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Lessons from Japan: Resilience after Tokyo and Fukushima

Author Biography

Michelle Spencer, President, MLSK Associates LLC, has worked on national security issues for more than seventeen years. In 2007-8, she was the primary author for a year-long study that resulted in U.S. Air Force Counterproliferation Center's Future Warfare Series Monograph #52, *Public Resilience in CBRNE Events: Lessons Learned from Seven Cases* (<http://cpc.au.af.mil/PDF/monograph/52publicres.pdf>). Her latest work on resilience is "Resilience to WMD: Communication and Active Participation Are Key," in the *Handbook of Emergency Response: Human Factors and Systems Engineering Approach*, Taylor and Francis, forthcoming in August 2013.

Abstract

In the spring of 1995 Japan experienced the world's first major terrorist attack using chemical weapons by a little-known religious cult called Aum Shinrikyo. The attack on the Tokyo subway, which killed 13 people, was the first lethal case of a non-state actor using a chemical agent against a civilian population. In March 2011, following a 9.0 magnitude earthquake in Japan, the Fukushima Daiichi nuclear reactor experienced a full meltdown releasing radiation into the surrounding area. The seemingly unhurried government reaction provided conflicting information to Japanese citizens, slowing evacuation and protective actions. Government failure is cited as a significant factor in the severity of the nuclear disaster in three investigations conducted after the incident. This article defines resilience and raises the question of whether the U.S. government has the ability to address the issues raised by the two case studies. There are four primary lessons of these two case studies from Japan: Trust is essential; two-way communications are vital; someone or something will always unexpectedly fail to act appropriately, while others will provide surprising support and; finally, recovery is long-term.

Introduction

In the spring of 1995 Japan experienced the world's first major terrorist attack using chemical weapons. Aum Shinrikyo, a little known religious cult, killed 13 people in a sarin attack on the Tokyo subway system. Japanese citizens were as unprepared for a terrorist attack then as those in the United States were from a two Chechen brothers who set off conventional bombs at the Boston Marathon in April 2013. While no country will ever be ultimately prepared for the “unknown,” the recent events in Boston calls into question the resilience of the American population to a catastrophic incident whether natural or man-made. Does the fact that Bostonians quickly returned to their regular routine following the capture of the terrorists mean that they are resilient? The events in Boston held the attention of the American public for those few fateful days, but then faded as other news stories took precedence in our fast-paced world. Our lives today are seemingly filled minute- by-minute with information in a 24-hour news cycle and the ability to text, Facebook, and Twitter the minute details of our lives. However, when citizens' daily lives are examined months or years after a catastrophic event, the question remains, “are they more prepared to manage future crises?” Do we know what we need— not expect – but need from our government to be resilient?

This article will explore what is meant by resilience and examine the 1995 Aum Shinrikyo attacks and the 2011 “triple disaster” earthquake, tsunami, and nuclear meltdown in Japan to determine what lessons the United States and other governments can glean from these events. They are representative of catastrophic incidents that can occur anywhere in the world and that all communities, regardless of location, must be prepared to address.

The Role of Information

One of the most significant issues throughout the lifecycle of a cataclysmic event is communication and information exchange between public and government. How, what, and by whom information is relayed to the public will shape the perception and reaction to an event. More than two years after the events of March 2011 the magnitude of the disaster is still unfolding as Japanese citizens struggle to deal with the consequences and aftermath of immense destruction and the ongoing threat of radiation. At least three studies have determined that the Japanese government and the Tokyo Electric Power Company (TEPCO) failed to lead the country through the crisis as expected or desired. The consequences of these actions have changed Japan as no other event since World War Two.¹ In many ways, the events of 2011 represent to an American audience Japan's Watergate, Hurricane Katrina, and 2008 financial crisis suffered simultaneously. For many Japanese citizens their faith in governmental leadership and accountability were severely tested, while the primary source of their energy was deemed no longer viable. The cost of rebuilding coupled with the decision to dramatically lessen reliance on nuclear energy has threatened the economic stability of Japan.

¹ Following the events of March 2011, three investigations have been undertaken by the executive branch, available at: <http://www.nirs.org/fukushima/SaishyuRecommendation.pdf>; the legislative branch - the National Diet (available at: <http://warp.da.ndl.go.jp/info:ndljp/pid/3856371/naic.go.jp/en/>; and finally the only independent study by the Rebuilding Japan Initiative Foundation, *Independent Investigation Commission on the Fukushima Nuclear Accident*, available at: <http://rebuildjpn.org/en/fukushima/>. All were critical of TEPCO and government actions during and following the crisis.

In order to improve the resilience of the population, the U.S. Government must integrate lessons learned not only from its own experiences with catastrophic events but also with those occurring in other countries with appropriate modification. The Aum Shinrikyo attack was the first lethal case of a non-state actor using a chemical agent against a civilian population.² Resilience as it is understood today was a virtually unknown concept prior to this attack and yet this case illuminates what should and should not be done to prepare, inform, and respond to deliberate man-made disasters designed to kill, but most importantly, to cause fear, terror, and panic among civilians.

Defining Resilience

It is important first to understand what “resilience” actually means. One of the challenges regarding the term lies in the difficulty of defining it, or coming to a common understanding of its relevance to society. As one recent report commissioned by the U.S. Government stated,

“Although resilience with respect to hazards and disasters has been part of the research literature for decades...the term first gained currency among national governments in 2005 with the adoption of The Hyogo Framework for Action by the United Nations to ensure that reducing risks to disasters and building resilience to disasters became priorities for governments and local communities...”³

The U.S. Government defined resilience in the 2011 Presidential Policy Directive 8 as “the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.” Alternatively, the Community and Regional Resilience Initiative (CARRI) at the Oak Ridge National Laboratory defined resilience in terms of a community’s “capability to prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to public safety and health, the economy, and national security.”⁴ The CARRI after action report on Hurricane Katrina further clarified the concept by adding that:

“enhancing a community’s resilience is to improve its capacity to *anticipate* significant multi-hazard threats, to *reduce* overall the community’s vulnerability to hazard events, and to *respond* to and *recover* from significant hazard events when they occur.”⁵

In addition to the difficulty of defining resilience, determining the level of resilience present in a community is equally challenging. Most communities are capable of “bouncing back” after a

² There was a preceding biological attack in the United States, but no deaths resulted. In 1984, followers of the Indian guru Bhagwan Shree Rajneesh spiked salad bars with salmonella at 10 restaurants in a small Oregon town and sickened about 750 people. The cult members had hoped to incapacitate so many voters their own candidates in the county elections would win. The scheme failed, but the episode spread fear and drained the town’s economy. See Gillian Flaccus, “Oregon Town Never Recovered From Scare,” *Associated Press*, October 19, 2001, available at: <http://www.rickross.com/reference/rajneesh/rajneesh8.html>.

³ National Research Council. *Disaster Resilience: A National Imperative* (Washington, D.C.: The National Academies Press, 2012), 28.

⁴ Wilbanks, Thomas J. The Research Component of the Community and Regional Resilience Initiative (CARRI). Presentation at the National Hazards Center, University of Colorado-Boulder. November 1, 2007.

⁵ Community and Regional Resilience Initiative (CARRI), *Community Resilience: Lessons from New Orleans and Hurricane Katrina*, CARRI Research Report 3, September 2008, available at: http://www.resilientus.org/library/FINAL_COLTEN_9-25-08_1223482263.pdf.

major disaster, such as the multitude of tornadoes and floods in the plains and southern states or hurricanes suffered throughout the coastal United States. Does this make them resilient? In the immediate aftermath of a disaster, help is often readily available. But, given the economic challenges of the modern era, is it possible to assist local communities in being better equipped to help themselves before and after a catastrophic event? We may more accurately define resilience not as the ability to “bounce back,” but rather as the ability to “bounce forward”⁶ — integrating the four elements of *anticipation* of threats, *reduction* of vulnerability, and *responding* and *recovering* from disastrous events.

Both physical and psychological preparation are required to make populations—individually and collectively—more resilient. Therefore, resilience must be assessed at the individual and community level, with a consideration of the influences of national, state, and local actions. This begs the question: More than 10 years after 9/11, and seven since Hurricane Katrina, are we really any better prepared for a catastrophic event? Many experts agree that the question of a weapon of mass destruction (WMD) event in the United States is not whether, but when one will occur, yet it is questionable whether we have prepared our population for just such an eventuality. How then can the public be prepared for and build resilience to a threat they do not know exists? As we explore the Japanese cases the role of citizen preparedness and their expectations and understanding of government actions are paramount to building and maintaining resilience.

Tokyo Subway Attacks

At 8:00 AM on March 20, 1995, during the busiest time of the Monday morning rush hour, sarin was released on the Tokyo subway. The nerve agent was carried into the metro in plastic bags wrapped in newspaper by five teams working in coordination. The teams placed their deadly packages on separate subway lines that converged at Kasumigaseki station, where the police headquarters, the seat of the Japanese government, and the largest fish market in the city are located. At the appointed time the individuals boarded their respective trains, set packages on the floor and punctured the bundles with sharpened umbrella tips, releasing sarin onto the subway floor. The nerve agent sarin is most lethal when dispersed through the air, but the less efficient method was chosen at the last minute due to a lack of preparation time. Investigators believe that the goal of the attack was to divert police attention from cult activities and prevent a scheduled police raid. The timing was chosen to maximize police casualties during the early morning shift change at police headquarters.

When formulated properly, sarin is extremely potent, and even low concentrations can be fatal. However, in this instance Aum rushed the manufacturing process in order to conduct the attack sooner than originally planned to thwart imminent police action. Their chosen delivery method, lack of purity of the agent, and the decision of some Aum operatives not to go through with the attack likely saved thousands of lives. Had the cult been able to take more time to prepare the sarin, it likely would have been far more potent. Chemical experts cite those reasons for the fact

⁶ For more research on the “bounce forward” concept, see Manyena, S.B., O’Brien, G., O’Keefe, P. & Rose, J. “Disaster Resilience; a Bounce Back or a Bounce Forward Ability?” *Local Environment*, Vol. 16, No. 5, pp. 417-424 and Douglas Paton, “Disaster Resilience: Building Capacity to Co-Exist with Natural Hazards and Their Consequences,” in Douglas Paton & David Moore Johnson, (eds.), *Disaster Resilience: An Integrated Approach*, Charles C. Thomas Publishers Ltd. Springfield, 2006.

there were only 13 deaths and 50 serious injuries from such a lethal weapon, in a confined space, which had the potential to do far greater harm.

In less than one hour after the attack, over 500 people sought care at St. Luke's Hospital, which is within walking distance of the Kasumigaseki subway station. As victims arrived at St. Luke's and other local hospitals, doctors tried to assess the symptoms and arrive at a diagnosis. At 9:30 AM, a physician who had treated victims of a previous Aum attack recognized the symptoms while watching the television coverage. The doctor called St. Luke's to suggest that sarin nerve agent may have been used in the attack. This was the first indication medical professionals had received of a chemical attack – and, more specifically, that sarin was the agent used. Japanese public health officials were unable to confirm that sarin was the agent for more than three hours. Given the uncertainty of diagnosis and the lack of medical experience in treating sarin casualties, it is not surprising that over 100 staff members of St. Luke's, as well as the majority of emergency personnel who transported the injured, reported symptoms of exposure.⁷ There was no mechanism for the government to communicate with doctors or hospitals, or for an expert within the medical community to reach out en masse. The novelty of the weapon played a significant role in the ability of Japan's first responders to react appropriately.

“A terrorist attack with chemical agents was so novel that the specialists that rescuers and hospitals needed to consult right away were not hooked into Japan's emergency response system. The lesson that Tokyo officials and physicians took away from this experience was the importance of pre-planning and the need to identify and link beforehand the range of experts that certain situations might demand.”⁸

One of the primary issues raised by the Aum attacks was the reality that terrorist groups could obtain WMD through both legal and illegal means. Aum Shinrikyo made many mistakes in the creation and formation of its weapon. Had the purity been higher and the delivery method more sophisticated, hundreds, if not thousands, could have died. With the Internet age comes much more accessible and detailed information about chemical and biological weapons. The medium also provides numerous avenues for communication among those with information and those seeking it.⁹ Addressing these issues requires different approaches to government-led planning and prevention programs, including understanding that today a government is more likely to face a biological or chemical threat that is significantly more virulent or capable than in the past. The “unthinkable” has become “doable.”¹⁰

⁷ Amy Smithson, “Rethinking the Lessons of Tokyo,” *Ataxia: The Chemical and Biological Terrorism Threat and the U.S. Response*, Henry L. Stimson Center, October 2000: 106, available at: <http://www.stimson.org/books-reports/ataxia-the-chemical-and-biological-terrorism-threat-and-the-us-response/>.

⁸ *Ibid.*, 109.

⁹ Smithson pointed out in the previously cited Stimson study that terrorist groups also may have learned two important lessons from Aum. First, Aum was flush with millions in cash and highly-qualified scientists, yet the group was incapable of large scale mass murder as they had intended. Secondly, following the attack, Aum was effectively shut down, negating the goals of the cult. *Ibid.*, 103-108.

¹⁰ The bipartisan Congressional Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism (WMD Commission) determined in December 2008 that WMD terrorism is a continuing and serious threat. The Commission further concluded that it is more likely that terrorists would obtain and use a biological rather than a nuclear weapon. In October 2011, the Bipartisan WMD Terrorism Research Center released a report card on America's bio-response capabilities stating that it was likely terrorists would conduct a biological attack before the end of 2013. See the report available at: <http://www.wmdcenter.org/>.

Public health officials and emergency planners must provide accurate information to the population, allowing those who are able to make better decisions about what types of symptoms require emergency care. There have been so few WMD-related events that most medical personnel would have no experience identifying and properly treating symptoms. This was precisely the case in the Washington, DC, area during the 2001 Anthrax attacks.¹¹ The novelty of a WMD attack could overwhelm any modern medical system and the capability to quickly and accurately inform the public of proper precautions or responses should an incident occur are essential to effective remediation.

The Triple Disaster

On March 11, 2011, an 8.9 magnitude earthquake occurred near the east coast of Honshu, Japan, causing a devastating tsunami that killed approximately 19,000 people. Within twenty minutes of the first tremors thirteen-meter-high waves crashed into the TEPCO Fukushima Daiichi nuclear facility north of Tokyo, knocking the plant off the power grid and leaving it without the essential cooling system.¹² TEPCO officials were unprepared for the disaster and thus, dallied over decisions, considered total evacuation of plant employees¹³ and had no contingency plan for dealing with the lack of power because they chose to believe it would never happen.¹⁴

TEPCO plant managers disagreed with their corporate leadership about the best methods for containing the crisis and both groups were on the phone with Japanese Prime Minister Naoto Kan. During the early hours of the crisis, numerous sources of authority released conflicting information about the severity of the crisis at the Daiichi plant, disintegrating trust between the responsible parties and eventually with the public. The Japanese government representatives' primary concern was to prevent panic, but even Mr. Kan has admitted that many—including himself—were concerned about their own political futures.¹⁵

¹¹ At least two of the Brentwood postal facility employees initially were diagnosed with influenza. Both later died from anthrax exposure. See Eric Lichtblau and Robert A. Rosenblatt, "2 D.C. Postal Workers Die; Anthrax Likely," *LA Times*, October 23, 2001, available at: <http://articles.latimes.com/2001/oct/23/news/mn-60483>; and Neely Tucker, "Emergency Rooms Overrun By the 'Worried but Well'," *The Washington Post*, November 1, 2001, B01.

¹² Backup generators flooded robbing the plant of any power, however, even with a cooling capability; there would have been no method for dissipating the heat. James Acton and Mark Hibbs, *Why Fukushima Was Preventable*, (Washington, DC: Carnegie Endowment for International Peace, March 2012), 5 available at: <http://www.carnegieendowment.org/files/fukushima.pdf>.

Eventually TEPCO unsuccessfully tried to use seawater to cool the fuel rods, but it was too little too late. For a detailed timeline of events see: International Atomic Energy Agency (IAEA) website, available at: <http://www.iaea.org/newscenter/news/2011/fukushima110311.html>.

¹³ According to nuclear experts, while TEPCO officials made numerous poor decisions, TEPCO employees at the plant were trying to mediate the circumstances. Their efforts were vital to contain what could have been a broader disaster. See the Rebuilding Japan Initiative Foundation, *Independent Investigation Commission on the Fukushima Nuclear Accident*, February 28, 2012, available at: <http://rebuildjpn.org/en/fukushima/>. The full report is not available in English, but numerous articles have been published on its findings. See Martin Fackler, "Japan Weighed Evacuating Tokyo in Nuclear Crisis," *The New York Times*, February 27, 2012, available at <http://www.nytimes.com/2012/02/28/world/asia/japan-considered-tokyo-evacuation-during-the-nuclear-crisis-report-says.html>.

¹⁴ James Acton, and Mark Hibbs, *op cit*, p. 30.

¹⁵ Kyung Lah, "Former Japanese leader: 'I Felt Fear' during Nuclear Crisis," CNN.com, May 28, 2012, available at: <http://www.cnn.com/2012/05/28/world/asia/japan-nuclear>.

Trust of authority and group decision-making are hallmarks of Japanese culture.¹⁶ The Japanese Government made numerous fateful decisions about nuclear energy under the guise of protecting the population from unnecessary concern and promoting the concept of safe nuclear energy. According to the Rebuild Japan Initiative Foundation, which conducted the only outside investigation called the Independent Investigation Commission on the Fukushima Daiichi Nuclear Accident:

“We Japanese have long prided ourselves on being a society that provides safety and security; this has been our trademark overseas and it has enjoyed broad popular appeal at home. But it also has given rise to a pacifistic-to-the-point-of-avoidance approach to national security. That same reluctance has been matched by our aversion to facing the potential threat of nuclear emergencies. Our officials and politicians have long emphasized safety in small doses, and in the process may have inadvertently sacrificed the security of the nation at large. Any drills for a nuclear emergency were meticulously designed to avoid giving any impression that an accident could possibly progress to the severity of a meltdown, and municipalities were discouraged from taking action to anticipate the compounded risks that would be involved in the event of an earthquake, for example.”¹⁷

This cultural proclivity to protect citizens from vital safety information went beyond policy; it also affected research and development of assets that could have had a direct impact on the nuclear crisis. Robots capable of acting in volatile nuclear environments were built in Japan following the 1999 nuclear accident at Tokaimura, but research funds were cut and prototypes placed in museums after government authorities became concerned that the public might stop supporting nuclear power if they knew there were accident scenarios requiring the robots to operate where it was unsafe for humans.¹⁸

The aftermath of the Triple Disaster goes beyond the massive destruction of property, economic downturn, and radiological contamination. As a report on the Brookings Institution emphasizes “The economic, political and social consequences of the Triple Disaster have changed Japan in fundamental ways.”¹⁹ There are political ramifications such as the change of government that have already occurred, fallout from the three investigations following the incidents as well as complex policy questions that have yet to be answered. These include the specific issues surrounding the long-term management and shutdown of the Daiichi plant, the resolution of status of Japan’s other nuclear facilities, of which the country is deeply reliant for energy, and the status of localities affected by radiation. Many of these issues are deeply rooted in tradition and the culture of Japan.

¹⁶ Seiji Takeshita, “What Japanese Leaders Can Learn from the Fukushima Nuclear Crisis,” *CNN.com*, July 6, 2012, available at: <http://www.cnn.com/2012/07/06/opinion/takeshita-fukushima-management/index.html?iref=allsearch>.

¹⁷ Yoichi Funabashi, “The End of Japanese Illusions,” *New York Times*, March 11, 2012, available at: <http://www.nytimes.com/2012/03/12/opinion/the-end-of-japanese-illusions.html>.

¹⁸ Mari Saito, Kiyoshi Takenaka and James Topham, “Insight: Japan’s “Long War” to Shut Down Fukushima,” *Reuters.com*, March 8, 2013, available at: <http://www.reuters.com/article/2013/03/08/us-japan-fukushima-idUSBRE92417Y20130308>.

¹⁹ Peter Ennis, “Recovering Nation: Battered Japan Searches for Bearings,” *The Brookings Institution*, April 2011, available at: <http://www.brookings.edu/research/opinions/2011/04/12-japan-ennis>.

The Lessons of Japan

While it is easy point the finger of blame from the long list of failures, it is worth noting what went well during both crises. Most notably, Japanese citizens heeded warnings and did as they were directed. This may sound simplistic, but it is important to understand cultural differences in societies, whether in Japan, New Orleans or the northeastern United States. Americans, as a whole, are much less likely to heed government warnings based on a culture of self-reliance. Additionally, personal experience or bias combined with lack uniformity in modern warning systems play a significant role. Finally, some populations have inherent lack of trust of government, further complicating both preparation for and response to government edicts during a catastrophic event.²⁰

In Japan, the earthquake and tsunami warning systems are among the best in the world and likely saved lives even though they dramatically underestimated the size and magnitude of the 2011 earthquake and ensuing waves. The civilian training that accompanied the systems was followed by most of the population. Citizens were prepared and acted quickly upon receiving notice of the quake. When the dead were examined many were wearing numerous layers of clothing as is recommended when heading for higher elevations. They also had their emergency packs strapped to their bodies containing food and other essentials. Unfortunately, those who perished were unable to reach heights and distances far enough away from shore to provide them safety.

Many Americans are used to hearing storm sirens, but not necessarily heeding the warning. Storm forecasting has improved dramatically through technological advances but warning systems have not improved at the same rate. Tornado sirens often sound regardless of the precise location of the storm or whether it is imminent. Thus, a screaming siren might mean that a tornado is heading to your locale and you should take immediate cover, or that a storm with the possibility of a tornado is heading your way or that either of these two options is in your county, but possibly not posing a direct threat to you.

The American public and therefore, their government representatives, have not prioritized funding for systems necessary for resilience. From gulf shore levees to storm warning systems, many efforts have taken a backseat to “immediate” priorities for decades. A prime example is the state-of-the-art earthquake warning system in Japan was designed by scientists in California, but has yet to be instituted in the United States.²¹

Instilling Resilience

According to a report by the Brookings Institution, 2011 was the most expensive year in terms of disaster losses in history. The earthquake and tsunami in Japan represented \$210 billion of the

²⁰ Hurricane Katrina is a primary example. See Michelle Spencer, Michael Kindt and Megan Stans, *Public Resilience in CBRN Events: Lessons Learned from Seven Cases*, (Maxwell AFB, AL: USAF Counterproliferation Center, May 2011), 53-54, available at: <http://cpc.au.af.mil/PDF/monograph/52publicres.pdf>; and K.M. Cordasco, D.P. Eisenman, D.C. Glik, J.F. Golden, and S.M. Asch, “They Blew the Levee: Distrust of Authorities among Hurricane Katrina Evacuees,” *Journal of Health Care for the Poor and Underserved* 18 (2007): 277-282.

²¹ Adam Nagourney, “Progress Stalls in California on Earthquake Warnings,” *New York Times*, March 21, 2013, A16.

\$380 billion total cost globally.²² The report states that 2011 represented a 72 percent increase from 2005, the second costliest year in history for disaster-related losses. However, “in terms of both the number of disasters and the number of people affected by them, 2011 was a below-average year in comparison with the previous decade.”²³ In the United States we are constantly faced with catastrophic events that affect all areas of the country. From California and Colorado wildfires, Gulf oil spills, floods and tornados in the Midwest and Southeast to winter storms and hurricanes (or super storms) on the East Coast, natural disasters threaten every community. On top of the hazards generated by Mother Nature, we are reminded by the bombings at the Boston Marathon that we also must consider the threat of terrorism and man-made crises in our daily lives.

One of the five core missions of the Department of Homeland Security (DHS) is to ensure resilience against terrorist attacks and natural disasters.²⁴ The question remains how can the U.S. or any government provide its citizenry what it needs to be resilient? In the era of shrinking budgets improving resilience is a necessity and there are distinct lessons to be learned from the Japanese cases. While certain aspects of societies differ, citizens will look to their government to provide clear directions before and following a catastrophic event – especially if this event involves threats previously unknown to them. The Fukushima nuclear disaster scenario had not been considered a real possibility by Japanese leaders, even though scientists and experts from the international nuclear community had outlined numerous actions required to prevent meltdown in the event of loss of power. But the gravest issue surrounding the Fukushima was the cultural aversion to sharing the associated risks with the population and encouraging them to prepare for the possibility of danger, regardless of its likelihood. This aversion may be rooted in culture in Japan, whereas it is more likely to be rooted in political decisions in the United States. Politicians and government leaders are increasingly more likely to avoid policy decisions that are costly or highlight a threat to the United States.

Conclusion

In summary, resilience is best defined as the ability to bounce forward by integrating the four elements of anticipation of threats, reduction of vulnerability, and responding and recovering from disastrous events. With this definition in mind, there are four primary lessons learned from the events in Japan.

1. **Trust is essential.** Often leaders are unwilling to admit they do not have all the answers, but providing incorrect information solely for the purpose of not having to say “I don’t know” does more harm than good. Government entities need to have clear lines of

²² Elizabeth Ferris, and Daniel Petz, “The Year that Shook the Rich: A Review of Natural Disasters of 2011,” *The Brookings Institution & London School of Economics Project on Internal Displacement*, March 2012, available at: http://www.brookings.edu/~media/research/files/reports/2012/3/natural%20disaster%20review%20ferris/03_natural_disaster_review_ferris.pdf.

²³ Ibid.

²⁴ The mission statement originated in the Quadrennial Homeland Security Review and is outlined on the DHS website, available at: <http://www.dhs.gov/mission> and <http://www.dhs.gov/quadrennial-homeland-security-review-qhsr>.

communication between each other and the public. Transparency is vital, but having a singular message is paramount to maintaining trust.

2. **Two way communications are vital.** In the age of Internet, Facebook, and Twitter, expectations of communication and feedback are high. A 2010 American Red Cross survey found that sixty nine percent of respondents felt that emergency responders “should be monitoring social media sites in order to quickly send help—and nearly half believe a response agency is probably already responding to any urgent request they might see.”²⁵
3. **Something or someone will always fail and some will always respond better than expected.** Resilience requires expecting the unexpected and thinking the unthinkable. Catastrophic events beyond the public’s wildest dreams will occur and the government (at all levels) must help to prepare the population. Communities (even virtual ones) are often the source of stability and support, but early involvement in planning and information sharing will lessen the stress of the crisis as it unfolds.
4. **Recovery is long-term.** While it is apparent that the cleanup from Fukushima will require decades of rebuilding and cleanup, the psychological effects are harder to measure, but important to recognize. Post-traumatic stress and depressions in Japan is widespread, as are other stress-related illnesses. Addressing the mental well-being of the population over time will be as essential to recovery as rebuilding structures. Additionally, witnesses and victims must understand that investigating, catching and trying the perpetrators of a malicious act can take decades. Three of the Aum Shinrikyo suspects were actively sought for more than 15 years. In December 2011, one surrendered, which lead to the apprehension of the final two individuals in June 2012.²⁶

Many communities and governments choose not to plan for “worst case” scenarios to avoid costs and unnecessarily raising fear or concern among the population. However, the lack of planning is often what causes the most dollars, time and lives lost in the aftermath of a catastrophic event. Each community should consider plausible scenarios and mold their response plans to the threat, but also allow flexibility for the “unknowns” such a fertilizer or chemical plant explosion or malicious act against a local enterprise.

Transparency is key to preventing public anxiety, fear, panic, or frustration. Given the novelty of a WMD incident, citizens need basic protective information. Information allows people to make their own decisions about their health. Even if citizens chose not to make the “right”

²⁵ American Red Cross, “Press Release: More Americans Using Social Media and Technology in Emergencies: New American Red Cross Survey Finds High Expectations on Response Organizations,” available at: http://new.paho.org/hq/index.php?option=com_content&view=article&id=5829%3Ared-cross%3A-more-americans-using-social-media-and-technology-in-emergencies&catid=3977%3Aroc-news%2Fnoticias&Itemid=4169&lang=en.

²⁶ “Aum Shinrikyo cult fugitive surrenders to Japan police,” *BBC News*, January 1, 2012, available at: <http://www.bbc.co.uk/news/world-asia-16377178?print=true>; and Adam Westlake, Additional Details Emerge about Aum Cult Member Kikuchi’s 17 Years on the Run,” *Japan Daily Press*, June 5, 2012, available at: <http://japandailynews.com/additional-details-emerge-about-aum-cult-member-kikuchis-17-years-on-the-run-053368>.

choice, the ability to make their own decision lessens the stress of a situation and thereby providing some element of mastery during a crisis. Mastery is a proven pillar of individual psychological resilience.²⁷

Advance preparation for disasters including education, training, and realistic exercises, can promote confidence in the public that they can cope with unknowns. During a crisis, clear, consistent information from a trusted, reliable source is enormously helpful. The Japanese cases highlight the challenges for governments attempting to encourage resilience, but they confirm that a prepared, informed and engaged public is a resilient one.

²⁷ Sir Michael Rutter formed one of the most commonly used definitions of resilience as facing, "...stress at a time and in a way that allows self-confidence and social competence to increase through mastery and appropriate responsibility," in "Family and School Influences on Cognitive Development," *Journal of Child Psychology and Psychiatry* 26 (1985): 683-704. Additionally, "self-efficacy is related to mastery, which is the ability to take control of the situation one is placed in, break a large problem down into smaller, more manageable pieces and begin with those small steps to work to resolve the problem. Hope that a bad situation can improve (optimism), the belief that one can work to improve it (self-efficacy), and the knowledge and experience of getting results when one takes initial steps toward recovery (mastery) combine to improve resiliency. Individuals are on their way to coping effectively with a traumatic event when they can achieve at least some level of optimism, self-efficacy and mastery," in Michelle Spencer, *op cit.*