they needed to develop operational exposure guidelines. The task force created a U.S. interagency Radiological Consequence Management Team (RCMT) ad hoc to develop a concept of operations for FCM. RCMT comprised individuals from DOE, NRC, and DoD, including the Defense Threat Reduction Agency (DTRA), USFJ, USPACOM, Northern Command, Navy oceanographers, and the Services, and the

team held daily meetings with USPACOM and USFJ commanders and their Japanese Army counterparts. The RCMT collected and analyzed data and worked to establish evacuation procedures as well as common operational exposure guidelines, which define the amount of radiation exposure that individuals can tolerate. This work proved difficult because standards and approaches differed across participating agencies and within DoD itself.⁶¹ Differing operational exposure guidelines, levels, and metrics used by the Japanese and Americans further complicated the situation. The Japanese Army, U.S. Army, USPACOM, USFJ, DOE, and Defense Threat Reduction Agency developed an evacuation plan but were unable to agree on a trigger for when to evacuate.⁶²

Consensus building among the coordinating agencies in the RCMT was challenging and time consuming due to the highly technical nature of the work and the numerous competing ideas. The pace of Japanese decision making added a layer of complexity because every change to the evacuation plan had to be approved by the Japanese chain of command, often requiring the Japanese Defense Minister to make decisions. In one instance, the Japanese Prime Minister himself had to make the decision. USPACOM and USFJ leadership were simultaneously saturated with information and lacked the unified RCMT recommendations needed to support their decisions.⁶³

While the USFJ had strong working relationships with their JSDF counterparts thanks to prior joint training and planning, the U.S. military was unprepared to execute a joint U.S.-Japanese response to a nuclear event. The lack of fit between Japanese needs and U.S. capabilities was highlighted by the mobilization of the U.S. national CBRN assets for an international response. The Japanese wanted additional transportation support from the U.S. in the event an evacuation was needed and received the full support of the JTF-CS team as a result. In addition to bringing in the JTF-CS, Admiral Willard ordered half of the Marine Chemical Biological Incident Response Force (CBIRF) team to Japan to augment

⁶⁰ Interview with a former Northern Command participant by Eric Weiner, July 19, 2013.

⁶¹ Ibid.

⁶² Ibid.

⁶³ Ibid.

USPACOM capabilities.⁶⁴ The CBIRF can rapidly go anywhere in the world to help respond to a terrorist attack involving a CBRN hazard. It trains year round on its mission to assist local, state, or Federal agencies and the geographic combatant commanders in CBRN response and consequence management operations.⁶⁵ However, it is not tasked or trained to respond to radiation leaks resulting from a nuclear accident at a commercial facility. Meanwhile, the Japanese wanted the CBIRF team in-country as a contingency, but did not give the team a mission and they required it to have a Japanese escort off-base. Without a clear mission and with the restrictions imposed upon it, there was little for the team to do. Its three-week stay consisted of subject matter exchanges with the Japanese and demonstrations of CBIRF capabilities on base.⁶⁶

The lack of clarity over radiological response and nuclear safety roles and responsibilities in the defense establishment during foreign CBRN incidents remains. The deployment of DoD CBRN assets in response to Fukushima raises questions about what future DoD FCM missions might require and whether the Japan response set a precedent for CBRN foreign assistance. If JTF-CS is expected to be DoD's global CBRN on-scene experts, then it will have to change its mission to include FCM. This will require increases in funding, in manpower, and in DoS, interagency, and foreign government knowledge. If FCM officially remains outside the domestic scope of the JTF-CS, then JTF-CS may be unprepared when called upon to respond overseas; without adjustments to authorizations and policies, the CBIRF may be similarly unprepared if called upon again to respond to future CBRN events not associated with terrorist attacks.⁶⁷ How the U.S. Government organizes itself domestically (with the state and local authorities in

charge) does not necessarily translate into overseas operations. Future foreign CBRN disaster response will require better U.S. Government coordination if these assets are to be used effectively.

Politics and fear appeared to influence policy and operations more than did science and established standards.⁶⁸ There was no government-wide protocol or framework for coordinating with a sovereign, foreign government to deploy U.S. military CBRN assets to respond to a natural or man-made disaster, and operations in Japan suffered as a result.⁶⁹

The Japan Precedent Regarding the International Atomic Energy Agency

The Japan-U.S. alliance set the stage for Japan's requests for assistance in managing the Fukushima radiological incident, but there were additional considerations driving Japan's calculus. Many UN member countries closed their embassy doors in Tokyo during the incident while the U.S. remained fully engaged, and this contributed to Japan's decision to request U.S. assistance.⁷⁰

The International Atomic Energy Agency (IAEA) is an independent international organization related to the United Nations, and its mission is guided by the interests of UN and IAEA members to ensure nuclear safety and security, science and technology, and safeguards and verification.⁷¹ Although a UN member, Japan did not want the IAEA to come in and take over the nuclear response, preferring instead to accept U.S. assistance for political reasons related to the alliance. Specifically, Japan did not want to grant certain UN member countries access within its borders, and the IAEA did not want to agree to

⁶⁴ Interview with a former Northern Command participant by Eric Weiner, July 19, 2013.

⁶⁵ Marines, Chemical Biological Incident Response Force, II Marine Expeditionary Force. <http://www.cbirf.marines.mil/About/History.aspx>.

⁶⁶ Interview with a former Northern Command participant by Eric Weiner, July 19, 2013.

⁶⁷ Unclassified U.S. Northern Command after-action briefing on Operation Tomodachi.

⁶⁸ Unclassified U.S. Northern Command after-action briefing on Operation Tomodachi.

⁶⁹ There is a classified U.S. Government response plan for managing fallout from a nuclear event overseas which had never been exercised before Fukushima. OFDA has agreements in place with Health and Human Services for expertise on handling nuclear fallout. (Interview with Mark Bartolini, former Director of USAID, OFDA by Eric Weiner, June 25, 2013).

⁷⁰ Interview with a former NRC official by Eric Weiner, July 12, 2013.

⁷¹ International Atomic Energy Agency, "About the IAEA." <http://www.iaea.org/About/about-iaea.html>.

keep certain countries out.⁷² The IAEA was able to put two radiation monitoring teams and one food safety assessment team on the ground in Japan a few days after the radiological threat was identified, but the composition of the teams is unclear. Since Fukushima, the IAEA has established more incident response capabilities to prepare for similar future events.⁷³ If there is another disaster in the Asia-Pacific with a radiological hazard, a request for assistance will likely be sent to the U.S., the IAEA, or both. In the latter scenario it will be important to understand how U.S. and IAEA response capabilities intersect to determine how they can best be applied when called upon to assist.

Conclusions Regarding the U.S. Government's Response to the Radiological Hazard

The U.S. Government response to the radiological hazard in Japan was executed through ad hoc combinations and applications of the U.S. NRF and U.S. Government agency FCM authorities. On the civilian side, the NRC and DOE augmented the OFDA/DART response, while Naval Reactors, the Defense Threat Reduction Agency, the National Nuclear Security Administration, Northern Command, and CBIRF supported the military response. Ad hoc fusion cells integrated civilian and military agency expertise. No government-wide plan organized U.S. nuclear safety assets to respond to a radiological incident overseas, creating a leadership void (later filled by the NRC) that negatively impacted U.S. Government decision making and coordination.

⁷² Interview with a former NRC official by Eric Weiner, July 12, 2013

⁷³ Briefing by IAEA Director General Yukiya Amano: Fukushima Nuclear Accident, March 28, 2011. <http://www.iaea.org/newscenter/pressreleases/2012/prn201208.html>.

Competing nuclear safety and radiological detection standards hampered consensus building, and risk assessment and interagency disagreements as well as competing priorities challenged response continuity.

In civilian and military nuclear agencies, a lack of clarity remains over international response roles and responsibilities. Establishing response leadership and authorities is critical to successfully coordinating the decisions and actions of the multiple stakeholders involved in a large-scale response to a complex disaster. Individual and agency roles should be clearly defined and understood, particularly when they are different from normal operating roles and/or roles in a domestic disaster.⁷⁴ Such guidance exists for U.S. domestic disaster response under the Nuclear/Radiological Incident Annex to the NRF. The annex “describes the policies, situations, concepts of operations, and responsibilities of the Federal departments and agencies governing U.S. domestic response and short-term recovery activities for incidents involving release of radioactive materials.”⁷⁵ No corresponding document exists to guide U.S. international nuclear incident response. A framework that codifies these authorities would help the U.S. Government prepare for future CBRN disasters.

⁷⁴ NRC Japan Incident Response After Action Report for the Fukushima Dai-Ichi Accident, Office of Nuclear Security and Incident Response, Division of Preparedness and Response, December 2011, 7.

⁷⁵ Nuclear/Radiological Incident Annex to the NRF, June 2008, 1. http://www.fema.gov/pdf/emergency/nrf/nrf_nuclearradiologicalincidentannex.pdf.



(Photo courtesy of the L. A. County Fire Department)
Source: USAID/OFDA March/April 2011 Newsletter

IV. Resourcing Challenges: Managing Funding Authorities and Constraints

A number of stakeholders identified gaps in the U.S. Government's ability to adequately resource domestic agencies to operate in Japan.⁷⁶ In very general terms, no single U.S. agency is funded to handle a disaster response of the size of the Japanese triple disaster, and domestically focused agencies (such as the NRC and FEMA) are not funded or authorized to operate outside the U.S. (This was also the case for the U.S. response to the January 2010 Haitian earthquake.) Multiple agencies needed to work together and pool their resources to execute a response.

This situation was further complicated by the rules governing how FCM, humanitarian affairs, and disaster response funds may be used and combined. The processes used to request additional funding from Congress, used by Congress to allocate funding to different accounts, and used to control how agencies expend these funds add significant complexity to the management of disaster response operations.

⁷⁶ While "resources" is a broad category that includes personnel, transportation, and logistics capabilities, this section focuses on funding.

Finally, each agency accounted for its individual disaster expenditures; no single agency tracked the total cost of the disaster response or facilitated reimbursement by the Japanese government. Existing rules governing reimbursements further complicated the process. While the exact cost of the U.S. response to the Japanese triple disaster is unclear, the USAID and DoD assistance alone totaled \$95.5 million.⁷⁷ This number is significantly larger than the responding agencies' available disaster funding (discussed later in this section). It is also sufficiently large enough to make reimbursement desirable.

In this section, resourcing challenges are broken down into four categories. The first examines how the large scope and complexity of the incident overwhelmed traditional humanitarian funding mechanisms and hindered Japan's reimbursement of the U.S. Government. The second looks at gaps in the abilities of DoS and DoD to fund FCM operations.

⁷⁷ U.S. Agency for International Development, "Japan-Earthquake and Tsunami," Fact Sheet #17, April 22, 2011.

The third explores the political dynamics of disaster funding decision making during the response, and the fourth discusses structural considerations that reveal some of the limitations of the current humanitarian aid model as it was applied in Japan.

Use of Traditional Humanitarian Assistance Funding

As the lead coordinating agency for U.S. disaster response overseas, USAID/OFDA provides \$50,000 in initial relief assistance from the International Disaster Assistance account.⁷⁸ OFDA in Washington programs any additional funding as required and approved. OFDA normally brings additional response capabilities and funding to bear from other agency partners. While this mechanism is often appropriate to fund standard disaster responses, it was not enough to fund the complex, large-scale response and FCM operations in Japan. Instead, DoD ended up paying for a significant portion of the initial response using funds left over from the last major overseas disaster (the Haitian earthquake).⁷⁹

Congress appropriates \$100 million in Overseas Humanitarian Disaster Assistance and Civic Account (OHDACA) funds annually to pay for DoD operations associated with humanitarian requirements.⁸⁰ Of the total, \$25 million to \$30 million is set aside for DoD support of foreign disaster relief to cover the 8% to 10% of foreign-declared disasters worldwide where DoD support is needed. The remainder is available for steady-state activities of the combatant commands, including USPACOM. The U.S. Embassy and USAID jointly determine DoD's disaster response role case by case. The \$25 million to \$30 million funding level has not been enough to pay for DoD's response to a high-end disaster, such as the Japanese triple disaster or Haiti in 2010.⁸¹

From the start of the response operations in Japan, it



Figure 9: Search-and-Rescue Workers in Ofunato, Iwate, Japan.

took approximately five weeks for DoD to develop a transition strategy that explained to the Secretary of Defense how the department was going to cover its costs. To fund its operations in Haiti, DoD had requested an emergency supplemental appropriation from Congress. Ultimately, only a portion of the supplemental was needed for the Haiti response, and DoD was able to reprogram the remaining funds to pay for its response operations in Japan one year later. The residual Haiti supplemental funding enabled DoD to operate in Japan without having to request additional funds from Congress. This was particularly fortuitous as the Fukushima nuclear disaster unfolded when there was little time to spare.⁸²

The effects of large-scale, complex, international disasters tend to develop and compound quickly; the presence of a CBRN hazard increases the need for a rapid response to contain the hazard and reduce casualties. Requesting supplemental funding from Congress requires additional time and adds uncertainty because there is a chance that the full

⁷⁸ Unclassified U.S. Department of State Foreign Affairs Manual, International Disaster and Humanitarian Assistance, volume 2, March 29, 2013, 4. <http://www.state.gov/documents/organization/84372.pdf>.

⁷⁹ Interview with a former defense official by Eric Weiner, July 15, 2013.

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² Ibid.

funding request might not be granted. A method for mobilizing resources for disasters or emergency contingencies is needed to enable the U.S. interagency to quickly respond to future events.

OFDA added NRC representatives to the DART to gain the internal technical expertise needed to coordinate the nuclear elements of the response. However, the lack of an NRC mechanism for funding a response to a CBRN event overseas imperiled OFDA's ability to deploy and use NRC participants in Japan. OFDA initially used its own budget to pay for the NRC representatives to be transported to and set up in the U.S. Embassy in Tokyo. Ultimately, the operation was billed to the NRC. Even though the NRC was part of the DART, it deployed to Japan independently as the NRC, not as part of USAID.⁸³

The NRC recovers 90% of its budget from the U.S. nuclear industry (its regulated parties) and 10% from American taxpayers. The U.S. nuclear industry is likely not interested in subsidizing NRC's international disaster response efforts.⁸⁴ Future NRC participation will require a clear funding mechanism which is designed to operate overseas in concert with OFDA and other coordinating U.S. Government agencies.

Limits to Funding for FCM Operations

DoS is the lead Federal agency responsible for coordinating a U.S. Government response to a request for assistance from a host nation after a CBRN incident.⁸⁵ DoS had authority to coordinate the U.S. Government FCM response in Japan, but it did not possess adequate operational funds, nor does it have the authority to manage the funding for all the U.S. Government agencies involved in the response.⁸⁶

The lack of authority to both manage the response and address its funding requirements made it more difficult for DoS to be effective in its lead agency role.

In a typical humanitarian response, OFDA provides and funds the assistance while working closely with the military to coordinate and prioritize the delivery of aid.⁸⁷ During the initial phase of the response in Japan, OFDA was overwhelmed by the cost of providing specific, technical and mechanical support for the nuclear elements of the disaster. Fortunately, DoD stepped in to pay for the majority of the FCM response out of its OHDACA funds.

However, DoD faced significant challenges using OHDACA humanitarian relief monies to pay for all of its consequence management activities in Japan. While some of those activities had a humanitarian focus (such as decontaminating and cleaning civilian communities potentially exposed to radiation), DoD was prohibited from using OHDACA funds to pay for other activities associated with the Fukushima nuclear disaster (such as to fix broken water pipes in a nuclear power plant). It was also prohibited from using its humanitarian assistance funding for DoD force protection.⁸⁸

DoD was authorized to use general operations and maintenance funds to help U.S. armed forces and pay for the decontamination of military vessels and planes as part of its force protection mission. However, it could not use these operations and maintenance funds to provide humanitarian assistance to the Japanese.⁸⁹

There is still no legislative fix that addresses these funding discrepancies (type, amount, and authorities) and adequately covers the cost of a U.S. Government response to a large-scale, complex foreign disaster with a CBRN element.

⁸³ Interviews with stakeholders by Eric Weiner, June 20 and 25, 2013.

⁸⁴ Interview with a former NRC official by Eric Weiner, July 12, 2013.

⁸⁵ Joint Publication 3-41, Chemical, Biological, Radiological, and Nuclear Consequence Management, June 21, 2012. https://www.fas.org/irp/doddir/dod/jp3_41.pdf.

⁸⁶ Interview with a former defense official by Eric Weiner, July 15, 2013.

⁸⁷ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

⁸⁸ Interview with a former defense official by Eric Weiner, July 15, 2013.

⁸⁹ Ibid.

Political Dynamics of Disaster Funding Decision Making

Political sensitivities, political dynamics, and sovereignty concerns complicated the resourcing of the disaster in Japan and influenced how American and Japanese decision makers funded and reimbursed response efforts. Japan preferred to work with its U.S. ally. It did not initiate a determination under the IAEA Convention,⁹⁰ which would have required the Government of Japan to reimburse the IAEA assisting party. The U.S. Government paid for the response without asking for reimbursement up front to avoid damaging the U.S.-Japan relationship.⁹¹ However, the Japanese did not want the U.S. to pay, so they approached their U.S. counterparts in a Hosono meeting one month into the crisis and said that as a wealthy nation with a strong economy, they would provide reimbursement. The U.S. Government worked for months to develop a consolidated bill to send to the Japanese but was unable to do so because there were too many agencies and too many accounting systems.⁹²

Japanese reimbursement of DoD was hampered by the lack of clear, existing channels. Under the Foreign Assistance Act, there is a mechanism for a recipient country to reimburse the U.S. for assistance. There were interagency discussions to assess whether the Foreign Assistance Act mechanism could be used to reimburse DoD for the initial phase of the deployment.⁹³ The legality of using Foreign Assistance Act mechanisms to reimburse DoD was in question, and the Office of Management and Budget had difficulty identifying alternative reimbursement mechanisms to fund ongoing operations.⁹⁴ Numerous discussions between the NRC and the Government of Japan also occurred regarding reimbursement, but in the end, the NRC decided to pay for its



Figure 10: Ambassador Roos visiting with Japanese survivors sheltering in Miyagi Prefecture, Japan.

own involvement because it would have required a disproportionate amount of work to request and process the reimbursement.⁹⁵

In addition to solving the cost accounting problem, identifying and/or clarifying reimbursement mechanisms for all relevant U.S. Government agencies, including DoD, would help streamline responses to large-scale future disasters by minimizing the diversion of precious time and resources to deciphering repayment in the midst of crisis. The U.S. Government could benefit from additional interagency discussions before the next big disaster to help clarify political dynamics involving such questions as these:

- When is it advantageous for the U.S. Government to pay and how much?

⁹⁰ IAEA Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Article 7, November 18, 1986. <http://www.iaea.org/Publications/Documents/Infcircs/Others/infirc336.shtml>.

⁹¹ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

⁹² Interview with a former NRC official by Eric Weiner, July 12, 2013.

⁹³ Interview with a former defense official by Eric Weiner, July 15, 2013.

⁹⁴ Ibid.

⁹⁵ Interview with former nuclear safety official, by Eric Weiner, June 20, 2013.

- What is the preferred method and timing to request reimbursement?
- Is it appropriate for the U.S. to encourage a country affected by a CBRN disaster to declare under the IAEA Convention to avoid reimbursement issues?

There has been some disagreement among DoS, OFDA, and the combatant commands over the appropriate balance of humanitarian and political interests when resourcing a foreign disaster response. The U.S. may have political interests that demand a more robust humanitarian response, so decisions are not made based solely on the needs of the requesting country. An interagency process has been set up by the NSS to look at responding to humanitarian disasters with political elements.⁹⁶

More broadly, there are diverging views within the U.S. Government over how to best resource a coordinated response to complex foreign disasters. Some support the current system of funding where OFDA uses its International Disaster Assistance account and requests additional funding from Congress if the funds run out before the end of the year. International Disaster Assistance funding, however, does not address mitigation of CBRN contamination or contagions. Others feel that a new funding mechanism for overseas disasters analogous to the Stafford Act for domestic natural disasters would be more appropriate. The Stafford Act⁹⁷ guarantees Federal disaster assistance to U.S., state, and local governments, and this funding assurance helps encourage entities to contribute their mission-related capabilities. Creating such a mechanism would expedite the coordination and funding of any U.S. interagency response to a rapidly developing international disaster.⁹⁸

Structural Considerations

The Japan disaster raised larger issues associated with spending global humanitarian aid money reserved for chronically needy parts of the world to pay for countries capable of paying or reimbursing for their own needs. Paying for response to an industrialized nation such as Japan put USAID in an awkward position because it took funding that would otherwise be used to provide disaster relief in other parts of the world in regular need, such as the horn of Africa.⁹⁹

DoD harbored similar reservations about paying for the disaster in Japan with money intended to be allocated to Africa Command or Central Command, even though DoD has used funds allocated to one combatant command to pay for a disaster response in another command's geographic area of responsibility.¹⁰⁰ When disaster strikes, the services and U.S. Government agencies generally find a way to resource the response, but there can and should be a more flexible system for managing humanitarian aid money that will enable stakeholders to respond effectively and responsibly within the limits of their assigned roles, responsibilities, and authorities.

Countries such as Japan and the U.S. view themselves as donor nations. They tend to have difficulties in both the mechanics and perceptions of receiving disaster aid, particularly when it is offered within the traditional donor-aid model, which implies a superior-subordinate relationship between the giving and receiving nations. For example, the U.S. declined various offers of international assistance during the response to Deepwater Horizon oil disaster and hurricanes Katrina and Sandy.

As a wealthy donor nation, Japan did not imagine a situation where it would need to receive international assistance and did not have adequate mechanisms

⁹⁶ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

⁹⁷ Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, and Related Authorities as of April 2013. <https://www.fema.gov/media-library/assets/documents/15271?fromSearch=fromsearch&id=3564>.

⁹⁸ Stakeholder interview by Eric Weiner, July 12, 2013.

⁹⁹ Interview with former defense official, by Eric Weiner, July 15, 2013.

¹⁰⁰ *Ibid.*

in place for doing so.¹⁰¹ The Japanese government requested help from the U.S. Government, and preexisting relationships helped manage government-to-government and military-to-military support. Japan did not have a plan for incorporating nonprofit organizations or donations management into the disaster response. As a result, Japan did not realize the full potential of volunteers, donations, and nonprofit organizations.¹⁰²

The donor-aid model can also be problematic for developing nations, which hesitate to accept aid for fear of appearing incompetent or inferior to donor nations.¹⁰³ Using a mutual-aid framework, in which the relationship is among equals helping each other as needs arise, eliminates many of these issues. Shifting from a donor-aid to a mutual-aid model may help provide face-saving solutions to address matters of sovereignty and capacity in Asia-Pacific countries and help them meet the response needs of increasingly complex disasters.

When considering how best to resource international disasters, it is important to realize that using U.S. Government assets is often the most expensive option relative to NGOs and international organizations. The Japanese triple disaster highlights the potentially high cost of U.S. Government foreign disaster response. Some of the costly U.S. Government rapid response capabilities also have few alternatives to reduce transport cost, and travel by air or sea can add significant expense. In some cases, similar capabilities can be provided by partner nations or international aid organizations at a fraction of the cost. For example, NGOs and UN partners can conduct basic radiological decontamination and provide medical care far more inexpensively than U.S. Government agencies. OFDA recognized this when it did not authorize deployment of HHS medical teams

because it was not cost effective.¹⁰⁴ Mobilizing a U.S. Government agency is costly, and the U.S. can often operate more inexpensively and have a larger impact through its NGO and UN partnerships.¹⁰⁵ Considering how best to leverage global capabilities to control costs and enhance effectiveness should be part of interagency discussions on how to improve international disaster response.

One major flaw in the OFDA response structure that became clear during the crisis was that the agency was prohibited from funding and working with U.S. elements (U.S. citizens, property, and other assets). Significant U.S. equities in Japan extended beyond Japan's borders, involving, for example, the potential for radiological contamination of the food supply and international shipping. OFDA did not have the authority to manage or fund those U.S. "domestic" elements (such as additional Customs and Border Protection activities related to screening shipping and imports from Japan) in the short or long term. If the goal is to protect U.S. citizens and if USAID's humanitarian assistance funding can pay only for foreign nationals, then this prohibition deserves additional consideration.¹⁰⁶

Conclusions Regarding Funding and Resource Management

The discussion from this section is summarized in Figure 11. The overlapping elements in the figure—the events, patterns, structures, and models—help highlight some basic interdependencies impacting disaster funding and resource management. These elements are described as follows:

Events: Large, complex disasters that exceed the existing international response capabilities of any single U.S. Government agency—for example,

¹⁰¹ Frances Veasey, Deputy Director of Banyan Analytics, an institute of Analytic Services Inc., "From Donor-Aid to Mutual-Aid: Changing the Landscape of International Disaster Assistance," Banyan Analytics Brief: Special Edition on Emergency Preparedness in the Asia-Pacific, October 30, 2013.

¹⁰² Leo Bosner, "Japan's Response to a Large-Scale Disaster: Can It Be Improved?" Risk Management Magazine, March 5, 2012, 8.

¹⁰³ Frances Veasey, Deputy Director of Banyan Analytics, an institute of Analytic Services Inc., "From Donor-Aid to Mutual-Aid: Changing the Landscape of International Disaster Assistance," Banyan Analytics Brief: Special Edition on Emergency Preparedness in the Asia-Pacific, October 30, 2013.

¹⁰⁴ For the quality of the response, it did not make sense to spend tens of millions of dollars to deploy mobile medical units from Health and Human Services when it would have cost only a few million to use NGO partners who possess extensive experience working overseas (Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013).

¹⁰⁵ Interview with Mark Bartolini, former Director of USAID, OFDA, by Eric Weiner, June 25, 2013.

¹⁰⁶ Ibid.

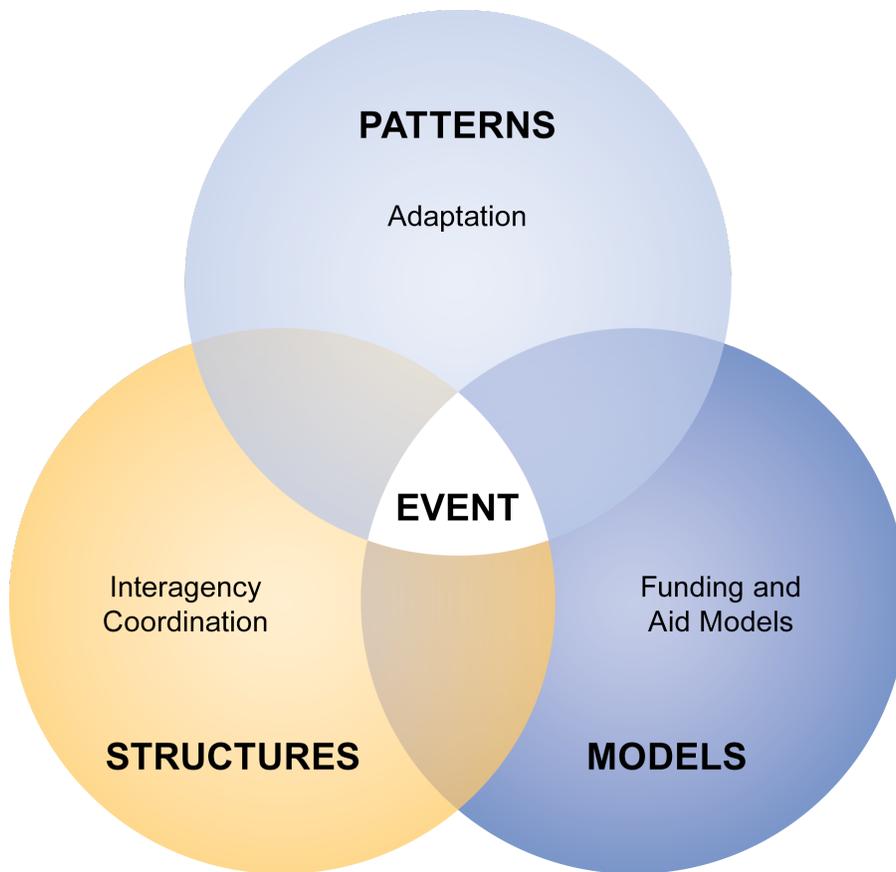


Figure 11: Summary of resources discussion.

the Japanese triple disaster or the 2010 Haitian earthquake.

Patterns: When the U.S. Government decides to respond, the responding agencies must use their existing disaster funding accounts within the rules governing their use. For example, gaps in how HA/DR and FCM funding accounts may be applied require stakeholders to adapt by devising workarounds to execute and fund the response. Because these accounts and rules were not designed for large-scale complex disasters, responding agencies must figure out and implement ways to execute and fund each disaster and response as it unfolds. While these adaptations frequently work, most stakeholders argue that there can and should be a more organized system for managing humanitarian aid and FCM money more equitably. It is sobering to consider what the limits on

the U.S. response in Japan might have been if Haiti hadn't occurred first and if funding had not remained unspent and available.

Structures: No clear mandate designates a lead agency with the resources, capabilities, roles, responsibilities, and authorities to fund, manage, and execute the response; account for response resources and overall costs; and accept and allocate reimbursements to responding entities. Interagency coordination through the NSS and other government entities is needed to create a unified interagency response for each event. Funding appears to be managed either ad hoc (with whatever resources each agency can deliver) and/or through individual agency requests to Congress for supplemental funding. For domestic disasters, the Stafford Act provides Federal natural disaster assistance for U.S. state and local

governments. This funding assurance (guaranteed reimbursement from Congress) is an important consideration in budget-constrained environments and helps encourage responding entities to contribute their mission-related capabilities without waiting to get the funding in advance, and it also provides a well-understood framework for coordinating the response. There is no similar mechanism to expedite international disaster response. It may be beneficial to allocate contingency funds and authorize an entity to disburse the funds for interagency foreign disaster response activities.

Models: The funding structures discussed above are based on a funding model that allocates operating funds to agencies more or less based on their expected annual needs and requires agencies to request supplemental funds when unexpected needs occur. This model adds risk and time to agencies' response planning and execution. The aid model also impacts international disaster response. Current U.S.

international disaster response is based on a donor-aid model where the responding country “gives” various types of aid and assistance to another country. This model was diplomatically and fiscally problematic in the U.S. interactions with Japan, a wealthy developed nation more accustomed to playing the donor role. The mutual-aid model—where nations help each other as needs and circumstances change—offers the possibility of more equitable exchanges of assistance over time. It requires cost accounting and reimbursement mechanisms that do not currently exist internationally or in the U.S.

Changing the models and structures underpinning international disaster response offers the possibility of changing the recent patterns of U.S. Government response to large complex disasters. It will likely be difficult to improve response coordination and effectiveness without addressing the underlying structures and models.

V. Findings and Areas for Further Research

Current coordination systems are inadequate to manage a full U.S. Government response to a complex foreign disaster.

Many levels of responders augmented or created new coordination bodies ad hoc because key relationships or mechanisms were missing. While they enabled a relatively successful response in this case, these adaptations may not necessarily be models for future responses or for a formal framework. Every foreign disaster will require some measure of ad hoc coordination to meet response needs, and the Hosono Process was a perfect example of such an effort. Even though the U.S.-Japan alliance was robust, there was still a need to develop a method for organizing communication channels. Among the adaptations:

- The need to absorb the large number of additional U.S. Government personnel required for this response within the U.S. Embassy in Tokyo proved very challenging. The embassy

did not have a construct that served to manage, organize, and/or integrate additional CBRN-qualified personnel and resources,

- The NSS efforts to coordinate U.S. capabilities and synchronize policies, plans, and procedures to address problems in Japan, while successful, disrupted ongoing NSS efforts elsewhere in the world as they out-competed the others for resources and personnel,
- The NSS coordinated successfully to monitor and mitigate potential impacts of the Fukushima nuclear disaster on the U.S. homeland,
- The severity of the disaster made it difficult for the Japanese government to measure threats and share information with its American counterparts, and systemic failures impeded the flow of information,
 - The creation of the Hosono Process ten days into the crisis improved communication, coordination, and information sharing between U.S. and Japanese government agencies,

- Preexisting relationships between the U.S. military and the JSDF provided much-needed communication and coordination, especially prior to the establishment of the Hosono Process, and
- DoD experienced some internal challenges with offering assistance due to chain-of-command issues among DoD, USPACOM, and USFJ.

The widespread use of coordination bodies highlights the need for effective, adaptable mechanisms that address the unique needs and attributes of the host nation. The ad hoc coordination mechanisms used in the Japan response highlight gaps a future response framework could address.

The U.S. Government lacks a comprehensive plan to address response to CBRN hazards abroad.

The risks, timelines, and technical difficulties associated with responding to the Fukushima meltdown demonstrated that even a wealthy, industrialized nation such as Japan can be overwhelmed by cascading failures of infrastructure resulting from a catastrophic natural disaster. If a large-scale disaster, especially one with a CBRN hazard, occurs in the near future, it is likely that U.S. response operations will encounter similar challenges. Specifically:

- No document exists to coordinate a comprehensive U.S. Government response to international disasters involving release of radioactive materials that is not the result of a terrorist attack,
- Application of U.S. nuclear assets was ad hoc and difficult in the absence of either experience or a government-wide plan for a non-terrorism related CBRN response,

- Competing nuclear safety and radiological detection standards hampered consensus building and risk assessment,
- Differences among the available risk models—particularly the assumptions used to build customized models for different nuclear applications—complicated decision making and drove differences in recommended exclusion (evacuation) zones,
- Interagency disagreements and competing priorities challenged response flow and coherence, and
- The U.S. Government struggled to manage radiation threat information coming in from U.S. agencies, the Government of Japan, and the media, making it difficult to determine the radiation hazard ground truth and determine what measures Americans in-country should take.

Responding to a nuclear event requires specialized knowledge, analysis tools, and detailed information describing the specific technical characteristics of the situation. Effective risk communications capabilities are essential. This disaster highlighted design and operational differences across the nuclear safety community. Specific knowledge and tools developed for one nuclear application did not readily transfer to another (for example, from military to industry applications in nuclear power generation plants). It also became clear that commercial nuclear power plant designs and safety standards may vary widely among countries, and these standards will influence the type and amount of radiological hazards during an accident, as well as decisions about how to contain and mitigate the effects of these hazards. Lack of agreement resulted in conflicts in exclusion zones and in planning, leadership, and decision making.

A more organized system for managing humanitarian aid and FCM money would improve foreign response and interagency cooperation.

The U.S. Government response to the disaster in Japan was hampered by a funding and reimbursement system that was inadequate in both scope and structure. Mechanisms are in place (including disaster declarations, the Stafford Act, and FEMA processes) to quickly release funding to support domestic disaster response, but corresponding mechanisms supporting international disaster response (primarily OFDA, DARTs, and DoD HA/DR capabilities and funding) are resourced at relatively low levels. The current informal response process requires individual agencies to request supplemental funding from Congress to pay for large disaster response operations. As a result, issues appeared repeatedly in the following areas:

Baseline funding is insufficient to respond to major disasters.

Funding issues arose because the U.S. Government allocates funding to agencies for their normal operations. These funding levels do not include sufficient resources to respond to major disasters. The process for adding supplemental funding to agency budgets is time-consuming and inhibits disaster response in the following ways:

- No single U.S. agency was funded to handle a disaster response the size of Japan's triple disaster; multiple agencies needed to pool their resources to execute the response,
- Many domestically focused agencies were not funded or authorized to operate outside the U.S.,
- Each U.S. Government agency accounted for its disaster expenditures individually. There was no single agency assigned to track the total cost of the disaster response and facilitate

reimbursement by the Japanese government. Existing rules governing reimbursements further complicated the process,

- The U.S. response was complicated by current rules governing how FCM, humanitarian affairs, and disaster response funds may be used and combined. For example, OFDA was prohibited from providing direct aid to U.S. citizens in the disaster area,
- Required funding processes and controls—particularly those used to request additional funding from Congress, used by Congress to allocate funding to different accounts, and used to control how agencies expend these funds—added significant complexity to the disaster response operations management, and
- A method for mobilizing resources for disasters or emergency contingencies is needed to enable the U.S. interagency to quickly respond to future events.

The radiological hazard required the use of FCM funding streams and authorities, which were not harmonized with humanitarian response funding and authorities.

The following complications emerged:

- As the lead Federal agency responsible for FCM response, DoS had the authority to coordinate the U.S. Government FCM response in Japan, but it did not possess adequate operational funds, nor did it possess authority to manage funding for all the U.S. Government agencies involved in the response. The lack of authority to both manage the response and assess its funding requirements made it more difficult for DoS to be effective in its lead agency role,
- DoD faced significant challenges using OHDACA to pay for some of its FCM activities in Japan; some FCM activities had a humanitarian focus, but DoD was prohibited from using OHDACA funds to pay for these activities, and

- There can and should be a more organized system for managing humanitarian aid and FCM money in a more equitable way.

The existence of separate funding streams and authorities will continue to complicate the designation of a lead agency and its authority in future CBRN disaster responses.

Political dynamics influenced funding and reimbursement decisions.

The relatively unprecedented response to a wealthy nation raised political concerns on both sides of the Pacific:

- Political sensitivities, political dynamics, and sovereignty concerns complicated disaster response resourcing and influenced how American and Japanese decision makers funded and reimbursed response efforts,
- The U.S. Government was unable to provide a consolidated bill to Japan because there were too many agencies and too many accounting systems, and
- Japanese reimbursement of the U.S. Government was further hampered by the lack of clear, existing reimbursement mechanisms.

The Government of Japan's decision to pay for the U.S. response addressed some of the uneasiness of providing assistance to a wealthy nation, but it highlighted the need for systems that track interagency funds and enable reimbursement.

The existing funding structures and models did not adequately meet the needs of the Japanese triple disaster response.

The existing structures and models fell short in three areas:

- The event raised larger issues associated with spending global humanitarian aid money reserved for chronically needy parts of the world to pay for countries capable of paying or reimbursing for their own needs,

- The donor-aid model has been problematic for developed and developing nations alike—shifting from a donor-aid to a mutual-aid model may help provide face-saving solutions to address matters of sovereignty and capacity, and
- The Japanese triple disaster highlighted the high cost of using U.S. Government assets to respond to a foreign disaster; using NGOs and UN partnerships during the response may lower the overall cost.

It may be possible to address the issues and deficiencies described above by addressing the inherent mismatch between the funding structures and models and their applicability to large-scale complex disasters.

Areas for Further Research

While it cannot generate a comprehensive list of recommendations, this single case study suggests that the following work could help improve U.S. Government foreign disaster response capabilities:

- Development of a framework that codifies policies, situations, concepts of operations, and responsibilities of the Federal departments and agencies governing U.S. response to complex, large-scale foreign disasters, including CBRN hazards, and
- Development of an adaptive coordination mechanism (such as the one needed during the first ten days of the disaster) deserves more attention to better understand when and where adaptive methods of communication and coordination will be needed in the future.

A mandate addressing funding for foreign disaster response could include the following:

- Empowering a lead entity with clear authority to both manage and assess disaster funding requirements and reimbursements,

- Developing a Stafford Act–like mechanism authorizing Congress to allocate funds to the above-mentioned authority, which should have the capacity to:
 - Quickly scale up to provide funding to support international disaster responses at a level appropriate for complex, large-scale disasters,
 - Fix the above-mentioned deficiencies in the International Disaster Assistance and OHDACA accounts,
 - Clarify funding for FCM and other CBRN-related cost contingencies, and
 - Identify, clarify, and provide reimbursement mechanisms for all relevant U.S. Government agencies,
- Leveraging and complementing global capabilities to control costs and enhance effectiveness, and
- Reexamining OFDA’s funding mandate prohibiting direct aid to U.S. citizens.

Banyan Analytics hopes that the results of this case study will inform interagency conversations about how to improve response planning, preparation, and coordination for complex international disasters.



Japan Tōhoku earthquake and tsunami
Taken by Douglas Sprott on March 24, 2011
Flickr Creative Commons <http://creativecommons.org/licenses/by-nc/2.0/legalcode>

Appendix A: Overview of Other Studies

This case study examines the interagency and international coordination of the U.S. Government response to the March 11, 2011, earthquake, tsunami, and nuclear disaster in Japan. This study is meant to complement existing analyses by assessing the U.S. Government response and assistance to the Government of Japan during the emergency phase of the disaster and identifying opportunities to improve the coordination of the U.S. response to future complex international disasters. A review of existing research reveals that the bulk of the analysis focuses on the Japanese response and lessons learned from the Fukushima Daiichi nuclear accident. Others studies have focused on specific subsets of the response, such as the U.S. HA/DR response or the Japan-U.S. alliance lessons learned.

Studies consulted for this case study fall into three categories: Japanese domestic investigations, individual U.S. Government stakeholder reports,

and NGO accounts. The Japanese government, the Diet (Japan's legislature), and an Independent Investigation Commission chartered by the Diet launched separate investigations into the Fukushima accident and produced public reports. The independent commission's final report¹⁰⁷ catalogues the errors and negligence that left the nuclear plant unprepared and examines deficiencies in the response to the Fukushima accident by TEPCO,¹⁰⁸ regulators, and the Japanese government. The Sasakawa Peace Foundation, a highly respected international NGO, published a report¹⁰⁹ authored by five Japanese security and nuclear experts assessing the Japan-U.S. response to the Fukushima nuclear crisis. The report seeks to enhance the nuclear crisis management capabilities of the Japan-U.S. alliance while offering proposals that enhance the larger crisis management system in the Asia-Pacific. The Rebuild Japan

¹⁰⁷ The National Diet of Japan, *The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission*, Executive Summary, English translation (2012). http://www.nirs.org/fukushima/naic_report.pdf.

¹⁰⁸ TEPCO was the electric utility servicing Fukushima Daiichi.

¹⁰⁹ The Fukushima Nuclear Accident and Crisis Management: Lessons for Japan-U.S. Alliance Cooperation.

Initiative Foundation¹¹⁰ established an independent investigation panel which found that the Japanese government, TEPCO, and other relevant actors were thoroughly unprepared for the nuclear disaster and that the tsunami could and should have been anticipated.

In addition to the Japanese reports, there has been a study commissioned by DoD examining the U.S. military response, and there is a brief case study by an NGO called Peace Winds America, which analyzes the HA/DR elements of the response.

¹¹⁰ Rebuild Japan Initiative Foundation, "About Us." <http://rebuildjpn.org/en/about-us/>.

Appendix B: Abbreviations

CBIRF	Chemical Biological Incident Response Force	NGO	non-governmental organization
CBRN	chemical, biological, radiological, or nuclear	NRC	Nuclear Regulatory Commission
CBRNE	chemical, biological, radiological, nuclear, or high explosive	NRF	National Response Framework
DART	Disaster Assistance Response Team	NSS	National Security Staff
DoD	Department of Defense	OFDA	Office of U.S. Foreign Disaster Assistance
DOE	Department of Energy	OHDACA	Overseas Humanitarian Disaster Assistance and Civic Account
DoS	Department of State	RCMT	Radiological Consequence Management Team
FCM	foreign consequence management	TEPCO	Tokyo Electric Power Company
FEMA	Federal Emergency Management Agency	USAID	U.S. Agency for International Development
HA/DR	humanitarian assistance and disaster relief	USFJ	U.S. Forces, Japan
IAEA	International Atomic Energy Agency	USG	U.S. Government
JTF-CS	Joint Task Force Civil Support	USPACOM	U.S. Pacific Command
JSDF	Japan Self Defense Force		



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