Homeland Security Institute

Financing Recovery From Catastrophic Events

Final Report

30 March 2007

2900 South Quincy Street • Suite 800 • Arlington, VA 22206-2233

HOMELAND SECURITY INSTITUTE

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HSI's mission is to assist the Secretary of Homeland Security, the Under Secretary for Science and Technology, and the Department of Homeland Security (DHS) operating elements in addressing national policy and security issues where scientific, technical, and analytical expertise is required. HSI also consults with other government agencies, nongovernmental organizations, institutions of higher education, and nonprofit organizations.

HSI delivers independent and objective analyses and advice to support policy development, decision making, alternative approaches, and new ideas on significance issues.

HSI's research is undertaken by mutual consent with DHS and is organized by Tasks in the annual HSI Research Plan. This report presents the results of research and analysis conducted under

Task 06-42

Financing Recovery from Catastrophic Events

of HSI's Fiscal Year 2006 Research Plan.

The views expressed in this report represent a consensus among the authors; they do not necessarily reflect official DHS opinion or policy.

Homeland Security Institute

Elizabeth Witham
Task lead

Steve Bowen

Richard Kohout
Division Manager

Sarah Maloney
Acting Deputy Director, Operations

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For information about this publication or other HSI research, contact
Homeland Security Institute
Analytic Services Incorporated
2900 S. Quincy Street
Arlington, VA 22206
Tel (703) 416-3550 • Fax (703) 416-3530
www.homelandsecurity.org

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EXECUTIVE SUMMARY

Background

Federal disaster expenditures have increased in recent decades, as evidenced by the huge costs of Hurricanes Andrew and Katrina and the terrorist attacks of 9/11. This is due, in part, to a combination of increasing government intervention and increasing property values in at-risk areas. The Federal Government needs to establish a comprehensive strategy for financing recovery from mega-catastrophes, financing that is critical to stabilize the economy, physically reconstruct damaged areas, reduce vulnerabilities to future events, and encourage continued faith in the government. The Department of Homeland Security should be particularly interested in the recovery options that increase critical infrastructure resilience, emphasize mitigation strategies, and encourage private sector–government partnerships.

Objective

The Homeland Security Institute (HSI) performed this analysis to create a reference document for the Department of Homeland Security on financing recovery from mega-catastrophes from a government perspective. HSI described the history, issues, and options associated with government intervention in disaster financing. We examined the use of all four sources of compensation (government, insurance, charity, and litigation) in both historical and recent experiences in the United States, including the September 11, 2001 attacks and Hurricane Katrina. HSI also examined the ways in which various countries handle destruction (or anticipated destruction) from war or natural disasters. Our objective was to document how losses are compensated and what methods were effective in stabilizing the local economy and initiating recovery throughout recent history. Based on our research, we gave general recommendations for improving the financing recovery process and for further research in gauging the effectiveness of recovery financing programs.

Findings and Recommendations

Our analysis indicates that disaster financing has evolved over the past hundred years, from the huge role of self-financing and lack of Federal financing following the Chicago Fire in 1871, the 1906 San Francisco Earthquake, and the Great Mississippi Flood of 1927, to the hundred-billion-dollar Federal expenditures for 9/11 and Katrina. Between 1927 and 2005, Federal financial involvement leaped from approximately 0% to 60% (56% for 9/11 and 67% for Katrina and Rita). This is due, in part, to a combination of increasing government intervention and legislation and the increasing concentration of wealth at risk.

Not only have Federal expenditures increased over the years, but they also have become easier to obtain. The inevitability of government bailout has created a moral hazard, where people expect the government to pay for the replacement of their homes or properties, regardless of whether they have implemented mitigation strategies. The

Federal Emergency Management Agency defines mitigation as "… any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event."[1]

Throughout the years, mitigation as a requirement for Federal disaster assistance has waxed and waned. When mitigation strategies are required or encouraged as a condition for grants, states and localities are more apt to enforce them. It is difficult to quantitatively measure the impact of mitigation on disaster expenditures, but it inevitably decreases the time, resources, and finances required to recover after a major catastrophe. In effect, it increases resilience. The Federal Government should consider mitigation a requirement for post-disaster assistance as it has in the past and enforce this requirement.

HSI explored several other options for financing recovery beyond mitigation. The government should consider property taxes proportional to wealth at risk. Issues of equity will grow as more taxes are used to rebuild damage in hazard-prone areas. The government might also consider giving tax breaks to those in high-risk areas who undertake and complete mitigation projects.

The most successful recovery programs in the United States and abroad have involved public-private partnerships. In the United States, the insurance industry has been an incredible resource in financing recovery, as shown by the huge role that it played in the aftermath of 9/11. In other countries, insurance pools have been very successful. When insurers can't or won't insure because the risk is either too high or too unpredictable, the government should intervene. However, this intervention should be minimal and should not crowd private insurers out of the market. Insurers could also work with the Federal Government to offer discounted policies to people who undertake mitigation strategies or employ mitigation technologies.

Finally, political pressures have a profound impact on the amount and timeliness of Federal disaster outlays (and charitable donations). These pressures add complexities to the recovery process. The Federal Government may be able to minimize these political pressures and its role in determining outlays by partnering with the insurance industry, states, and the private sector. These partnerships could come in many forms, including reinsurance or tax incentives.

[1] FEMA website: http://www.fema.gov/plan/mitplanning/index.shtm. Accessed Jan. 24, 2007.

INTRODUCTION

Federal disaster expenditures have dramatically increased in the past century, as evidenced by the huge costs of Hurricanes Andrew and Katrina and the terrorist attacks of 9/11. What happened in the 20th century to increase Federal expenditures in the aftermath of a disaster? Between 1927 and 2005, government financial involvement leaped from approximately 0% to 60% (56% for 9/11 and 67% for Katrina and Rita). This same timeframe corresponded to the development of disaster policies of many types, as well as migration, land use changes, and increased wealth at risk.

Given the amount of financial disaster assistance and the fraction borne by the Federal treasury, it is important to analyze the effectiveness of financing recovery programs. Furthermore, a comprehensive Federal strategy needs to be established to address financing recovery from mega-catastrophes, financing which is critical to stabilize the economy, physically reconstruct damaged areas, reduce vulnerabilities to future events, and encourage continued faith in the government. The Department of Homeland Security should be particularly interested in the recovery options that increase critical infrastructure resilience, emphasize mitigation strategies, and encourage private sector–government partnerships.

A mega-catastrophe, such as a Category 5 hurricane or a devastating terrorist attack, is defined by the Financial Services Roundtable as one

> whose consequences not only loom large in economic and human terms in a particular city or region of the country, but also adversely affect the national economy and even psyche: interrupting and depressing economic activity, leading to a drop in national output and possibly a major disruption of financial markets and activity.[2]

What is the Federal Government's financial responsibility in case of one of these events? How can the Federal Government pre-position itself to help the nation recover and still encourage the public and private sectors to undertake mitigation strategies? What is the best combination of compensation mechanisms in case of a mega-catastrophe, and how can the Federal Government best encourage this division of responsibility?

Objective

HSI performed this analysis to create a reference document for use by the Department of Homeland Security to address financing recovery from mega-catastrophes from a government perspective. HSI described the history, issues, and options associated with government intervention in disaster financing. HSI examined the use of all four sources of compensation (government, insurance, charity, and litigation) in both historical and recent experiences in the United States, including the September 11 attacks and Hurricane Katrina. HSI also examined the ways in which various countries handle destruction (or anticipated destruction) from war or

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[2] The Financial Services Roundtable Blue Ribbon Commission on Mega Catastrophes Comprehensive Report. January 2007 Working Group Draft.

natural disasters. Our objective was to document how losses are compensated and what methods were effective in stabilizing the local economy and initiating recovery throughout recent history. Based on its research, HSI gave general recommendations for improving the financing recovery process and for further research to gauge the effectiveness of recovery financing programs.

Methodology

HSI analyzed historical documents, academic studies, government publications, and international conference proceedings and consulted subject matter experts in the insurance industry and legal community. HSI used this information to study the evolution of the government's role in financing recovery, as well as the role of the three other compensation mechanisms in recent history. Based on this analysis, HSI recommends further research into the most effective way to finance recovery, namely by achieving post-event economic stabilization, recovery and reconstruction, and reduction of vulnerability to future events.

HSI analyzed select historic experiences (U.S. and foreign) and studied options for financing recovery from very large catastrophes. HSI studied recent experiences in the United States and ways in which other countries have handled destruction (or anticipated destruction) from war or natural disasters. HSI primarily used data from case studies to analyze trends in disaster assistance but also included a few anecdotal cases as data points.

HSI focused on determining how losses are compensated and what methods have been successful throughout recent history. The four compensation mechanisms were identified as government, insurance, charity, and litigation, and are described briefly below.

- Government
  - Encourages mitigation and planning by offering Federal grants
  - Provides assistance in the form of FEMA and other assets during and after a declared disaster
  - Uses the Disaster Relief Fund and supplementary appropriations
  - Acts as reinsurer or insurer if the insurance industry will not cover certain events
- Insurance
  - Compensates policyholders in case of covered disaster
  - Works with government to establish policies for extreme events
- Charity
  - Provides financial, physical, and psychological aid to victims and their families
  - Covers some of the cost of reconstruction, especially in high-profile disasters
  - Assists people who may not have insurance

- Litigation[3]
  - Applies in circumstances where government agencies and insurance fail to provide compensation
  - Offers an option for post-disaster remuneration for victims when others are at fault for loss or suffering
  - Often is included as a liability insurance cost

In this study, HSI provides context by first describing the evolution of Federal disaster assistance. The next sections are, sequentially, case studies of historical disasters, a discussion of terrorism and war damage, an international financing section, and a set of conclusions and recommendations based on our analysis.

[3] Because of the inconsistency of available data, the overlap between litigation and insurance, and the extended time to realization of cost in the litigation mechanism, HSI focuses less on litigation than on the other mechanisms.

THE EVOLUTION OF FEDERAL DISASTER ASSISTANCE

Background

What is the difference between an emergency and a major disaster? To a layperson, it may seem that the terms are interchangeable. However, in policy terms, there is a significant difference between the two, particularly in the amount and degree of Federal assistance available. A "major disaster" is declared by the President upon request from a state governor, and it authorizes the Department of Homeland Security to make numerous resources available to the affected state. An "emergency" declaration, however, is not contingent on a governor's request. To declare an emergency without gubernatorial request, the president must judge that the Federal Government has primary responsibility for the response to the given event, and assistance is capped at $5 million (unless more is authorized by Congress).[4] These distinctions are important in the current landscape of Federal disaster assistance—where the Federal Government is assuming responsibility for more and more disaster expenditures.

Supplemental appropriations are used to fund most disaster assistance. These appropriations have become a greater fraction of the total recovery cost when compared to other compensation options and are less often used as the primary source of funding in recent history. Congressional disaster outlays increased from $5 million in 1950 to $52 million in 1953, up to an average of $300 million per year in the 1990s.[5] Figure 1 shows the increase of Federal disaster outlays through the Disaster Relief Fund as reported by the Congressional Research Service.

[4] Bea, Keith, "Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding," Congressional Research Service report, Aug. 29, 2005. From http://www.fas.org/sgp/crs/homesec/RL33053.pdf. Accessed Nov. 21, 2006.

[5] In 1993 dollars. "Disaster Assistance: Information on Expenditures and Proposals to Improve Effectiveness and Reduce Future Costs." Washington, DC: U.S. General Accounting Office, March 16, 1995. GAO/T-RCED-95-140. http://archive.gao.gov/t2pbat1/153758.pdf.

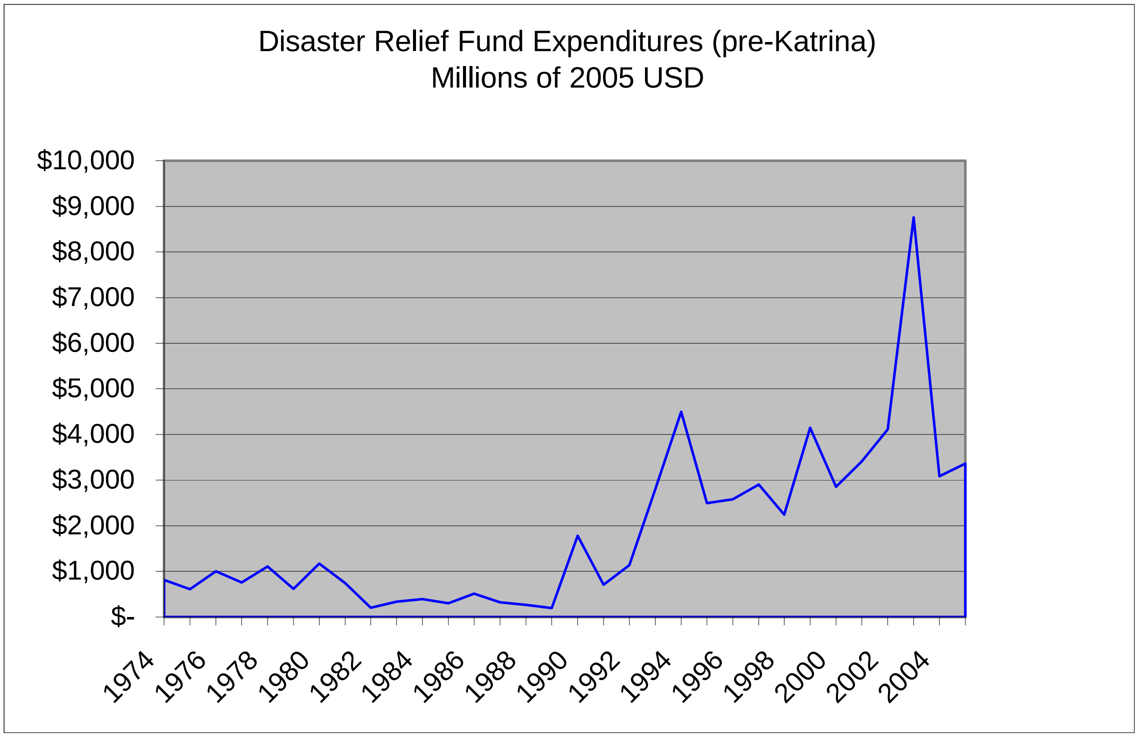

Figure 1: Disaster Relief Expenditures 1974–2005.[6]

Disaster relief acts have been written with the caveat that a major disaster must be declared before Federal assistance is offered, but the distinction between an emergency and a major disaster has become hazier through the years. The presidential declaration policy has also made it easier for grants to be awarded without a means test. The governor of an affected state requests Federal assistance and the president must approve that request to deploy disaster assistance assets.

As the government's share of post-disaster expenditures increased, public expectation has changed. When the Federal Government assumes more responsibility for state and local recovery, a moral hazard is created:[7] people do not feel compelled to undertake mitigation strategies or finance their own recovery when they assume that the government will pay for it. Even in the infancy of Federal disaster assistance, in 1973, the White House recognized problems with it and hypothesized that it might replace rather than supplement nonfederal efforts and pose a moral

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[6] Bea, Keith, "Federal Stafford Act Disaster Assistance."

[7] *Moral hazard* is a term used in both economics and insurance. It generally refers to how the redistribution of risk changes people's behavior—that when people do not assume the full risk of an action or decision, they are not inclined to make a fully responsible or moral choice. In this case, we use *moral hazard* to refer to the disincentive for responsible behavior that is created when the Federal Government assumes financial responsibility for private choices.

hazard, with "benefits so generous that individuals, businesses, and communities had little incentive to take initiatives to reduce personal and local hazards."[8]

In this chapter, we will explore the history of Federal intervention in disaster assistance from the late 19th century to present, highlighting both successful and unsuccessful policy choices over the years and offering suggestions when necessary. We highlight several key findings, including the following:

- Disaster expenditures have increased dramatically over the past century.
- A moral hazard has been created. People have moved from self-reliance to government-reliance.
- Political forces have affected the amount and geographic distribution of disaster relief expenditures, particularly of late.
- There are some similarities between financing recovery from natural disasters and terrorism, but perception of government responsibility is different.

Discussion

In the late 19th century, Federal disaster policy was all but nonexistent.[9] The laissez-faire paradigm of the time discouraged Federal intervention and encouraged individual self-reliance and free market control of business.[10] Only 128 disaster relief acts were passed by Congress from 1803 through 1947, and most expressed sympathy and offered little financial assistance.[11] The Federal Government intervened by providing military assistance when local resources were overwhelmed (as shown in case studies), but the majority of response and reconstruction was left up to the states and localities, aided by churches and other charities. Mitigation was undertaken on a personal level, as citizens knew that any damage to their property would be their own responsibility.

At the turn of the 20th century, progressive reform gained popularity and challenged this laissez-faire paradigm. In part due to the loss of life in the *Titanic* disaster in 1912, Congress passed the La Follette Seaman's Act in 1915, which regulated the number of lifeboat seats available on ships so that the disaster would not be repeated. The public began to recognize the need to move away from a laissez-faire system and embrace more oversight, relying on the Federal Government to

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[8] President of the United States (1973). *New Approaches to Federal Disaster Preparedness and Assistance.* House Doc. 93-100 (93rd Congress, 1st Session). Washington, DC: U.S. Government Printing Office, p. 5. From Platt, Rutherford H., *Disasters and Democracy: The Politics of Extreme Natural Events*. Washington, DC: Island Press, 1999, p. 8.

[9] The Congressional Act of 1803 is widely regarded as the first piece of Federal disaster legislation, and it provided assistance to a New Hampshire town after a devastating fire. In the following century, disaster assistance was offered intermittently, but there was no cohesive Federal policy for assistance. From http://www.fema.gov/about/history.shtm. Accessed Feb. 2, 2007.

[10] Platt, Rutherford H. *Disasters and Democracy*, p. 2.

[11] Ibid., p. 1.

regulate hazardous activities and corporate misconduct.[12] State and local governments began to intervene with mitigation strategies such as building codes and flood zone mapping. A solid legislative basis for these policies, however, was not in place for several decades. Two seminal events changed the face of Federal disaster assistance: the Great Depression and the Second World War.

The 1930's: The Great Depression and the Reconstruction Finance Corporation

The Great Depression was the first national event that demonstrated a real need for Federal assistance. The banking system was overwhelmed, crops failed across the nation, and, as a result, many fell from affluence into penury. The Federal Government offered loans and assistance to states, localities, businesses, and individuals to help them get back on their feet. Government intervention did not end with the depression, however. It evolved and changed with the political and natural landscape in the United States and abroad, steadily expanding in scope and expense. During times of significant economic hardship, such as the Great Depression, these expenditures were necessary to stimulate the economy and help the public recover. At other times, the assistance has been extravagant and catastrophe assistance has been mismanaged, even in the eyes of lawmakers, Federal employees, and those who have received the aid.

Federal assistance became an articulated policy when Herbert Hoover created the Reconstruction Finance Corporation (RFC) in 1932 to alleviate pressure on farmers who suffered crop failures during the depression and to restore confidence in the banking system.[13] The RFC sold some securities to the public and received most of its funding from the sale of Treasury bonds.[14] The RFC could not help circumvent the banking crisis of 1933, but it was not abandoned.

Herbert Hoover's RFC was altered after the Great Depression to meet the needs of the New Deal and Franklin Delano Roosevelt's administration, which saw particular utility in the RFC and used it to pay for damage incurred by natural disasters. The RFC received its funding through an independent stream from the Treasury and could be used to finance projects without legislative approval.[15] This loophole allowed the Federal Government to establish programs and fund projects to jumpstart the economy when it was in distress. In particular, during the New Deal, the RFC was used to buy and sell Federal Housing Administration mortgages, establish "Fannie Mae" (the Federal National Mortgage Association), and provide capital to the Export-Import Bank for trade with the Soviet Union, as well as provide relief for disaster loans to Federal, state, and local governments.[16]

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[12] Platt, Rutherford H., *Disasters and Democracy*, pp. 5-6.

[13] 72nd Congress Sess. I, Ch. 8, Jan. 22, 1932. H.R. 7360.

[14] Butkiewicz, James. EH.Net Encyclopedia: Reconstruction Finance Corporation. http://eh.net/encyclopedia/article/butkiewicz.finance.corp.reconstruction. Accessed June 14, 2006.

[15] *United States Secretary of the Treasury: Final Report of the Reconstruction Finance Corporation.* Washington, DC: U.S. Government Printing Office, 1959.

[16] Butkiewicz, James. EH.Net Encyclopedia: Reconstruction Finance Corporation.

The RFC's sphere of influence and financial responsibilities increased each year that it was in existence, especially under Roosevelt. In 1933, Congress enacted legislation to provide direct assistance to private citizens following an earthquake, and the RFC was authorized to make loans to nonprofit corporations to repair buildings damaged in earthquakes, fires, tornados, or cyclones. The following year, it was authorized to finance loans to buy or repair buildings declared unsafe following the aforementioned natural disasters. In 1936, the Catastrophe Relief Act expanded these authorities, and in 1937 the Disaster Loan Corporation was formed and financed by the RFC.[17]

The 1940's

Federal assistance through the RFC was offered not only in the cases of natural disasters and economic hardships. In the middle of the 20th century, assistance was extended to cover wartime damages incurred from an enemy attack. This extension was a rational one—weapons were getting larger, and the attack on Pearl Harbor proved that the United States was not invulnerable to foreign attack. With the New Deal and the beginning of World War II, the depression ended. The war invigorated the U.S. economy, and it was necessary to stockpile the surplus that the economic boom created. In 1940, the RFC organized subsidiaries to handle national defense and war programs, which procured, stockpiled, and sold strategic materials and commodities, including rubber, metals, and scrap materials. One such subsidiary was the War Damage Corporation, detailed in the "Terrorism and War Damage" section.

In the same decade, broader Federal disaster assistance was enacted. In 1940, President Roosevelt issued the Administrative Order of May 25, 1940, and established the Office for Emergency Management.[18] A year later, he defined its duties, namely, "to advise and assist the President in the discharge of extraordinary responsibilities imposed upon him by any emergency arising out of war, the threat of war, imminence of war, flood, drought, or other condition threatening the public peace or safety."[19] Within the Office of Emergency Management, the Office of Civil Defense was established to prepare for wartime disasters and teach state and local governments about disaster relief operations.[20] It was abolished June 30, 1945, by executive order, as by then its wartime charges were obsolete.[21]

During World War II, the Treasury sold war bonds in part to lessen inflationary pressures and reduce consumer spending, which had been brought about by increased employment and productivity. The success of these bonds reflected the patriotic spirit of the time—the division of

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[17] The Disaster Loan Corporation came under the charge of the Small Business Administration when the RFC was dissolved. Final Report of the RFC.

[18] Administrative Order, May 25, 1940, in accordance with Executive Order 8248, Sep. 8, 1939.

[19] Administrative Order, Jan. 7, 1941.

[20] Executive Order 8757, May 20, 1941.

[21] Executive Order 9562, May 4, 1945.

the Treasury responsible for these bonds sold $186 billion (in 1945 dollars) worth of government securities.[22] That amount would equal $1.8 trillion in 2005 dollars.

The 1950's

After the Soviet Union tested its first nuclear weapon in 1949 and North Korea invaded South Korea in 1950, Congress, the President, and the Department of Defense recognized once again the need for a civil defense authority.[23] The Federal Civil Defense Act of 1950 charged state and local governments with primary responsibility in civil defense but also delineated Federal authorities.[24] In 1950, the Federal Disaster Relief Act established a national permanent disaster relief program.[25] The law supported the use of Federal funds to supplement state and local resources. The act was implemented by a number of civil defense agencies from 1950 through 1974 and would become the model for later disaster relief legislation.

Throughout the 1950s and 1960s, a number of civil defense revisions and acts were passed—including the transfer of responsibility for the Federal Civil Defense Act into the Office of Civil Defense within the Defense Department and the establishment of a federally funded fallout shelter program.[26] However, Federal, state, and local governments realized that these civil defense resources and plans could be used in case of natural hazards as well as a nuclear attack, and they began to plan accordingly. Public awareness and national education programs became more widespread. For example, a cooperative project taught people to "duck and cover" in event of an attack, using Bert the Turtle, an animated cartoon.[27] Later education programs taught children to duck and cover in case of an earthquake, using the same protective technique for a different hazard.

In 1956, the Federal Interstate Highway system was established. Once these roads were constructed, it was easier than ever for Americans to move to stream valleys, coasts, forests, and farmland—areas that were more at risk for natural hazards than the urban centers, which were established as centers of trade or commerce in relatively safe areas.[28] At the same time, Congress started to shift from encouraging personal and local accountability to shared responsibility. In 1958, for example, the Federal Civil Defense Act was amended to make civil defense a "joint

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[22] Bickley, James M., "War Bonds in the Second World War: A Model for Hurricane Recovery Bonds?" Washington, DC: Congressional Research Service, Oct. 20, 2005. http://www.opencrs.com/rpts/RS22305_20051020.pdf.

[23] Executive Order 10186, Dec. 1, 1950.

[24] Federal Civil Defense Act of 1950, Public Law 920.

[25] Public Law 81-875.

[26] Executive Order 10952, July 20, 1961.

[27] From http://www.Military.com archives of civil defense. http://www.military.com/ContentFiles/cw_duckncvr.qt. Accessed Nov. 20, 2006.

[28] Platt, Rutherford H., *Disasters and Democracy*, p. 11.

responsibility" of the Federal Government and state and local governments.[29] This compact between the Federal Government and citizens allowed the former to pay for the latter's poor judgment or bad luck.

Warnings were clear even then that this Federal policy might encourage a sort of moral hazard. As Rutherford Platt asked in his book *Disasters and Democracy*,

> … to what extent does the likelihood of generous federal assistance serve to diminish the natural caution that individuals, communities, and businesses might otherwise exercise in adjusting to natural hazards in their investment and location decisions? At what point does compassion lead to "codependency"?…[30]

The 1960's: The National Flood Insurance Program

Property along the coasts and waterways of the United States is densely populated, despite the risk of occasional or even routine flooding. Government intervention in flood control and flood insurance matters has been a contentious issue over the past century. Should the government provide flood insurance when private insurers refuse? How much responsibility does the government have to build structures such as levees for mitigation? Should the government pay repeat claims to individuals and rebuild in areas that will surely flood again? These are all questions that Congress has been asking for decades.

The first Flood Control Act was approved in 1917, but a National Flood Program was not officially established until 1936 (partly in response to the losses incurred after the Mississippi flood of 1927, which dissuaded insurers from covering the flood hazard).[31] Under the Flood Control Act of 1936, the Army Corps of Engineers could undertake flood control and mitigation projects with Federal funding.[32] Very little was done regarding the flood hazard for the next few decades. Then, Hurricane Betsy hit south Florida and Louisiana in September of 1965 and caused billions of dollars in damage and 75 deaths.[33] Following a Housing and Urban Development study of Hurricane Betsy, the National Flood Insurance Act was passed in 1968.[34] Prior to that

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[29] Public Law 85-606, Aug. 8, 1958.

[30] Platt, Rutherford H., *Disasters and Democracy*, p. 9.

[31] *A Chronology of Major Events Affecting the National Flood Insurance Program*. Washington, DC: American Institutes for Research. December 2005. From http://www.fema.gov/pdf/nfip/chronology.pdf. Accessed Nov. 30, 2006.

[32] Flood Control Act of 1936.

[33] $9.7 billion in 2005 U.S. dollars. "Memorable Gulf Coast Hurricanes of the 20th Century." From National Oceanic and Atmospheric Administration website. http://www.aoml.noaa.gov/general/lib/mgch.html. Accessed Nov. 15, 2006.

[34] U.S. Congress (1966). Insurance and Other Programs for Financial Assistance to Flood Victims. Senate Committee on Banking and Currency (89th Congress, 2nd session). Washington, DC: U.S. Government Printing Office. Public Law 90-448.

year, there had been no insurance available for the flood hazard, so people had to rely on the Federal Government, charity, or themselves for recovery assistance.[35]

Most private insurers were (and still are) unwilling to enter the flood insurance market, partly because of the high probability of loss. Congress wanted to make low-cost flood insurance available to property owners when they did not have the option of buying private flood insurance.[36] In its establishment, Federal insurance was supposed to be available only to property owners in communities that enacted floodplain management regulations to meet minimum Federal standards.[37] This caveat was in place to share the burden of recovery between the states and Federal Government. It also protected the taxpayers in invulnerable states from assuming liability for losses incurred in communities that did not invest in mitigation. In 1973, the National Flood Insurance Program (NFIP) was broadened in the Flood Disaster Protection Act of 1973, after the devastation wrought by Hurricanes Camille and Agnes in 1972.[38] This act required states to adopt flood plain ordinances consistent with Federal standards to avoid future losses. It also made flood insurance mandatory for properties secured by federally regulated or insured loans in special flood hazard areas (communities subject to 1% or greater chance of flooding in a given year).[39] Federal Flood Insurance would continue to plague the United States for decades; it is included and expanded on in the excerpt at the end of this section.

The 1970's: From Civil Defense to Disaster Assistance

In 1972, President Nixon moved the Office of Civil Defense into the Defense Civil Preparedness Agency within the Defense Department, recognizing that communities that were prepared for natural hazards would be more likely to be prepared for wartime events (such as nuclear attack). The agency had the charge of "providing preparedness assistance planning in all areas of civil defense and natural disasters."[40] The dual use of Defense Civil Preparedness Agency resources in natural disasters and wartime was officially sanctioned in 1976.[41] At the same time, the National Earthquake Hazards Reduction Act was passed, encouraging the enactment of mitigation strategies for earthquake risks.

Also in response to the hurricanes of 1972, Congress passed the Disaster Relief Act of 1974, the first explicit requirement for mitigation strategies to receive Federal funding.[42] The act also gave

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[35] Kunreuther, Howard, and Louis Miller, "Insurance Versus Disaster Relief: An Analysis of Interactive Modeling for Disaster Policy Planning," *Public Administration Review*: Special Issue, 1985.

[36] Platt, Rutherford H., *Disasters and Democracy*, p. 28.

[37] Ibid.

[38] Public Law 93-234.

[39] Flood Insurance: Information on the Mandatory Purchase Requirement. Washington, DC: General Accounting Office, August 1990. http://archive.gao.gov/d23t8/142248.pdf.

[40] Defense Department Directive No. 5105.43, released July 14, 1972.

[41] Public Law 94-361.

[42] Public Law 93-288, Section 406.

the Federal Government the authority to grant direct assistance to individuals and families. When it was first established, the disaster relief act was supposed to be:

- Limited in the scope of Federal assistance
- Contingent upon a presidential disaster declaration that Federal assistance was necessary
- Limited as to amounts of Federal funding allocated to disaster relief[43]

In its initial state, the act differentiated between individual assistance and public assistance.[44] Individual assistance included temporary housing, unemployment compensation, and other personal assistance. Individual assistance was provided based on financial need. The applicant's primary residence had to be unlivable, and insurance benefits available were deducted from the Federal grant. Public assistance, on the other hand, included debris removal and repair or replacement of public facilities (including beaches and trees) and was provided regardless of the economic status of the community or its residences; public assistance had no means test. The government began to be criticized for generous public assistance policies as early as the mid-70s.

Superfund

The Federal Government has also intervened historically in environmental remediation to protect citizens from hazardous waste and pollution. In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or "Superfund") was passed.[45] It created a tax on hazardous industries and gave the Federal Government the authority to "respond to the release or threatened release of hazardous substances that may endanger public health or the environment."[46] The Superfund also made polluters liable for hazardous release. The tax went into a fund to clean up hazardous waste sites when the responsible party could not be identified.[47]

The 1980's and 1990's: Disaster Relief Act Transferred to FEMA, Stafford Act Passed and Revised

President Carter, responding to a National Governors Association report on emergency preparedness and criticism of the Federal response to the accident at the Three Mile Island nuclear power plant, reorganized Federal programs and created the Federal Emergency Management Agency (FEMA) to consolidate preparedness for, response to, and mitigation of all types of hazards.[48] The Disaster Relief Act was transferred to FEMA shortly thereafter (in 1979). FEMA was charged with "integrated emergency management" of everything from a flood to

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[43] Platt, Rutherford H., *Disasters and Democracy*, pp. 13-15.

[44] Ibid., pp. 16-17.

[45] From the Environmental Protection Agency website. Superfund Overview. http://www.epa.gov/superfund/action/law/cercla.htm. Accessed Feb. 27, 2007.

[46] Ibid.

[47] Ibid.

[48] Reorganization Plan #3 of 1978 (43 FR 41943), enacted by Executive Order 12127 in 1979.

nuclear attack. Throughout the 1980's and early 1990's, FEMA was criticized for its response to hurricanes and earthquakes, with senators and congressmen citing inadequate responses, mismanagement, and incompetence.[49]

The General Accounting Office reviewed the disaster declaration process in detail in 1979 through 1981, finding a "lack of consistency in the quality and method of assessments … creat[ing] doubt as to whether the Federal Government is only providing supplementary assistance and whether each request is judged in a fair and equitable manner."[50] After this review, FEMA prepared a plan to reduce Federal spending on disaster relief by decreasing the number of declarable disasters, based in part on the ratio of the state or local price index to the national index. This effectively meant that wealthier communities would receive *less* disaster assistance.[51] When this suggestion went before Congress, it received such adamant opposition that the 1988 revision of the Stafford Act prohibited an "arithmetic formula or sliding scale" to be used in determining disaster assistance in a certain geographical area.[52] This left the disaster declaration process and amount of Federal assistance offered up to the discretion of the legislative and executive branches of the Federal Government. Some analysts have studied a possible connection between the number of disasters declared in certain areas and their strategic importance to the party in power, and they conjecture that the more important states (politically) receive more disaster declarations, especially during election years.[53]

The Disaster Relief Act was revised in 1988 and renamed the Stafford Act.[54] According to Congress, it was intended to "provide an orderly and continuing means of assistance by the Federal Government to State and local governments in carrying out their responsibilities to alleviate the suffering and damage which result from disasters.…"[55] The Stafford Act broadened the scope of existing disaster relief programs and attempted to encourage comprehensive disaster planning and preparedness by state and local governments, to achieve greater coordination and

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[49] Blanchard, B. Wayne. *Hazards, Disasters and the U.S. Emergency Management System—An Introduction*. FEMA educational excerpt, p. 33. From http://training.fema.gov/EMIWeb/edu/hazdisusems.asp. Accessed Nov. 14, 2006.

[50] *Requests for Federal Disaster Assistance Need Better Evaluation.* CED-82-4. Washington, DC: U.S. General Accounting Office, 1981, p. iv.

[51] Emphasis added. House Subcommittee on Investigations and Oversight (1987). *The Federal Emergency Management Agency's Proposed Disaster Relief Regulations* (100th Congress, 1st session). Washington, DC: U.S. Government Printing Office.

[52] Platt, Rutherford H., *Disasters and Democracy*, pp. 19-20. Stafford Act Legislation: Public Law 100-707, Sec. 320.

[53] Reeves, Andrew, "Plucking Votes From Disasters," *Los Angeles Times*, May 12, 2004. From http://www.people.fas.harvard.edu/~reeves/papers/plucking_votes.htm; http://www.harvard-magazine.com/on-line/030492.html. Accessed Dec. 5, 2006.

[54] Public Law 93-288.

[55] The Robert T. Stafford Disaster Relief and Emergency Assistance Act or Stafford Act, as amended by Public Law 106-390, Oct. 30, 2000. U.S. Code Title 42. The Public Health and Welfare, Chapter 68. Disaster Relief Findings, Declarations and Definitions. S 5121 (b).

response, to encourage insurance programs to supplement or replace government assistance, to encourage mitigation, and to provide Federal assistance programs.[56] In 2000, another revision of the Stafford Act, pressure was put on communities to undertake more mitigation. If a disaster occurred in the same place more than once, the recipients of Federal aid for the first occurrence had to prove that they had undertaken mitigation techniques to receive the same percentage of aid; otherwise, the percentage decreased.

The Loma Prieta earthquake and Hurricane Hugo hit in quick succession in 1989. According to a General Accounting Office investigation, these events highlighted preparedness problems. The General Accounting Office identified weaknesses in FEMA's response and guidance, and it critiqued state and local preparedness programs.[57] Shortly thereafter, in 1992, Hurricane Andrew hit the United States and caused billions of dollars in damage. It is estimated that one-fourth of this damage was avoidable and due to ignored building codes.[58] After numerous studies by the General Accounting Office and National Academy for Public Administration and a National Performance Review, a mitigation directorate was added to FEMA.[59]

After the Midwest flood of 1993, President Clinton urged Congress to adopt the Hazard Mitigation and Relocation Assistance Act, which amended the Stafford Act and raised the Federal share of disaster mitigation measures to 75% (up from 50%) in an attempt to pre-position states to incur less loss in the event of a disaster.[60] At the same time, the Galloway Report was written by a team of experts and professionals (the Interagency Floodplain Management Review Committee), who were highly critical of the NFIP and "cautioned against abandoning a meaningful non-Federal cost share and sense of personal and community responsibility in responding to disasters."[61] The NFIP was reformed in 1994, and although it was intended to limit coastal property rights, it ended up merely endorsing hazard mitigation suggestions. In the 1994 Unified National Program for Floodplain Management redrafting, mandatory local regulation requirements were replaced by a "cultivation of positive attitude towards floodplain management."[62] The concept of land use regulation as a prerequisite for Federal assistance was eliminated. In the same year, House and Senate reports agreed that availability of Federal assistance had encouraged state and local governments and the private sector to avoid responsibility for disaster preparedness and mitigation.[63]

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[56] Ibid.

[57] Platt, Rutherford H., *Disasters and Democracy*, p. 84. "Federal, State, and Local Responses to Natural Disasters Need Improvement." GAO/RCED-91-43. Washington, DC: U.S. General Accounting Office. March 1991. http://archive.gao.gov/t2pbat8/143524.pdf.

[58] Platt, Rutherford H., *Disasters and Democracy*, p. 86.

[59] Ibid., pp. 88-89.

[60] Platt, Rutherford H., *Disasters and Democracy*, p. 90, and Public Law 103-181.

[61] Ibid., p. 91.

[62] Ibid., p. 96.

[63] Ibid., p. 91.

A Senate task force in 1995 said that Federal disaster assistance was too generous and fiscally irresponsible and that non-emergency items are included under disaster funding. This task force made recommendations such as funding disaster programs at historical levels and discouraging funding for non-emergencies in any supplemental containing an emergency declaration.[64]

It is important to note that the Federal Government is not allowed to mandate building codes or land use decisions. It ends up funding much of the disaster assistance process (from mitigation to response and recovery) but is constrained to making suggestions and setting minimum standards. The non-compensatory regulations must be applied through state and local laws to reduce vulnerability in hazard-prone areas.[65] As we will see in state-specific programs, states are often in a better position to regulate and mitigate than is the Federal Government, but Federal standards and grants can be extremely beneficial.

Buyback Programs

Also after the 1993 flood, the Federal Government tried a new tactic in mitigation. It attempted, via buyout programs, to relocate communities out of known floodplains and thereby reduce damage to property in future floods. Buyout programs, framed generally in this discussion to include property sales, structure relocation, and structure elevation, aim to avoid flooding damage.

Successful attempts at federally funded, locally administered buyback programs occurred in the Midwest after the damaging 1993 flooding. Overall, FEMA chronicles the results of Federal, post-1993 buyout efforts in a 2003 report titled *The 1993 Great Midwest Flood: Voices 10 Years Later*.[66] As noted in Table 1, the efforts following the 1993 flood were extensive.

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[64] Platt, Rutherford H., *Disasters and Democracy*, p. 24. U.S. Congress, Senate Bipartisan Task Force on Funding Disaster Relief, *Federal Disaster Assistance*, S.Doc. 104-4, 104th Cong., 1st Sess. Washington, DC: Government Printing Office, 1995.

[65] Platt, Rutherford H., *Disasters and Democracy*, p. 131.

[66] “The 1993 Great Midwest Flood: Voices 10 Years Later,” FEMA, U.S. Department of Homeland Security, May 2003. From http://www.fema.gov/business/nfip/voices.shtm.

Table 1: Mitigation Measures by Type Following the 1993 Midwest Flood[67]

Properties acquired	11,888
Properties relocated	356
Properties elevated	31
Properties floodproofed	110
Total	12,385

The State of Missouri Hazard Mitigation Grant Program, for example, acquired over $100 million in funding, a large sum of which originated from the Federal Emergency Management Agency, the Housing and Urban Development Community Development Block Grant Program, Missouri General Revenue Funds, and other sources. The program directed these funds at 4,800 properties, elevating structures, relocating them, or acquiring the properties.[68]

In future flooding, some Missouri communities demonstrated lower flooding statistics, in terms of sites flooded and flooding assistance funds required, as a result of these buyout programs. Overall, the St. Louis *Post-Dispatch* reported, more than 9,000 homeowners sold properties after the 1993 flooding.[69] Table 2 demonstrates the marked decrease in three measures of flood impact in Arnold, Missouri, as a result of its buyout efforts.

Table 2: Mitigation Measures in Arnold, Missouri.[70]

	1993 Flood	1995 Flood	May 2002 Flood (as of June 25, 2002)
Sandbagging sites	60	3	0
FEMA public assistance (public infrastructure)	$1,436,277	$71,414	$0
Applications for individual assistance	52	26	1

In conclusion, though not all of the decreases in flood assistance applications and costs of payouts as a result of flooding are attributable to buyout programs, the local, statewide, and national examples point to floodplain buyout programs as effective mitigation measures. However, the

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[67] Ibid.

[68] "Success Stories From the Missouri Buyout Program," FEMA and State of Missouri Emergency Management Agency, August 2002, p. 1. From http://www.fema.gov/txt/CaseStudy/mo_buyoutreport.txt. Accessed Oct. 12, 2006.

[69] Ibid. p. 10.

[70] Ibid. p. 3.

floods' differing circumstances in 1993, 1995, and 2002 make such analysis impossible without detailed geographic knowledge of the flooded areas.

2000 and Beyond

The terrorist attacks of September 11, 2001, and subsequent anthrax attacks caused another major overhaul of disaster preparedness and response agencies. The Office of Homeland Security and the Homeland Security Council were created October 8, 2001, within the Executive Office of the President under the Direction of Tom Ridge.[71] Two years later, the Department of Homeland Security was created as a coordinating agency, and FEMA was integrated into its super-organization.[72]

Federally funded recovery from the 9/11 attacks was financed by supplementary appropriations. The recovery appropriations included the establishment of the Victim Compensation Fund.[73] The Environmental Protection Agency financed the anthrax attack cleanup through the Superfund chemical, biological, radiological, and nuclear provision, spending $27 million, which represented $25 million more than the typical 1-year cleanup program limit (Congress passed an emergency supplemental to reimburse the Superfund program).[74] Also as a result of the 9/11 attacks, the Federal Government established the Terrorism Risk Insurance Act (TRIA) to "ensure the continued financial capacity of insurers to provide coverage from risks from terrorism."[75] TRIA allowed the government to act as the reinsurer of last resort in case of a terrorist attack (or attacks) that overwhelmed the insurance industry.[76]

Since 2005, FEMA has come under scrutiny yet again. Hurricanes Katrina and Rita showed that neither the Department of Homeland Security nor FEMA was prepared for a major disaster. The Federal Government has spent billions of dollars on response and recovery, when many of these expenditures could have been avoided by pre-disaster mitigation (such as levee repair) and planning (evacuation, etc.). This highly publicized disaster should motivate closer analysis and reform of Federal disaster policy.

[71] Executive Order 13288.

[72] The Homeland Security Act of 2002.

[73] See the 9/11 case study for more information.

[74] *Capitol Hill Anthrax Incident: EPA's Cleanup Was Successful; Opportunities Exist to Enhance Contract Oversight.* Washington, DC: General Accounting Office. June 17, 2003. GAO-03-686. http://www.gao.gov/htext/d03686.html. Accessed Nov. 28, 2006.

[75] H.R. 3210. 107th U.S. Congress. Jan. 23, 2002.

[76] See the War Damage and Terrorism section for further information.

More National Flood Insurance Program Information

The NFIP is administered by the Federal Insurance Administration, which is part of FEMA. The mitigation requirement has been relaxed in the past 40 years, and the NFIP has, for the most part, been a huge loss to the Federal Government and the taxpayer. A report by the Comptroller General in 1983 claimed that the program required major changes to operate without a Federal subsidy. The report (and the General Accounting Office) found that between the years of 1970 and 1980, the NFIP borrowed $854 million from the Treasury without a plan to repay the loan.[77] In the same report, the General Accounting Office found that the program's risk premium rates were not adequate to cover potential losses and operating costs. In an apparent turnaround, between 1984 and 1997, the NFIP took in more revenue than it paid out.[78] However, this profitable trend did not last.

One major problem with the NFIP is that it is willing to insure despite repeat claims. As of 1998, repetitive losses to the same properties accounted for over 40% of NFIP payments.[79] It is not enough to warn or discourage people from building in flood-prone areas. As long as they know that their homes will be replaced in case of loss, they will live wherever they wish. There is no incentive to make wise decisions without the possibility of self-financed recovery. For example, John Stossel received Federal flood insurance for the loss of his oceanfront home. "It was an absurd place to build a house. One block down the road was a desert-like wasteland where a dozen houses had eroded away …"[80] His house was destroyed in a storm and the Federal Government paid for its full replacement—in the exact same location.[81]

By August 2005, the Government Accountability Office estimated that NFIP had 4.6 million policyholders in 20,000 communities.[82] The program had paid out $14.6 billion in insurance claims from 1968 through August 2005. Then Katrina struck. Almost 15,000 New Orleanians who have applied for Federal grants after Katrina say that they plan to rebuild in flood-prone areas. The program collected $2.2 billion in premiums last year but will pay out over $20 billion in post-Katrina claims.[83]

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[77] *National Flood Insurance Program—Major Changes Needed if It Is to Operate Without a Federal Subsidy*. U.S. Comptroller General, GAO/RCED-83-53. Jan. 3, 1983.

[78] Platt, Rutherford H., *Disasters and Democracy*, p. 30.

[79] Ibid., p. 38.

[80] Ibid., p. 41.

[81] He was once again offered flood insurance.

[82] Jenkins, William O., Jr., "Federal Emergency Management Agency: Challenges Facing the National Flood Insurance Program." GAO-06-174T. Washington, DC: U.S. Government Accountability Office, 2006.

[83] "New Orleans Plan: Rebuild in Flood Zones, Hand You the Bill," *USA Today*, Oct. 25, 2006.

INTRODUCTION TO CASE STUDIES

By charting the evolution of Federal disaster assistance, we can identify the milestones in past recovery efforts in the United States. To provide an historical context and specific details, HSI discusses selected natural catastrophe and war damage case studies, all of which could be considered mega-catastrophes. The case studies are organized by the four main compensation mechanisms: direct government assistance, insurance, charity, and litigation. Each case study is a narrative describing the event and the aftermath, focusing on the recovery process.

HSI studied five catastrophes in depth from 1871 to 2005, selected to represent a range of time, geography, and disaster type. Table 1 shows a snapshot of the case studies that HSI focused on.

Table 3: Case Studies at a Glance

Event	Cost, 2005 U.S. Dollars	Gov't %	Deaths	Displaced
Chicago Fire, 1871	$3.2B	0%	300	100,000
San Francisco Earthquake and Fire, 1906	$7.8B to $11.2B	0%	700 - 3,000	225,000 - 300,000
Mississippi River Great Flood, 1927	~$12B	1%	246 - 1,000	600,000
September 11 Terrorist Attacks, 2001	~$50B	56%	2,976	N/A[84]
Hurricanes Katrina & Rita, 2005	~$135B	67%	N/A	N/A

The table highlights the fact that the costs of mega-catastrophes increased over time and that the fraction paid by the government has increased as well. The figures for deaths and displacement have been included to highlight the scale of the catastrophes.

Figure 2 outlines the cost of each catastrophe in greater detail.

[84] The N/A data is a placeholder, as exact numbers have not yet been calculated.

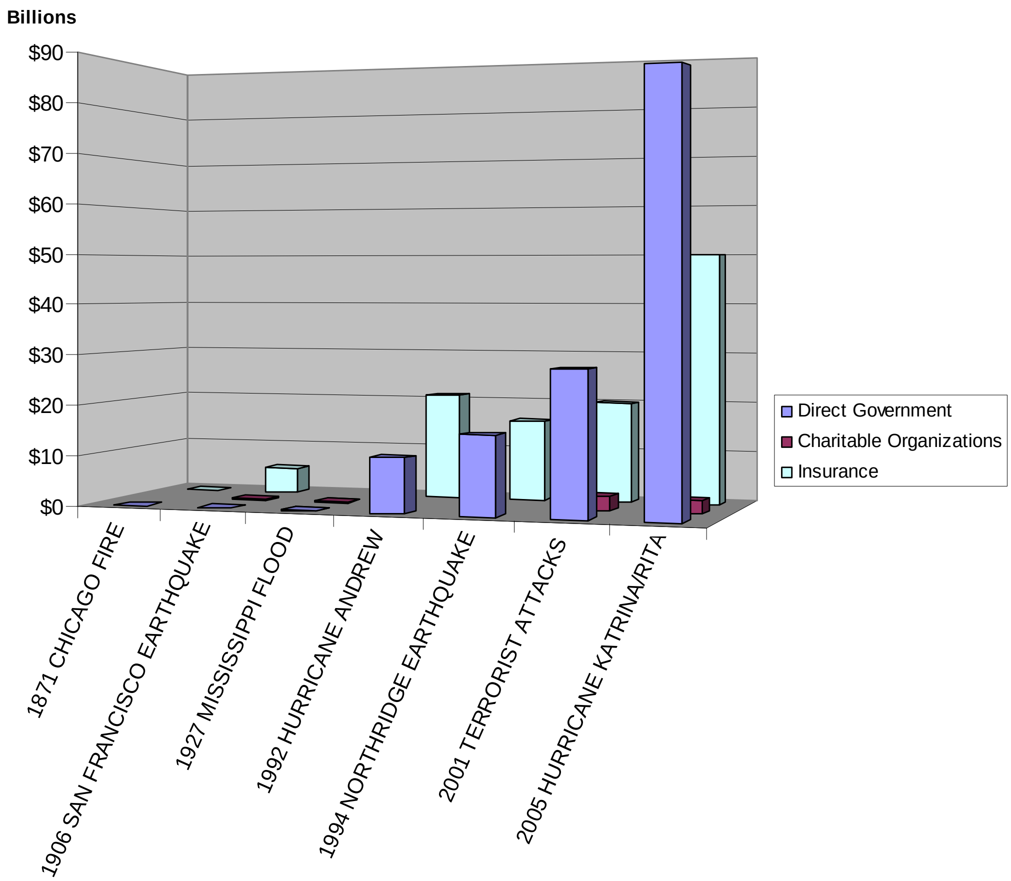

Figure 2: Costs of Mega-Catastrophes in 2005 U.S. Dollars, Broken Down by Government, Charity, and Insurance Contributions.

The figure presents the dramatic increase in direct government assistance and, to a lesser extent, insurance. It also highlights the fact that charitable contributions have been an asset to the recovery process. HSI includes Hurricane Andrew and the Northridge Earthquake because data were readily available, and these events are described in the evolution section. Although charity played a sizeable role in recovery from the Chicago Fire, it is not shown on this chart because a full quantitative account was not available.

THE GREAT CHICAGO FIRE OF 1871

Key Observations

- Chicago was a booming industrial revolution town with a hastily designed infrastructure.
- One-third of the population was left homeless as the conflagration destroyed a majority of the city.
- The mayor placed an Army lieutenant general in charge of maintaining order in the city.
- Banking and other private industries in large cities such as New York and Boston had a vested interest in Chicago's recovery and donated generously.
- Charitable organizations such as the American Red Cross had not yet formed at this time.
- Donations came in from throughout the country and were carefully managed through application of St. Paul's rule: "If any man among you will not work, neither let him eat."
- The Federal Government sent little assistance except the Army. Local and state governments were primarily involved.
- Even though many insurance and legal documents burned in the fire, the insurance industry paid most of the damages.
- No insurance firm would write a policy in Chicago after the fire until uniform building codes had been established.

Background

> The brute creation was crazed. The horses, maddened by heat and noise, and irritated by falling sparks, neighed and screamed with affright and anger, and reared and kicked, and bit each other, or stood with drooping tails and rigid legs, ears laid back and eyes wild with amazement, shivering as if with cold.…
>
> The people were mad.… Seized with wild and causeless panics, they surged together, backwards and forwards, in the narrow streets, cursing, threatening, imploring, fighting to get free.…With electric velocity the flames seized upon the frame blocks fronting the river on the North, and leaped from square to square faster than an Arab steed could gallop.… Nothing human could stand before or check these combined elements of annihilation.…[85]

"The terrible conflagration in Chicago will long be remembered as one of the most prominent events of the nineteenth century," according to two historians covering the reconstruction

[85] *Chicago Evening Post,* Oct. 17, 1871. From *The Great Chicago Fire and the Web of Memory,* "… the adamantine bulwarks of hell …" Chicago Historical Society and Northwestern University. From http://www.chicagohs.org/fire/media/bulwark.html..

immediately following the fire.[86] Over a century later, the fire is still remembered as one of the most devastating calamities that our nation has ever faced. The particular societal and economic conditions at the beginning of the industrial revolution in the United States were amplified in Chicago, including the mass media coverage, an influx of working immigrants, and a city developing quickly with a hastily conceived infrastructure.

On the night of October 8, 1871, a small fire started in southwest Chicago. Popularly blamed on O'Leary's cow, the origins of the fire are not actually known.[87] Because it had been unseasonably dry in the months preceding the blaze, the hastily erected wood structures in southern Chicago ignited like tinder as the fire spread through the city, leaving little standing in its wake. At the time, Chicago was attempting to rival the glamour of New York and had built ostentatious structures that were not architecturally sound or fire-resistant.[88] The devastated area was one mile wide and four miles in length, and if the houses burned were set ten feet apart they would form a row over a hundred miles in length.[89] The fire was a great equalizer; it indiscriminately spread through the mansions of the rich and shacks of the impoverished alike and left 100,000 people—literally one-third of Chicago's population—homeless.

Chicago grew from only 7 citizens in 1830 (according to the census) to just over 334,000 directly preceding the fire. The fire caused Chicago to be "… suddenly overtaken by the direst financial calamity the world has ever witnessed … thrusting [her] from wealth and luxury to actual penury and suffering."[90] After the blaze, interest in rebuilding Chicago was significant; it was said that people would "… invest from 4 corners of the globe to see Chicago rebuilt … they recognize[d] the necessities of Chicago Future."[91]

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[86] Colbert, Elias, and Everett Chamberlin, *Chicago and the Great Conflagration*. New York: C. F. Vent, 1871, p. 9.

[87] Some historians blame the O'Leary myth on anti-immigrant sentiments in the late 1800's, as "O'Leary" was a name with Irish roots.

[88] Olmstead, Frederick Law. Report in *The Nation*, November 1871, from *The Great Chicago Fire and the Web of Memory*, "Chicago in Distress." http://www.chicagohs.org/fire/media/distress.html. Accessed July 10, 2006.

[89] Ibid.

[90] Randolph, Charles, "Our Trade and Commerce: Development of Chicago in Material Wealth and Prosperity," *Lakeside Monthly*, January 1872. From *The Great Chicago Fire and the Web of Memory*. http://www.chicagohs.org/fire/queen/trade.html.

[91] Ibid.

People from around the world were linked to Chicago through the Chicago Board of Trade, which traded agricultural futures beginning in 1848.[92] Also, through the telegraph and other mass media, people were able to vicariously experience the disaster for one of the first times in history. In the words of *The Nation*,

> The fortunes of the whole race are being so closely linked together … that there is nobody, from the hod carrier up to the millionaire, who may not, any morning, read in the paper news from the uttermost ends of the earth, depriving him of his fortune or his daily bread.[93]

This economic and virtual closeness encouraged benefactors from around the world to send money and supplies to Chicago.

The fire left so many homeless in shelters and the streets that the local police could not handle the sheer volume of humanity. The mayor placed Army Lieutenant General Philip Sheridan in charge of keeping the "order and peace of the city." In an October 9 communiqué to the Secretary of War, M. W. Belknap, Sheridan said, "The fire here … has destroyed almost all that was very valuable in this city."[94]

The Secretary of War wrote back, telling him, "I agree with you that the fire is a national calamity …" and redeployed companies in the area to assist in the disaster. Military rule in Chicago lasted from October 11 to October 24, and Sheridan insisted that the people were well behaved as a whole and that those stories about looting, murder, and rioting were baseless urban myths.

Old property had to be rebuilt with the labor that would have gone into the production of new property. Some losses could not be quantified, such as rental values of houses burned, transfers of property, and the burning of bank notes, public records, scientific collections, choice books, pictures, and heirlooms.[95] Destruction of important papers and contracts was another devastating aspect of the fire; deeds to homes were lost and insurance papers were burned.

The Recovery Process

Americans found a "profound sign of spiritual or cultural renewal" in the relief effort following the fire—the nation came together, as it was the first opportunity after the Civil War to prove that the nation was united.

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[92] From the Chicago Board of Trade website. http://www.cbot.com/cbot/pub/page/0,3181,942,00.html. Accessed July 30, 2006.

[93] Wheeler, David Hilton, "Political Economy of the Fire," *Lakeside Monthly*, January 1872. From *The Great Chicago Fire and the Web of Memory*. http://www.chicagohs.org/fire/queen/economy.html. Accessed July 11, 2006.

[94] From *The Great Chicago Fire and the Web of Memory*, "Military Rule in the City." http://www.chicagohs.org/fire/rescue/military.html.

[95] Randolph, Charles, "Political Economy of the Fire."

Direct Government Assistance

Besides providing military aid, the Federal Government did not markedly contribute to financing recovery from the Chicago Fire. Local governments provided some contributions to the recovery process, in both money and resources. While the fire burned, long-time commercial rivals of Chicago such as St. Louis, Cincinnati, Cleveland, and Buffalo pledged hundreds of thousands of dollars in aid.[96]

Charity

Money poured into Chicago after the fire. As Chicago was a huge industrial and transportation (water and rail) center for the United States, people had a vested interest in its complete, timely recovery. Indebtedness to Boston and New York bankers ensured that they would offer aid. The same applied to members of the international financial and insurance markets, who also shared in the financial burden for Chicago's recovery.[97] In total, "over $4 Million was received from the outside world.…"[98]

On October 13, 1871, the Mayor of Chicago, R. B. Mason, turned over all contributions for the impacted citizens to the Chicago Relief and Aid Society. The Society comprised Chicago citizens charged with dispensing money and supplies to Chicagoans in need. Shortly thereafter, the "General Superintendent (in charge) of Distribution of Supplies" issued guidance to the Society as a whole that supplies would run out mid-winter without fiscal constraint. The Society advised "that not a single dollar be expended for persons able to provide for themselves, no matter how strongly their claims may be urged by themselves or others.…"[99] All those able to work joined the recovery effort and were compensated for their work, but direct aid was supplied only to those incapable of physical exertion. The Society cited St. Paul's rule, "if any man among you will not work, neither let him eat."

The relief workers took this charge seriously; according to a report by Frederick Law Olmstead: "The most scrupulous caution [was] taken to guard against waste or imposition, and to avoid encouraging improvidence, indolence, or a disposition to mendicant habits."[100] The dispensation of relief was complicated, as many Chicagoans were too proud to ask or be known to receive charity. Building materials with plans for constructing cabins were dispensed to thousands of homeless residents.

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[96] Pauly, John J., "The Great Chicago Fire as a National Event." *American Quarterly*, Vol. 36, No. 5., winter 1984, p. 671.

[97] Ibid., pp. 668-683.

[98] Ibid.

[99] O. C. Gibbs, General Superintendent (in charge) of Distribution of Supplies. Circular regarding the distribution of supplies. Oct. 24, 1871. From *The Great Chicago Fire and the Web of Memory*, "Organizing the Relief." http://www.chicagohs.org/fire/rescue/organizing.html.

[100] Olmstead, Frederick Law, "Chicago in Distress."

Insurance

American and European insurance companies paid most of their obligations to the city's residents and businesses, even though many of the insurance documents were lost in the fire.[101] The claims were not quantified in historical accounts of the fire, but payments from insurers did not match the magnitude of the charitable contributions. Although they paid the claims from the fire, insurance companies threatened not to insure unless city planning improved.[102]

> The City of Chicago didn't always inspect property in the early part of its history. No one thought this was important … until the Chicago Fire ripped through the city, leveling it in 1871. Because of that devastating fire, no insurance company in the country would insure any property in Chicago, unless and until they developed a unified Building Code. The Department of Buildings began in 1875 to ensure the enforcement of the Chicago Building Code relating to the construction, rehabilitation, and maintenance of approximately 450,000 structures located in the City of Chicago.[103]

Premiums of insurance subscribers were anonymously and efficiently redistributed to the families of those who died or were injured by the Chicago Aid Society: "Sympathy is re-enforced not only by the sense of fellowship and gratitude, but by public spirit, sagacity, and even selfishness."[104]

Overall Impact

Historians agree that the fire was a national catastrophe, affecting not only Chicago citizens, but the greater American and international trade, banking, and finance interactions. The Chicago Fire provided the first major opportunity for the North and South to work together after the Civil War and prove that the nation could be united once again. Although states from both sides of the Mason-Dixon Line sent aid to Chicago, the North donated more to the recovery effort, as the South was still recovering from the financial devastation of the war.

Several elements contributed to Chicago's speedy recovery. The greatest contribution to the recovery effort was charity from all over the United States and abroad. The Chicago Relief and Aid Society dispensed charitable funds with incredible efficiency and oversight, and it required all those who were able to help rebuild the city and earn the money that they were given. The insurance industry played an important role in the recovery as well by setting new mitigation requirements; it would not insure shoddy structures like the ones that had been hastily erected in Chicago's rapid development.

The recovery from the Chicago Fire was completely different than recent catastrophic recovery efforts. The Federal Government played a minimal role, and state governments stepped in only to

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[101] Pauly, John J., "The Great Chicago Fire as a National Event," p. 678.

[102] Ibid., p. 676.

[103] Ibid.

[104] "The Great Insurance Company," *Every Saturday*, 3 (1871), 458.

offer charity. Affected people took responsibility and worked to recover their own homes and businesses; many Chicagoans were too proud to accept charity from anyone. Much of Chicago's destruction was physical and could be rebuilt and replaced by hand (people's greatest assets were their homes, and they didn't have as much wealth at risk as today's Americans do).

1906 San Francisco Earthquake

Key Observations

- In 1906, San Francisco was the leading Western American city.
- 80% of the city was destroyed by the earthquake and ensuing conflagration.
- With local governors and responders largely overwhelmed, a local Army commander took the initiative and mobilized thousands of local troops to assist.
- The Federal Government appropriated funds, sent more Army units, and tasked the American Red Cross (created in 1881) with overall relief operations.
- Insurance industry funds were massively depleted because 90% of homes had fire policies.
- Earthquake and fire resulted in the uniformity of property contracts to avoid disputes, the emergence of international reinsurance firms to cover urban catastrophes, and the subsequent idea of "global insurance."

Background

On the morning of Wednesday, April 18, 1906, San Francisco was universally recognized as the leading Western American city. Roughly 410,000 people bustled through the streets, energizing the most important financial, trade, and cultural metropolis on the Pacific Coast. As the "gateway to the Pacific," San Francisco was both an international center for commerce and strategically important for the projection of U.S. naval power to Asia. In almost every capacity, San Francisco was the emerging capital of the American West just as America itself was emerging as a formidable power on the world stage.

San Francisco's prosperity was violently interrupted by the massive earthquake (8.3 on the Mercalli scale) that shook its streets at 5:12.[105] The force of the earthquake severed power lines and ruptured water mains. This unfortunate combination caused dozens of fires throughout the city and ensured that fire hoses would have no water immediately available to combat the flames.[106] The fire burned largely uncontrolled for three straight days. The earthquake and the ensuing fire left 80% of the city in ruins, and 90% of the total damage was attributed to the fire. The size and scope of the damage to San Francisco elicited a national response from both the public and private sectors. State and local firefighters and police surged to the scene. They were augmented by thousands of U.S. Army troops from the nearby Presidio base. Mayor Schmitz and Governor George C. Pardee's offices worked around the clock, but they too were assisted by the Federal Government in the form of President Roosevelt and the U.S. Congress. Private financial

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[105] "Predictive Intensity Map for the 1906 San Francisco Earthquake," U.S. Geological Survey website. http://quake.usgs.gov/research/strongmotion/intensity/1906.html. Accessed March 10, 2007.

[106] "The San Francisco Earthquake of 1906 and the Red Cross Response." From the American Red Cross Museum. http://www.redcross.org/museum/history/sanfranquake.asp.

and insurance firms based in San Francisco hastily relayed the extent of the damage to their national (and international) offices. Even local shelters and food kitchens were reinforced by national charitable organizations such as the American Red Cross. The financial and policy implications of the earthquake that struck San Francisco reverberated throughout the public and private sectors.

The numbers associated with the physical and financial damage caused by the San Francisco earthquake of 1906 are staggering:

- The overall cost of recovery ranged between $350 million and $500 million (in 1906 U.S. dollars).[107]
- Total economic loss represented 1.8% of U.S. gross domestic product in 1906.[108]
- 43 insurance firms paid out $235 million (in 1906 U.S. dollars) in settling over 100,000 claims.[109]
- 90% of the properties in San Francisco carried fire insurance.[110]
- Between 225,000 and 300,000 of San Francisco's 410,000 residents were left homeless.
- More than four square miles of the city were destroyed.[111]
- Only 700 deaths were reported at the time, but later estimates were closer to 3,000, some as high as 6,000.[112]

The Recovery Process

Direct Government Assistance

The overall government response to the 1906 San Francisco Earthquake was enormous and included officials from the Federal, state, and local levels making significant contributions of finances, time, personnel, and other resources. President Theodore Roosevelt and Congress appropriated $2.5 million (in 1906 dollars) for emergency relief in the San Francisco Bay area.

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[107] Odell, Kerry, and Ronnie J. Phillips, "Testing the Ties That Bind: Financial Networks and the 1906 San Francisco Earthquake," July 2001, p. 6. http://lamar.colostate.edu/~rphillip/odellphillips2.pdf.

[108] Munich Re, "The 1906 Earthquake and Hurricane Katrina: Similarities and Differences—Implications for the Insurance Industry," 2006, p. 3. http://www.munichre.com/publications/302-04961_en.pdf.

[109] Guatteri, Mariagiovanna, Martin Bertogg, and Andrew Castaldi, "A Shake in Insurance History: The 1906 San Francisco Earthquake." From Swiss Reinsurance Company, 2005, p. 12. http://www.swissre.com/Internet/pwsfilpr.nsf/vwFilebyIDKEYLu/ULUR-6KJGP6/$FILE/Publ06_EQ_SF_en.pdf.

[110] Guatteri, Mariagiovanna, Martin Bertogg, and Andrew Castaldi, "A Shake in Insurance History," p. 10.

[111] Odell, Kerry, and Ronnie J. Phillips, "Testing the Ties that Bind," p. 6.

[112] Guatteri, Mariagiovanna, Martin Bertogg, and Andrew Castaldi, "A Shake in Insurance History," p. 9.

This would be the equivalent of $56 million in 2006 dollars.[113] While this represented only a fraction of the price tag (estimated at $350 million to $500 million) for this catastrophe, the money was appropriated quickly and the Federal Government assisted in other ways besides direct monetary contributions. Just two days after the earthquake, while the fires were still burning, President Roosevelt and Secretary of War William Howard Taft put Congress and the Federal bureaucracy into action. Congress passed its first appropriation, amounting to $500,000 (in 1906 dollars), without debate on April 20. President Roosevelt and Secretary Taft also pushed the Army quartermaster to rush supplies to San Francisco from bases across the country.[114]

In the initial phases of recovery, the U.S. military was perhaps the most important organization in San Francisco. While President Roosevelt and Secretary Taft moved quickly to appropriate funds and coordinate assistance from national bases, it was the troops stationed in the Bay area that made the difference. Army units stationed nearby at the Presidio and Fort Mason reported to the streets of San Francisco and assisted the overwhelmed local police and fire departments. The fast response was largely due to the initiative and leadership of Brigadier General Frederick Funston. General Funston was awoken by the earthquake in his San Francisco home. After a quick survey of the city, Funston realized the gravity of the situation and sent messages to all his commanding officers to muster their units for immediate duty. Their response time and flexibility in the chaotic and changing situation were invaluable:

> Before ten o'clock the troops from Forts McDowell and Miley had arrived and there were now on duty about seventeen hundred regulars. They were used in various ways, guarding the people, the Sub-Treasury and the Mint, patrolling the streets to prevent looting, maintaining fire-lines, and taking a hand at the hose wherever there was sufficient water pressure to enable the firemen to accomplish anything.[115]

After the chaos of the first few days passed, the Army focused its efforts on providing shelter for the hundreds of thousands of instantly displaced residents. Tent cities were quickly erected and Army units also provided clothing and food for the victims. When many San Franciscans considered the scale of the damage against the relatively few casualties, an often heard comment was "Thank God for the Army!"

While the U.S. Army was naturally more adept at assisting San Francisco police and firefighters with their ground mission, the U.S. Navy also made a significant contribution in the crucial first

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[113] Epstein, Edward, "The Great Quake: 1906-2006—As With Katrina, Federal Role Caused Discord." *San Francisco Chronicle*. April 18, 2006. From http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/04/18/MNGQRESPONSE18.DTL.
Price adjusted using the consumer price index from "Measuring Worth." http://www.measuringworth.com/calculators/compare/. Accessed March 16, 2007.

[114] Epstein, Edward, "The Great Quake: 1906-2006—As With Katrina, Federal Role Caused Discord."

[115] Funston, Frederick, Brigadier General, U.S. Army. "How the Army Worked to Save San Francisco. Personal Narrative of the Acute and Active Commanding Officer of the Troops at the Presidio." *Cosmopolitan Magazine*. Vol. XLI, July 1906, No. 3. From the Virtual Museum of the City of San Francisco. http://www.sfmuseum.org/1906/cosmo.html. Accessed Oct. 20, 2006.

few hours after the earthquake. Navy vessels were used to pick up naval doctors and nurses from surrounding bases and transport them to the city to assist with patients. On their way out, Navy vessels assisted in the evacuation by moving 20,000 to 30,000 people over water to Oakland and other less-affected cities in the Bay area. Additionally, the Navy assisted the fire department by putting out as many fires as possible from the water.[116]

At the state and local levels, government offices and services were largely overwhelmed. Firefighters had to confront multiple blazes with many of the water mains ruptured by the earthquake. Additionally, as Fire Department Chief Engineer Shaughnessy remembers, San Francisco was particularly vulnerable to conflagration, as "ninety percent of the buildings of San Francisco were frame and were constructed on hilly territory, with the winds of the Pacific Ocean sweeping over the city at all hours."[117] With the fire spreading rapidly and with most fire hydrants useless, the department had to improvise. Multiple 800-foot hoses were connected from the few hydrants that did work. Dynamite provided by the U.S. Army was used in some instances to topple buildings and form a barrier to the approaching fire. Given the situation, it was generally held that the fire department did a remarkable job to save as much of the city from the flames as it did.

The mayor's office and the city police were also in dire straits. Many police officers were so busy ferrying wounded to temporary hospitals that they could keep little control over the growing number of looters throughout the city. Even if they had been able to arrest all the looters and criminals, they had no place to incarcerate them. When Mayor E. E. Schmitz learned of this, he issued a "shoot to kill" order for all police, stating, "As it has come to my attention [that] thieves are taking advantage of the present deplorable conditions and are plying their nefarious vocations among the ruins in our city, all peace officers are ordered to instantly kill any one caught looting or committing any other serious crimes."[118] The police regained control of the city by dividing responsibility for it with Army soldiers and the National Guard. After a few weeks, responsibility for the entire city was returned to the San Francisco police.

In general, the San Francisco earthquake and resulting fire overwhelmed state and local government. Firefighters, police, and local officials contributed heroic efforts to the cause of saving their city, but ultimately they required large amounts of Federal aid in order to halt the destruction and begin the recovery process.

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[116] Freeman, Frederick, Lieutenant, U.S. Navy. Personal letter. April 30, 1906. From the Virtual Museum of the City of San Francisco. http://www.sfmuseum.org/1906/usn.html. Accessed Oct. 16, 2006.

[117] Shaughnessy, Patrick H., "San Francisco Fire Department Report." Sep. 13, 1906. From the Virtual Museum of the City of San Francisco. http://www.sfmuseum.net/conflag/cod.html. Accessed Oct. 16, 2006.

[118] Duke, Thomas S., "Synopsis of the San Francisco Police and Municipal Records of the Greatest Catastrophe in American History," 1910. From the Virtual Museum of the City of San Francisco. http://www.sfmuseum.org/1906/06pd1.html.

Insurance

The insurance industry in San Francisco was not prepared for a catastrophe of the 1906 earthquake's magnitude. The fact that 90% of the homes in San Francisco were covered by fire insurance was evidence that the regional insurers had not collectively considered the possibility of a conflagration affecting the entire city. The insurers had considered writing earthquake policies and dismissed the idea on the grounds that the entire city would be affected in that eventuality. The combination of these two factors led to disastrous results: "43 insurance companies paid a total of" $235 million ($4.9 billion in 2005 dollars) "for more than 100,000 settled claims. This equals roughly 100 times the 1906 premium amount for fire insurance for San Francisco. This amount effectively eliminated the entire US insurance market's profit of the 47 preceding years."[119]

Settling claims for this catastrophe proved particularly difficult. It was often impossible to determine the initial cause of damage for an individual building or residence. Consider that San Francisco buildings were damaged by one or more of the following: earthquake, fire, U.S. Army or San Francisco police demolition teams, arson, or general pandemonium.[120] Insurance companies could not distinguish between fire and earthquake damage to San Francisco buildings.[121] Some property owners set fire to their damaged buildings, because most insurance policies covered fire losses while prohibiting payment if the building had sustained only earthquake damage. Captain Leonard D. Wildman of the U.S. Army Signal Corps reported, "… I was stopped by a fireman who told me that people in that neighborhood were firing their houses, as they were told that they would not get their insurance on buildings damaged by the earthquake unless they were damaged by fire."[122] To add even more complications to settling claims, it was common in San Francisco to have several insurance companies insuring a single location. The earthquake and resulting catastrophic fire revealed that each company had its own, often conflicting policy terms and conditions.[123]

The San Francisco earthquake had an extensive impact on the insurance industry. After the initial damage estimates were calculated and before the claims were settled, the major insurance agencies met in New York City to discuss the way ahead. They agreed to pay the majority of the San Francisco claims, despite conspiracies regarding damage other than fire, and agreed to adopt uniform property contracts and wording designed to avoid confusion in settling future claims.[124] What also emerged from this catastrophe was the idea of insurance as a global concept. The large

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[119] Guatteri, Mariagiovanna, Martin Bertogg, and Andrew Castaldi, "A Shake in Insurance History," p. 12.

[120] Ibid.

[121] Ibid.

[122] Wildman, Leonard D., Captain, U.S. Army, Report on San Francisco Fire. April 27, 1906. From the Virtual Museum of the City of San Francisco. http://www.sfmuseum.org/1906.2/arson.html. Accessed Oct. 16, 2006.

[123] Guatteri, Mariagiovanna, Martin Bertogg, and Andrew Castaldi, "A Shake in Insurance History," p. 13.

[124] Ibid.

insurance agencies were better able to compensate those suffering because of their "greater financial strength and broader risk spread."[125] This catastrophe made the insurance industry acutely aware of the exposure of major cities to catastrophes and what an insurance risk those situations entailed. It resulted in the emergence of even larger, international reinsurance firms to cover the potential damage from urban catastrophes.

Charity

The most organized and influential charity involved with the San Francisco earthquake of 1906 was the American Red Cross (ARC). Established in May 1881, the challenge of this catastrophe was a major stepping stone for the development of the ARC. In a broad use of executive power, President Roosevelt installed an appointee to lead the ARC and gave the organization overall responsibility for relief operations. Roosevelt declared that the ARC was "the only organization chartered and authorized by Congress to act at times of great national calamity."[126] This executive mandate served to place the ARC in the driver's seat for organizing charitable donations and the larger relief and recovery operation.

When the ARC and subordinate charities arrived in San Francisco, they partnered with the Army, police, and local officials to meet the immediate needs of the victims. ARC nurses and doctors set up makeshift healthcare facilities. ARC headquarters had so many doctors and nurses volunteering their services that ultimately the ARC had to turn down some offers by medical professionals.[127] As critical needs were eventually brought under control, the ARC and other charitable organizations turned toward the long-term recovery mission.[128] In doing so, they took over many services that had been provided by the Army since the day of the earthquake. Their broadened efforts included providing kitchens that accepted food tickets or just ten cents for a meal; constructing simple houses to replace the tent cities erected by the Army; providing a $500 reward for citizens who agreed to rebuild permanent homes on burned land; reestablishing the business district by providing craftsmen with tools and tradesmen with goods; offering $500 loans to qualified applicants for reestablishing their livelihood; and distributing the remaining funds in various forms based on the needs of the applicants.[129] To process the thousands of claims more effectively, the ARC divided San Francisco into districts and reorganized its overall effort. Reacting to complaints that the claims application process was unnecessarily tedious, the ARC created a Bureau of Special Relief with a fast-track system designed for those most in need.

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[125] Ibid.

[126] "The San Francisco Earthquake of 1906 and the Red Cross Response." From the American Red Cross Museum. http://www.redcross.org/museum/history/sanfranquake.asp. Accessed Nov. 16, 2006.

[127] Ibid.

[128] Stohr, Kate, "San Fran's Lessons for New Orleans," From *BusinessWeek Online*. http://businessweek.com/innovate/content/sep2005/id20050909_175049.htm.

[129] Money in 1906 U.S. dollars. "The San Francisco Earthquake of 1906 and the Red Cross Response." From the American Red Cross Museum.

ARC leadership of the relief and recovery process provoked complaints and even accusations of profiteering by some of the contractors the ARC hired to run kitchens. Nevertheless, the ARC played an integral role by integrating local and national charitable efforts and volunteers into a single relief and recovery effort.

Overall Impact

The aftermath of the 1906 San Francisco Earthquake redefined the roles of government, charity, and the insurance industry in disaster recovery. By immediately appropriating funds, mobilizing the Army, and appointing the American Red Cross, the Federal Government took a larger-than-ever role in disaster relief. Charitable giving was substantial from throughout the United States. Moreover, President Roosevelt's empowerment of the ARC to be the lead disaster relief organization set an important precedent for future administrations in Federal control of such situations. While it would be decades before the creation of FEMA or other Federal organizations involved with disaster recovery, the significantly expanded role of the ARC in this recovery was a first step down the path toward government involvement in the recovery process. Similarly, the shock to the insurance industry provided by this disaster resulted in significant standardization of policies between firms and expansion of the insurance industry as a whole.

1927 GREAT MISSISSIPPI FLOOD

Key Observations

- 600,000 Americans were displaced by the flood, which affected seven states (26,000 square miles).
- A high level of public awareness regarding flood potential in the months preceding the levee breaks kept casualty figures relatively low.
- Secretary of Commerce Herbert Hoover was given largely unlimited power by President Coolidge to be recovery czar.
- Hoover's role set a precedent for Presidential appointees to lead natural disaster recovery efforts.
- Hoover's Flood Commission was an efficient and unique blending of public and private organizations, charities, and individuals focused on recovery.
- Hoover used centralized decision making and decentralized execution to empower local authorities while maintaining overall control.
- Integration of the American Red Cross and its state and local networks was key to success.
- African Americans were pressed into levee repair and rebuilding work by local government, highlighting the lack of Federal oversight of state and local disaster response.
- The magnitude of uninsured losses made some Federal legislators consider federally subsidized flood insurance programs.

Background

Unlike the 9/11 attacks, the Chicago Fire of 1871, or the San Francisco Earthquake and Fire of 1906, the Great Mississippi Flood of 1927 was not a complete shock to those affected. Heavy rains had been pounding the central basin of the Mississippi since the summer of 1926. By April 1927, residents up and down the river basin were well aware of how high the river had risen, and there was widespread speculation about whether the levee system would hold. Two days before the first levee break, the *Memphis Commercial-Appeal* warned: "The roaring Mississippi river, bank and levee full from St. Louis to New Orleans, is believed to be on its mightiest rampage.… All along the Mississippi considerable fear is felt over the prospects for the greatest flood in history."[130] Additionally, residents along the Mississippi were used to the river's periodic large-scale flooding—so much so that "people who lived along [the river] came to measure time not simply in years, but in [great] flood years—1858, 1862, 1867, 1882, 1884, 1890, 1897, 1903,

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[130] Barry, John M., *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America*. New York: Simon and Schuster, 1997, p. 13.

1912, 1913, 1922."[131] The potential catastrophe of a great flood was well understood throughout the Mississippi River basin.

The level of public awareness kept the overall casualty figures relatively low and allowed residents and the government time to attempt to fortify levees and prepare for the flood. Nevertheless, the series of breaks in the levees that began in Dorena, Missouri, on April 16 inflicted catastrophic results on the Mississippi River basin. In nearly four months of damaging flooding, the Mississippi River levees broke in 145 places and sent hundreds of millions of gallons of water violently washing over seven states.[132] Roughly 26,000 square miles of land in those seven states was flooded, resulting in over 200,000 homes and other buildings destroyed and hundreds of millions of dollars (in 2005 U.S. dollars) of crops and farm animals ruined and killed. More than 600,000 Americans were displaced and forced into temporary relief camps.[133] Additionally, the combination of disastrous flood effects and persecution from local officials resulted in thousands of African Americans fleeing Mississippi Valley farmland for Northern cities.

The scope of recovery was amazing. Key statistics:

- The cost was $12 billion in 2005 dollars
- Counties affected: 170
- Maximum length of flood: 1,000 miles
- Maximum width of flood: 80 miles
- Square miles of cultivated land inundated: 8,265
- Breaks in protection levees: 145
- Emergency boats used by the Red Cross in rescue work: 5,934
- Persons fed by the Red Cross during the emergency: 637,476
- Refugee camps operated by the Red Cross: 154
- Persons inoculated against typhoid fever: 457,719
- Persons inoculated against smallpox: 146,745
- Grains of quinine distributed to combat malaria: 25 million
- Acres planted with Red Cross assistance in 1927 and 1928: 2,199,551

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[131] Daniel, Pete, *Deep'n As It Come: The 1927 Mississippi River Flood*. New York: Oxford University Press, 1977, pp. 4-5, quoted in Kevin R. Kosar, "Disaster Response and Appointment of a Recovery Czar: The Executive Branch's Response to the Flood of 1927." Congressional Research Service report, Oct. 25, 2005, p. 2. http://www.fas.org/sgp/crs/misc/RL33126.pdf.

[132] Ibid., p. 3.

[133] Ibid.

- "The public donated and the Red Cross delivered over $21 million [$234.9 million] in aid. The federal government provided, perhaps, $10 million [$111.8 million] in resources and manpower—nearly $32 million [$346.7 million] in all."[134]

The Recovery Process

The recovery process was unique in its concentration of power and the blending of public- and private-sector efforts. President Calvin Coolidge tapped his Secretary of Commerce, Herbert Hoover, to organize and lead a comprehensive recovery effort. Although a government appointment, Hoover's position as recovery czar allowed him virtually unlimited control over a large collection of private and government resources and organizations. Thus empowered, Hoover was able to cut through red tape and respond rapidly to the needs of the Mississippi Valley. Well organized and highly efficient, Hoover's recovery process produced rapid results. Power and lack of oversight, while efficient, allowed some inadvisable decisions by Hoover and his Flood Commission. One such decision was to turn a blind eye to the numerous abuses of African Americans by local police and other officials. African Americans were impressed into service filling sandbags, repairing levees, and any other menial task of the recovery effort that needed labor.

Direct Government Assistance and Charity

As President Coolidge's recovery czar, Hoover struck an efficient balance between centralized policy and decentralized execution. Establishment of the quasi-government Flood Commission gave the former Secretary of Commerce the chairmanship of the American Red Cross (ARC) and presidential backing to call on the resources of government or private organizations. However, instead of descending on the Mississippi Valley with a Federal task force, Hoover's commission decided to rely on and empower the existing ARC networks in each state. This strategy proved advantageous: First, the ARC had an existing and efficient fundraising system that could be mobilized and expanded to solicit donations from across the nation. Second, most of the affected counties already had ARC chapters chaired by prominent men in those communities. These men, further empowered by Federal and state supplies and funding, had the local connections, ability, and incentive to move the recovery process along swiftly. Third, using the ARC would save money on administration costs and strengthen ARC ties to the local communities.

To coordinate county ARC efforts but remain detached themselves, the Flood Commission also decided that the affected states would appoint "dictators" to manage their state's recovery. Each dictator "would serve as the point-person for the state … and see to it that state resources were provided to the centrally directed response."[135] In most states, the person appointed shared close ties with the governor's office or was already a state employee or elected officeholder. Figure 3 shows the flood command organization.

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[134] Kosar, Kevin R. "Disaster Response and Appointment of a Recovery Czar," p. 8.

[135] Ibid., pp. 5-6.

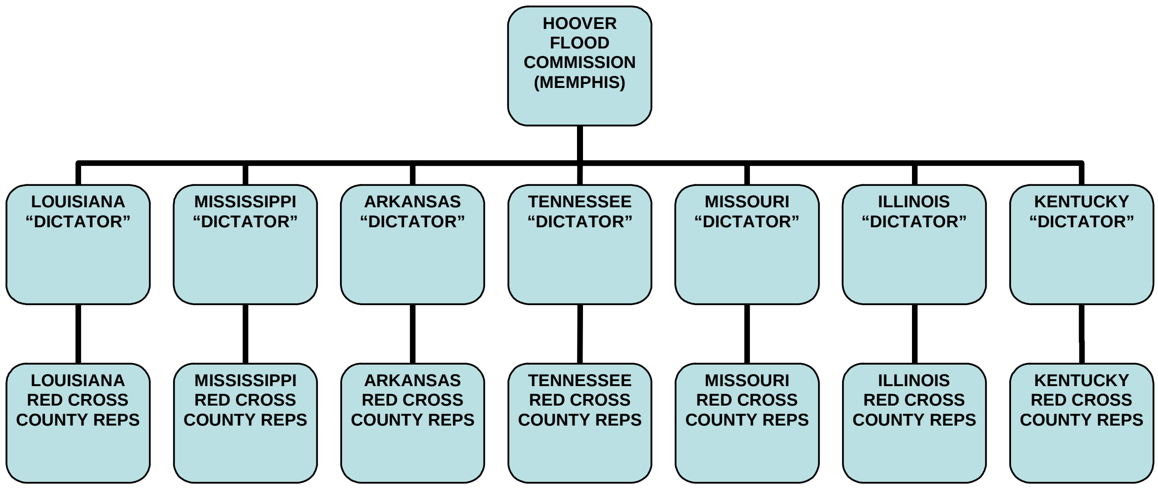

Figure 3. Federal Government–American Red Cross Organizational Chart for 1927 Mississippi Flood Recovery.

While given autonomy to coordinate recovery operations within their own states, these dictators ensured that they had representatives at the Hoover Flood Commission Headquarters in Memphis. Henry M. Baker, director of the ARC and Hoover’s lead administrator, ran the Memphis headquarters, which served a central purchase, supply, and logistics function.

> Red tape disappeared. Representatives from every Federal agency, from the Army to the Public Health Service, and several governors soon sat near Baker’s desk. When Baker needed something, he called the appropriate man, who took care of it. Thirty yards away a Red Cross purchasing agent conducted a nearly continuous reverse auction; he stood on a platform and shouted out supplies and quantities needed, and dozens of suppliers shouted back bids.[136]

Insurance

Given the propensity of the Mississippi River to flood every four or five years and Federal Government policy to cover disaster relief, few insurance firms offered flood insurance, and few landowners looked to purchase it.[137] Some farmers were careful to carry flood insurance to prevent an entire crop from being lost, but that was not the norm. After the Great Flood of 1927, as in previous floods, the Federal Government provided relief funding for thousands whose destroyed properties were uninsured. However, the magnitude of the uninsured losses associated with the 1927 flood resulted in a wide range of other Federal solutions to assist those recovering but also to mitigate the damage of the next flood. While it would be years before implementation,

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[136] Barry, John M., *Rising Tide*, p. 274.

[137] King, Rawle O., “Federal Flood Insurance: The Repetitive Loss Program.” Congressional Research Service report, June 30, 2005, p. 5. http://www.fas.org/sgp/crs/misc/RL32972.pdf.

the proposals for a federally subsidized flood insurance program were the result of the 1927 Great Flood recovery effort.[138]

Overall Impact

The Great Flood of 1927 recovery effort was remarkable for the significantly larger Federal role compared with previous catastrophes. The Federal Government did not simply assist the affected state governments but instead directed them from Flood Commission headquarters. State governments were certainly integrated into the process, but there could be no doubt that Herbert Hoover had ultimate control over the recovery efforts. In this way, the Great Flood recovery effort represented one of the earlier moments when the Federal Government made it known that it would assume control (and responsibility) if a natural disaster reached the mega-catastrophe level. Considering the modern popular conception of moral hazard and the size and scope of the current Federal disaster recovery bureaucracy, this was an important precedent.

The Great Flood recovery effort was also remarkable for how the Hoover Flood Commission approached its mission. By most accounts, the synthesis of public and private interests that took direction from Hoover was remarkably efficient. The concept of centralized decision making but decentralized execution allowed state and local representatives to receive their marching orders and funding but then accomplish the job as they saw fit. The integration of the American Red Cross state and local networks was also critical to the success of this strategy. While this system was undoubtedly efficient, it owed much of its success to the persecution of African Americans on whose backs much of the recovery work was completed. The lack of Federal oversight in this recovery effort illuminated a need for significant government oversight in later natural disasters.

[138] Thornton, Mark, "The Government's Great Flood," *Free Market*, September 1999, Vol. 17, No. 9. From http://www.mises.org/freemarket_detail.asp?control=8&sortorder=articledate.

SEPTEMBER 11[139]

Key Observations

- Nearly 3,000 killed in a devastating attack on New York City's financial district and the Pentagon.
- Short-term impact only for New York City financial district tenants, as they quickly moved to planned alternative locations.
- Long-term impact on the insurance industry, prompting passage of TRIA.
- Government-coordinated dispensation of benefits through the Victim Compensation Fund.
- Coordination of compensation mechanisms was a significant issue.
- Hundreds of new charities were created after 9/11, and existing charities moved quickly to fill gaps left by government and the insurance industry. Extensive government involvement in all compensation mechanisms.
- Resilience of the financial system was impressive and a model for other critical infrastructure sectors.
- Insurance paid out claims, but may not have been prepared to handle a second catastrophe in quick succession.

Background

On September 11, 2001, terrorists flew two airplanes into the World Trade Center and one into the Pentagon. As part of the same coordinated attack, another commercial airliner crashed into a field in Pennsylvania, killing all on board. As a result of the impacts and ensuing fires, the twin towers of the World Trade Center came crashing down, devastating lower Manhattan and shocking millions of Americans. One wing of the Pentagon was severely damaged. The United States faced an unexpected loss of life, property, and income. The attack killed and severely injured thousands of people and noticeably impacted financial and insurance markets as well as the airline industry.

Insurance companies scrambled to classify the event and begin to pay the property-casualty claims arising from the destruction in the financial center of New York City and the death of many of its occupants. The financial markets felt the sting of the attack: they lost lives and

[139] Although 9/11 was not a natural disaster, it was definitely a mega-catastrophe that involved all four compensation mechanisms. It is also the only Terrorism or War Damage case study that we have explored. Following the conclusion of the final case study, a Terrorism and War Damage section has been included. For the sake of chronological continuity, HSI has included it here.

property, had to relocate, and had to provide counseling to remaining employees.[140] The telecommunication infrastructure experienced destruction that made some financial transactions and most telephone communications impossible. Commercial aviation was grounded for almost a week and required a government bailout costing billions of dollars. However, the financial industry was resilient. It was back on its feet within hours—working from other offices or contingency sites, having planned for severe physical and cyber destruction.[141]

This event resulted in severe physical damage of specific targets (lower Manhattan and the Pentagon), unlike the widespread physical destruction incurred in a major natural disaster. Around the World Trade Center site, the sky was filled with dust, including building debris and combustion byproducts containing lead and asbestos.[142]

The event impacted the banking and finance sector in the short term and affected the industry in the long term. Government involvement was unique and unprecedented. The government stepped in to help the insurance industry by passing TRIA, an act that limits the maximum payouts by insurers in the event of a terrorist event, and helped the airlines and victims by passing the Victim Compensation Fund.

Because this catastrophe happened so recently, data are readily available from a multitude of charities, the insurance industry, and the Federal Government. However, lawsuits are still in progress and money is still being spent on physical reconstruction. The actual value of recovery may be a bit higher than we estimate in this case study. Summary statistics are listed below.

- Deaths: 2,973; 2,749 killed by the attack on the World Trade Center; 40 killed in United Airlines flight 93; 184 killed in the Pentagon.[143]
- Number seriously injured: Hundreds, if not thousands.[144]

[140] Ferguson, Roger W., Jr., remarks by the Federal Reserve Board Vice Chairman at the Conference on Bank Structure and Competition, Chicago, May 9, 2002. From http://www.federalreserve.gov/boarddocs/Speeches/2002/20020509/default.htm. Accessed Oct. 25, 2006.

[141] Ibid.

[142] Office of the Inspector General, Environmental Protection Agency, "Evaluation Report: EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement." Report No. 2003-P-00012, Aug. 21, 2003. From http://www.epa.gov/oig/reports/2003/WTC_report_20030821.pdf. Accessed Nov. 6, 2006.

[143] Excluding 19 hijackers. 9/11 Commission Report. Numbers as of 2004, FBI report on victims.

[144] Numbers vary by source; there may have been undocumented workers in the World Trade Center, and the long-term health effects in lower Manhattan are still unclear.

- Total quantified benefits—those killed in plane crashes and at the Pentagon and World Trade Center:
  - Charity ~$2.7 billion.[145]
  - Government ~$31 billion.[146]
  - Insurance ~$35.6 billion.[147] (Value excluding assistance to airlines or benefits paid for the repair of public buildings, the transportation system, or other parts of public infrastructure—these benefits are estimated in each part of the "compensation mechanisms" section.)

The Recovery Process

In all forms of compensation, the response to 9/11 was unprecedented. The government pledged billions of dollars for recovery and reconstruction and established the Victim Compensation Fund. The insurance industry paid almost all claims. In fact, shortly after 9/11, a group of insurance companies took out a full-page ad in the *New York Times* promising to pay all claims resulting from the catastrophe.[148] Longstanding charities rallied and new organizations formed and dispensed aid to victims' families and other affected individuals (including emergency responders). The torts system was not often used because of the caveats attached to relief from the Victim Compensation Fund, but some lawsuits are still pending (against Boeing, the Environmental Protection Agency, and the Saudi government, for example). Physical reconstruction was stymied by the presence of many harmful compounds in the dust from the collapsed buildings and destroyed airplanes.

Coordination between compensation mechanisms was a major issue. Victims' families faced an incredibly confusing range of benefits and were separately contacted by charities, government agencies, and insurance actuaries.[149] They were forced to recount their tragedy over and over for lack of coordination. Charitable organizations did not communicate with one another or with Federal agencies, and Federal agencies often responded without coordinating with one another. For example, when the Special Master of the Victim Compensation Fund approached charities to broach the topic of offsetting charitable donations from Victim Compensation Fund awards, the

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[145] "September 11: More Effective Collaboration Could Enhance Charitable Organizations' Contributions in Disasters," Washington, DC: U.S. General Accounting Office, GAO-03-259, December 2002. http://www.gao.gov/new.items/d03259.pdf.

[146] $20 billion physical, $5 billion to airlines, $6 billion Victim Compensation Fund.

[147] Valverde, L. James, Jr., and Robert P. Hartwig, "9/11 and Insurance: The Five Year Anniversary." Insurance Information Institute press release, September 2006.

[148] Korkuch, Marylu. Chubb Corporation, personal communication.

[149] "September 11: More Effective Collaboration Could Enhance Charitable Organizations' Contributions in Disasters."

charities refused to provide information on the size of those donations.[150] As a result, people sometimes received compensation from charities and the Victim Compensation Fund for the same loss.[151]

Direct Government Assistance

Overall government assistance after 9/11 far exceeded previous post-disaster aid in catastrophic events. That being said, the quantity and quality of Federal assistance provided in the aftermath of 9/11 varied by government agency, as would be expected from such a unique circumstance. Most performed well, but others made hasty choices that may have a negative long-term financial impact. The Environmental Protection Agency, for example, with encouragement from the White House Council on Environmental Quality, announced on September 18 that the air in lower Manhattan was safe to breathe when it did not have data to back it up.[152] The Environmental Protection Agency and Council on Environmental Quality had no health-based benchmarks to which they could compare the World Trade Center site, but they made an educated guess that the area was clean enough to reopen the area for human habitation.[153] Cleanup of the area around the World Trade Center site is still in process.[154] If the contamination from the site turns out to be carcinogenic or otherwise harmful, it will be years before we know the cost to insurance and the government agencies.

The 2001 Emergency Supplemental Appropriations Act for Recovery From and Response to Terrorist Attacks on the United States provided over $20 billion for physical reconstruction in New York, Virginia, and Pennsylvania.[155] The Federal Government pledged $20 billion to help the New York City area recover and $5 billion to help airlines recover in the immediate aftermath. Congress capped the liability of airlines, airports, and local governments to existing insurance coverage limits, required all lawsuits to be filed in Federal court, and established the Victim Compensation Fund.[156] Billions more were spent on infrastructure reconstruction and homeland security efforts to reduce vulnerability to future attacks. As well as monetary compensation, victims (and their families) received significant tax breaks and Social Security

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[150] Justice Department news conference with Kenneth Feinberg, Special Master for the September 11th Victim Compensation Fund, Federal News Service, Dec. 20, 2001.

[151] Katz, Robert A., “Too Much of a Good Thing: When Charitable Gifts Augment Victim Compensation.” *DePaul Law Review*, Vol. 52, No. 2, 2003. From http://ssrn.com/abstract=938565. Accessed Nov. 20, 2006.

[152] Office of the Inspector General, Environmental Protection Agency. “Evaluation Report: EPA’s Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement,” p. i.

[153] 9/11 Commission Report.

[154] “EPA Response to September 11: Frequently Asked Questions.” From http://www.epa.gov/wtc/questions/index.html. Accessed Nov. 6, 2006.

[155] Public Law 107-38.

[156] Public Law No. 107-42, 115 Stat. 230 (codified at 49 U.S.C. § 40101).

benefits.[157] The cleanup of the Pentagon was funded by an emergency supplemental directly to the Department of Defense.

The Victim Compensation Fund was the most notable form of government assistance after 9/11. It was established as part of the Air Transportation Safety and Stabilization Act (Public Law 107-42) to compensate the families of the dead or seriously injured in the events of 9/11.[158] The Victim Compensation Fund was patterned to some extent after the tort system, as projected earnings were the starting point (at least for those with incomes up to the 98th percentile of incomes of all wage earners).[159] Claimants under the Victim Compensation Fund waived the right to sue the government for the deaths or injuries incurred during 9/11, significantly diminishing the number of litigations against the Federal Government.

Overall, the Victim Compensation Fund paid 2,880 death claims (for 97% of those killed) and 2,680 personal injury claims. Average awards for those killed exceeded $2 million, and the average injury award was almost $400,000.[160] There have been complaints that if the event was considered an airline crash, claimants would be compensated much more in non-economic damages in a *successful* torts case.[161] However, the risk of losing such a case deterred most of the victims from suing.

Additionally, the Department of Justice created a "Terrorism and International Victims Unit" in its Office for Victims of Crime (funded through the Crime Victims Fund) to make antiterrorism and emergency assistance funding available in the aftermath of 9/11.[162] The Crime Victims Fund collects money from "criminal fines, forfeited bail bonds, penalty fees, and special assessments collected by the Offices of the U.S. Attorneys, the U.S. Courts, and the Bureau of Prisons."[163] This unit provided over $42 million in the form of crisis counseling, emergency transportation and housing, and emergency food, among other things.[164]

The Federal Government also passed TRIA, which limited the liability of the insurance industry following a terrorist act, as described in the War Damage and Terrorism section.

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[157] Victims of Terrorism Tax Relief Act of 2001: Public Law 107-134. Public Law 107-42 and Social Security Administration, from http://usgovinfo.about.com/cs/waronterror/a/ss911.htm. Accessed Nov. 20, 2006.

[158] Public Law No. 107-42, 115 Stat. 230 (codified at 49 U.S.C. § 40101).

[159] Feinberg, Kenneth R., et al. *Final Report of the Special Master for the September 11th Victim Compensation Fund of 2001, Volume 1*. U.S. Department of Justice, Nov. 18, 2004. From http://www.usdoj.gov/final_report.pdf. Accessed Nov. 6, 2006.

[160] Ibid., p. 1.

[161] Dixon, Lloyd, and Rachel Kaganoff Stern, *Compensation for Losses From the 9/11 Attacks*. Santa Monica, CA: RAND, 2004, pp. 34-35. From http://www.rand.org/pubs/monographs/MG264/.

[162] Public Law 98-473, codified at 42 U.S.C. 10601.

[163] Siskin, Alison, "Assistance for Victims of Crime and Terrorism." Washington, DC: Congressional Research Service, report RL31295, Feb. 21, 2002.

[164] From the Office for Victims of Crime. http://www.ojp.usdoj.gov/ovc. Accessed Nov. 7, 2006.

Insurance

The estimated loss from 9/11 to the insurance industry was $35.6 billion.[165] Insurers mobilized hundreds of adjusters to evaluate and process claims after 9/11 and were generally lauded for their quick response and generous interpretation of policies (the few problems came from business interruption insurance). Thirty-three percent of claims were from business interruption in the World Trade Center, by far the highest fraction of industry loss estimates.[166]

The attacks were classified as an extreme event by the insurers and made obvious the necessity of considering terrorism in insurance policies. How would the insurance industry handle the possibility of a new, unpredictable risk? When there was no actuarial evidence, how could insurers charge premiums and expect to cover unknowable losses?

War exclusion clauses are written into most insurance policies, but the distinction between an act of war and an act of terrorism is unclear. TRIA defines an act of terrorism:

> … a violent act or an act that is dangerous to--
>
> (I) human life;
>
> (II) property; or
>
> (III) infrastructure
>
> … to have resulted in damage within the United States, or outside of the United States in the case of--
>
> (I) an air carrier or vessel …
>
> (II) the premises of a United States mission; and …
>
> to have been committed by an individual or individuals acting on behalf of any foreign person or foreign interest [excluding an act of war][167]

The Chubb Corporation, along with other New York insurers, decided on September 11 that the war exclusion clause would not be invoked in post–9/11 claims.[168] Insurance companies proactively contacted the families of policyholders to explain benefits (mainly workers' compensation). Complications for this catastrophe included the high amount of advance payments, obstacles to inspection, concentration of damage, and stress of the situation.

The insurance industry was capable of covering the losses of 9/11. However, if another such event had happened in quick succession, such as a large hurricane in the same year, the industry might have had huge problems paying all of the claims.

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[165] Valverde, L. James, Jr., and Robert P. Hartwig, "9/11 and Insurance: The Five Year Anniversary."

[166] Ibid.

[167] H.R.3210; TRIA. Sec. 102, definitions. From http://www.ustreas.gov/offices/domestic-finance/financial-institution/terrorism-insurance/pdf/hr3210.pdf.

[168] *ChubbCircle*, Special Issue on 9/11.

Charity

According to surveys, almost two-thirds of Americans made financial contributions to charities for victims of the 9/11 attacks, totaling upwards of $2.5 billion.[169] The New York Attorney General's office estimated that over 250 charitable funds were created directly following 9/11.[170]

The charities responded quickly, and they gathered and distributed money swiftly. They identified needs missed by government and insurance programs (that is, undocumented workers, small businesses, and those who didn't qualify for unemployment). They provided food, shelter, and spiritual and mental health services for relief workers and victims.[171] For example, the Salvation Army, along with 107,169 volunteers, served 5 million meals to relief workers and victims in New York, Washington, and Pennsylvania.[172]

The September 11th Fund was a unique charity designed as a collaboration between the New York Community Trust and the United Way of New York City; it dispersed $528 million in financial assistance and services to people and businesses affected by 9/11.[173]

Charities are exempt from income taxes based on Section 501(c) of the Internal Revenue Code, which has some stipulations about where the charitable donations can be dispensed.[174] In the case of 9/11 and the anthrax attacks, the IRS suspended this dispensation requirement, and charities received exemption to distribute money to the families of those killed in the attacks, regardless of their need.[175]

The Neediest Cases Fund, established 90 years ago by the *New York Times*, had a goal of raising $8 million but ended up bringing in over $61 million in a very short period and found that social service agencies worked exceptionally well together after 9/11.[176] The greatest charitable contribution to the recovery, from the American Red Cross, was a total of $904,683,000 to families of the dead and seriously injured.[177]

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[169] Wolfe, M. Ann, "Homeland Security: 9/11 Victim Relief Funds." Washington, DC: Congressional Research Service, March 27, 2003. Cites the Center on Philanthropy at Indiana University, 2003. http://www.law.umaryland.edu/marshall/crsreports/crsdocuments/RL31716.pdf.

[170] Ibid.

[171] American Red Cross—Liberty Disaster Relief Fund. From http://www.redcross.org/pubs/car04/libertyDRF04.pdf. Accessed Nov. 20, 2006.

[172] From the Salvation Army website. http://www.salvationarmy-usaeast.org. Accessed Nov. 6, 2006.

[173] The September 11th Fund Final Report, Dec. 8, 2004. From http://september11fund.org/sep11fund_final_report.pdf. Accessed Nov. 6, 2006.

[174] Internal Revenue Code 501(c)(3).

[175] Victims of Terrorism Tax Relief Act of 2001, Public Law 107-134, enacted Jan. 23, 2002.

[176] *New York Times* 9/11 Neediest Fund website. From http://www.nytco.com/company/foundation/neediest/index.html. Accessed Nov. 7, 2006.

[177] Liberty Disaster Relief Fund Report, December 2004. Data from inception (9/11) to June 30, 2004.

Overall, charities contributed a remarkable amount of manpower and money, as well as psychological counseling, to the recovery effort. There were a few criticisms, however. Duplicated payments and communication breakdowns between and among charities were not uncommon. Big charities were also criticized for focusing too much on Lower Manhattan and not enough on other parts of the New York City region.

Litigation

Liability caps and the Victim Compensation Fund have limited the role of the tort system so far (as the recovery process is ongoing). Some lawsuits are in process, but none have gone to trial or been settled yet. It is not possible to determine the amount of money from torts at this time.

However, the torts system did play a role in 9/11 recovery and victim relief. The Association of Trial Lawyers of America, an international coalition of attorneys, law professors, students, and paralegals, worked with the Victim Compensation Fund to provide free legal representation to 9/11 victims and families through the Trial Lawyers Care program,[178] which absorbed over $200 million in legal fees by providing over 1,100 lawyers who represented over 1,700 victim families.

Overall Impact

The financial industry was resilient. It was back on its feet within hours—working from other offices or contingency sites, having planned for severe physical and cyber destruction.[179] The financial industry had redundant systems and was capable of getting back online quickly after the catastrophe. If the attack had struck a less resilient infrastructure, the damage would have been much worse and the recovery effort would have been more expensive. Both the private sector and DHS can learn from the resilience of the financial industry in this event.

The insurance industry played a huge role in the recovery process, financing about half of the recovery by paying property-casualty claims. The industry did not invoke the war damage clause in many of its policies and paid out an extraordinary amount in claims. Although the industry was able to handle the claims arising from 9/11, it may not have been positioned to handle another catastrophe of the same magnitude. The insurance industry and government need to work together to establish a mutually beneficial terrorism insurance program that protects both the industry and the government from excessive loss.

The Federal Government played a huge role in the recovery. The Victim Compensation Fund limited liability, diminished the role of torts, and helped the victims and their families get through the disaster. The government also passed TRIA to limit the amount that the insurance industry would be expected to pay in the aftermath of an attack and encourage the industry to sell terrorism coverage. This arrangement was incredibly helpful for the insurers in the short term, but

[178] Trial Lawyers Care final report. http://www.atla.org/homepage/TLC.aspx. Accessed Nov. 20, 2006.

[179] Ferguson, Roger W., Jr., remarks by the Federal Reserve Board Vice Chairman at the Conference on Bank Structure and Competition, Chicago, May 9, 2002.

it has a short lifetime (as discussed in the TRIA section). The Federal Government also provided billions of dollars in recovery funds to New York and the airline industry.

The attack on 9/11 was the first big terrorist attack on U.S. soil, and it had an impact on citizens around the nation. Charitable donations came in from almost two-thirds of the population and were dispensed to those in need. However, some charities came under scrutiny for their lack of coordination and awards criteria (or lack thereof).

Working together, the government and charities set up health monitoring and spent $660 million on environmental exposures. Despite these efforts, published sources and interviewees said that there were major shortcomings in the Federal response to health hazards posed by the collapse and cleanup of the World Trade Center. Long-term health effects are not known at this point, and the environmental cleanup is still ongoing. Care should be taken to monitor the environment in the event of another attack.

2005 HURRICANES KATRINA AND RITA

Background

On August 29, 2005, Hurricane Katrina hit the Gulf Coast. It caused massive destruction to the infrastructure of New Orleans and other cities, and it immediately overwhelmed local response. The levees in New Orleans broke, and water inundated the already damaged city. A few weeks later, on September 24, Hurricane Rita hit the Gulf Coast at the Texas-Louisiana border, causing extensive damage to communities in the same general vicinity. The following case study is an abbreviated explanation of the roles of the four compensation mechanisms, as many of the calculations are still ongoing.

The Recovery Process

Government

In the case of Hurricanes Katrina and Rita, unprecedented amounts of government spending and other forms of assistance have been authorized. Initial emergency funding of $62.3 billion was made available shortly after the storms hit. Experts disagree on the final price tag for recovery on the Gulf Coast, but estimates range between an additional $100 billion and $300 billion.[180]

The responses from the military, police, Federal organizations, and the emergency medical community were equally massive. Active, Reserve, and National Guard units were integrated into Joint Task Force Katrina, which oversaw the military aspects of the emergency response mission. Emergency medical responders from the Federal level (FEMA) all the way down to local volunteers were mobilized. Police and fire units responded from throughout the Gulf Coast.[181] In addition, federally funded flood-mitigation mechanisms such as the New Orleans levee system and the NFIP were already in place. Despite massive government funding and mobilization of personnel and resources, the overall initial government response to the hurricanes has been widely criticized as poorly coordinated and not fast enough. What remains is the largest recovery and rebuilding effort ever undertaken in U.S. history.[182]

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[180] Manning, Jason. “Rebuilding the Gulf Coast: Massive Recovery Effort Raises Cost Concerns.” *Online NewsHour*, Public Broadcasting Service. Oct. 14, 2005. http://www.pbs.org/newshour/local/gulfcoast/background/economic_budget.html. Accessed Feb. 3, 2007.

[181] House Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, *A Failure of Initiative*, p. 5.

[182] Manning, Jason. “Rebuilding the Gulf Coast: Massive Recovery Effort Cost Concerns.”

Insurance

In the case of Hurricanes Katrina and Rita, the insurance industry faced the costliest insured loss from a single event in U.S. history.[183] Insurers have had significant difficulty determining whether wind or flooding was the cause of damage to homes and businesses. As many Gulf Coast residents carried only one of those policies and not the other, this has been a highly contentious issue. While the overall insured loss from these hurricanes was unprecedented and payouts drained a significant portion of the insurance industry's funds, the vast majority of insurance and reinsurance firms were able to handle a one-time financial disaster on this scale.[184] The larger question raised by Hurricanes Katrina and Rita is whether the insurance industry could handle a second such catastrophe if it occurred shortly after the first. This question has sparked debate in Congress as to what role the government should play to back up the insurance industry in preparation for the next catastrophe.[185]

Charity

Charitable organizations have proven irreplaceable to the recovery effort for Hurricanes Katrina and Rita. While the American Red Cross and the Salvation Army have come under criticism for their initial response efforts, their sustained presence in the Gulf region has undoubtedly made a positive impact. Other private charitable organizations such as Habitat for Humanity have also made significant contributions to the recovery effort. While media attention and government inquiry have focused on many secular charitable organizations, religious organizations have been, and continue to be, instrumental in the recovery, as HSI found in its study *Heralding Unheard Voices: The Role of Faith-Based Organizations and Nongovernmental Organizations During Disasters*.[186] Religious organizations of all faiths were vital to the initial emergency response efforts and continue to integrate themselves into the overall recovery effort. Indeed, before FEMA and Red Cross shelters were established, it was the local churches of the Gulf Coast that opened their doors to thousands of refugees.

Litigation

In the case of Hurricanes Katrina and Rita, many of the individual and class-action suits have been filed against insurance firms by New Orleans and Gulf Coast residents who did not have flood insurance before the storms. Many others have sued insurance firms for what they perceived to be inadequate compensation for insured losses. Still others have sued government organizations such as the Army Corps of Engineers, which has been faulted for the levee breaks.

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[183] King, Rawle O., "Hurricane Katrina: Insurance Losses and National Capacities for Financing Disaster Risk." Congressional Research Service. Sep. 15, 2005, p. 2. http://www.opencrs.com/rpts/RL33086_20050915.pdf.

[184] Ibid.

[185] Ibid., p. 15.

[186] Hull, Pete, Steve Bowen, Tanya Buttress, Bridget Kanawati, Russell Miller, and Richard Rowe, *Heralding Unheard Voices: The Role of Faith-Based Organizations and Nongovernmental Organizations During Disasters*. Arlington, VA: Homeland Security Institute, Dec. 18, 2006, p. 2.

While costly and time consuming, litigation remains an increasingly significant aspect of compensation for victims of natural disasters.

War Damage and Terrorism

Before the terrorist attacks of 9/11, the United States had not had much experience with terrorism or war damage. There have been, however, a few historical cases of war damage and riot insurance that were underwritten or backed by the Federal Government. These policies could act as a model for possible government intervention in the terrorism insurance or war damage markets. We chose to assess terrorism and war damage financing recovery programs together because they are, by nature, different than natural disaster financing programs: the government can influence war or terrorism risk through domestic and foreign policies, intelligence operations, and interdiction programs.[187]

Historical War Damage Program

The War Damage Corporation (also known as the War Insurance Corporation), a subsidiary of the RFC, "provided insurance against loss of or damage to property as the result of enemy attack, or from the action of the military, naval or air force of the United States in resisting enemy attack."[188] The Federal Government sold these insurance policies because private insurers were not expected to assume the risk of war damages on U.S. soil. The War Damage Corporation entered agreements with insurance companies to issue 8,700,000 policies and renewal certificates with an associated risk of $117 billion, and it ended up paying 1,782 claims of almost $1.3 million (most of which went to Hawaiian residents).[189] The corporation had produced a net income of $210,598,722 by the time it was liquidated in 1949.[190]

This War Damage Insurance concept was never replicated in the United States. During the Korean War, Congress toyed with the idea of establishing another War Damage Corporation, but the option was ruled out by the Budget Bureau, which favored congressional appropriation to relieve those suffering losses from enemy action.[191]

Civil Disorder

There is a precedent for government intervention in the insurance industry in areas at high risk of crime and destruction. Insurers were hesitant to underwrite property insurance in high-risk areas

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[187] "Policy Issues in Insurance No 9: Terrorism Risk Insurance in OECD Countries." Organisation for Economic Co-operation and Development, 2005, p. 12. http://www.oecd.org/document/62/0,2340,en_2649_201185_35092862_1_1_1_1,00.html.

[188] Final Report of the RFC.

[189] Ibid., p. 139.

[190] Ibid., p. 140.

[191] Hirshleifer, Jack, "War Damage Insurance," *The Review of Economics and Statistics*, Vol. 35, No. 2. May 1953, pp. 144-153.

during the urban riots and civil disorder of the 1960s.[192] To ensure that property insurance would be available to residential and commercial owners in areas at high risk of fire, crime, and other hazards, the National Insurance Development Program was established. The program offered reinsurance to property insurance companies that operated in states that agreed to share in losses with the Federal Government and required insurers to retain a portion of the liability that would be paid first in the event of a claim.[193] The program actually made money because claims did not exceed premiums, and the excess money went into funding a Department of Justice crime insurance program in the 1970s and continued to do so until 1984, when it was discontinued.[194]

Ships and Airplanes

There is a federally backed, mandatory war risk insurance program for airplanes in the United States. This program covers risk of violence, terrorism, and hijacking.[195] Before 9/11, the Federal Aviation Administration (FAA) could issue such policies only for international operations. In the aftermath of 9/11, policies became available for domestic operations, partly because the commercial insurance market would not provide war risk coverage at a price “that commercial air carriers deem financially reasonable or bearable.”[196] Policies are now issued by the Secretary of Transportation to cover war risk and eliminate third-party liability in case of such an event. It also caps punitive claims at $100 million in case of a terrorist attack. The FAA’s war risk program has produced a net benefit for the Federal Treasury in its operations thus far.[197]

The Federal Government began selling maritime insurance to U.S. ships in 1936 to ensure that insurance was available to vessels carrying supplies overseas.[198] Because overseas shipping was such a valuable asset to the U.S. military and economy, this insurance could be issued “without premium, at the request of the Secretary of Defense whenever it appeared that such insurance cannot be obtained on reasonable terms and conditions from commercial underwriters.”[199] The insurance covers war damage to ship’s hulls, cargo, crew, and crew’s effects.

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192 “Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers.” Washington, DC: U.S. General Accounting Office, Oct. 24, 2001. GAO-02-199T, p. 5. http://www.gao.gov/new.items/d02199t.pdf.

193 Housing and Urban Development Act of 1968. Public Law 90-448.

194 “Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers,” p. 6.

195 War Risk Insurance: Senate Report 109-223. March 27, 2006, p. 1.

196 Ibid., p. 2.

197 Ibid., p. 3.

198 Merchant Marine Act of 1936. U.S. Statutes at Large, 74th Congress, 1935-1936, Vol. 49, Part 1, Public Laws, pp. 1985-2017.

199 Ibid.

The Terrorism Risk Insurance Act

In the wake of 9/11, insurers paid tens of billions of dollars in property and casualty insurance claims. Because of the immensity of these losses and the possibility of another event within a compressed timeframe, insurers and reinsurers began to exclude terrorism coverage from their policies. The government quickly intervened to ensure that terrorism insurance was available by passing TRIA, which was enacted to "ensure the continued financial capacity of insurers to provide coverage from risks from terrorism"[200] and to fill the coverage gap while insurers assessed the risk of terrorism, raised capital, and reentered the market.[201] Initially, TRIA was designed to be a short-term program to limit insurers' risk of financial loss from acts of terrorism. The initial act expired at the end of 2005; however it was revised to expire in 2007.[202]

Under TRIA, insurance companies are required to offer terrorism coverage, but the Federal Government agrees to pay 90% of the loss above a deductible, in the event of an attack by foreign terrorists.[203] In its inception in 2002, the threshold for TRIA to go into effect was $5 million in aggregate property and casualty insurance losses, with a declaration by the Secretary of the Treasury that the act was indeed an act of terrorism. As of March 2006, the threshold for TRIA was $50 million, and it will rise to $100 million in 2007, with the same certification stipulations.[204] Some states *require* terrorism coverage to be included in commercial property and casualty insurance.[205] Workers' compensation insurance, available in every state except Pennsylvania, stipulates that occupational injuries must be covered regardless of their cause.[206] So, in effect, a victim of a terrorist attack while at work would be covered through workers' compensation.

Insurers are worried about their ability to set the right price for terrorism insurance without actuarial data, and they have not been able to accurately assess the risk of terrorist attacks on U.S. cities. As a high-consequence, low-probability event, an act of terrorism is similar to a major natural disaster.[207] There is a huge difference, however: terrorists are dynamic adversaries and can adapt to avoid mitigation measures, whereas natural disasters are not dynamic.[208] Building a

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[200] H.R. 3210. 107th U.S. Congress. Jan. 23, 2002.

[201] "Federal Terrorism Reinsurance: An Update." Washington, DC: Congressional Budget Office, January 2005, p. 1.

[202] Terrorism Risk Insurance Extension Act of 2005. Public Law 109-144, Dec. 22, 2005.

[203] "Federal Terrorism Reinsurance: An Update," p. 2.

[204] Valverde, L. James, Jr., and Robert P. Hartwig, "9/11 and Insurance: The Five Year Anniversary."

[205] "Federal Terrorism Reinsurance: An Update," p. 11.

[206] Ibid., p. 11.

[207] Dixon, Lloyd, and Robert T. Reville, "National Security and Compensation Policy for Terrorism Losses," RAND Center for Terrorism Risk Management Policy, 2005.

[208] Kunreuther, Howard, and Erwann Michel-Kerjan, "Policy Watch: Challenges for Terrorism Risk Insurance in the United States," *Journal of Economic Perspectives*, 18(4), 2004.

more resilient infrastructure would undoubtedly mitigate the consequences of either event. "By helping the economy rebound after an attack, the compensation system can reduce economic vulnerability to terrorism," Dixon and Reville stated.[209]

TRIA is not universally accepted. Experts from the government and the insurance industry disagree over its extension and coverage system. In a 2005 letter to the Committee on Banking and Finance, the Secretary of the Treasury, John Snow, said that Federal intervention in the market for terrorism insurance discourages innovation in the insurance industry.[210] Furthermore, TRIA exposes taxpayers to tens of billions of dollars in possible liabilities, in addition to the $14 million it cost them from 2003 through 2005.[211]

It has been years since the last terrorist attack on American soil, but the threat of terrorism is still real. Since TRIA's enactment, rates for terrorism coverage have fallen, and insurers have sold increasing levels of terrorism insurance.[212] If TRIA expires, insurance premiums will likely increase and fewer property owners will be insured. In the event of another attack, the Federal Government might find itself providing even more supplemental disaster assistance for uninsured losses.[213]

There have been so few major events in the United States and elsewhere that the magnitude of potential losses is unclear. TRIA has encouraged industry participation in the market, but it has not encouraged the industry to assume levels of risk consistent with the policies it is selling, as TRIA provides Federal reinsurance at no cost to the insurers.

In TRIA's current state, the Federal Government is exposed to much more risk than the insurance industry. The industry and Federal Government need to work together to reconcile the amount of risk that each community is willing to assume in case of a terrorist event or series of terrorist events. In these dealings, they should consider options and look to the international community, which has had experience with different insurance and disaster financing schemes.

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[209] Dixon, Lloyd, and Robert T. Reville, "National Security and Compensation Policy for Terrorism Losses."

[210] Snow, John W., TRIA Report to Congress. Letter to the Department of the Treasury, June 30, 2005.

[211] "Federal Terrorism Reinsurance: An Update," p. 9.

[212] Ibid., p. 6.

[213] Ibid., p. 19.

INTERNATIONAL AND STATE-SPECIFIC PROGRAMS

The losses of 9/11 showed just how important a healthy insurance industry is to the U.S. economy and society. The insurance industry is instrumental in financing recovery in many other countries as well. Mega-catastrophes are not as predictable as other insured events, such as automobile crashes, and many do not adhere to the law of large numbers, so they are difficult to insure.[214] These events also affect many policyholders at once and contradict the criteria of independence. Some severe weather events repeatedly hit the same geographic area and thus are easier to predict than terrorist events, but in both instances the consequences of an event would be even more financially devastating without a healthy insurance industry.

The United States may want to find a way to encourage the insurance industry to provide coverage for mega-catastrophes while offering either a reinsurance scheme or a threshold of losses where the Federal Government will assume some recovery or reconstruction costs to keep the industry solvent. The government can learn from other countries that have been successfully dealing with catastrophic losses for decades.

Risks from natural disasters and terrorism vary between and within countries. The government often ends up as the insurer or reinsurer of catastrophic insurance in many international cases. Some countries deal with all catastrophic events the same, and some differentiate by event type (natural or man-made). In this analysis, we highlight several policies that could serve as models for future U.S. mega-catastrophe policy. We study these policies and then make recommendations by event type. Several institutions (such as the Organization of Economic Co-Operation and Development and the U.S. Government) have explored options for terrorism and natural disaster recovery financing, focusing on one or a few aspects or options but never in a comprehensive fashion.

Countries

The United Kingdom

The United Kingdom has a long history of financing recovery from terrorist attacks. Individuals and business owners can buy coverage against terrorism from their property insurance provider, and this insurance is backed by an industry pool. Insurers set premiums on the basis of relative risk and rely on assessing surcharges on pool members after the fact to cover shortfalls.[215]

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[214] The law of large numbers describes part of probability theory, namely that “the observed frequency of an event more nearly approaches the underlying probability of the population as the number of trials approaches infinity.” In the insurance industry, it is used to explain the result that the more cars you insure, for example, the more accurately you can predict the number of cars that will be stolen. Example and definition from Her Majesty’s Revenue & Customs, “Economic Basis of Insurance: Law of Large Numbers.” http://www.hmrc.gov.uk/manuals/gimanual/GIM1130.htm. Accessed Feb. 20, 2007.

[215] “Federal Terrorism Reinsurance: An Update,” p. 15.

The initial claims of up to 100,000 pounds are paid by the responsible insurance company. Claims in excess of 100,000 pounds are paid from premiums that have been pooled by insurance companies and Lloyd's of London syndicates.[216] If this pool is exhausted, the participating insurers are asked to pay up to 10% of premiums that they have collected during the year. If claims exceed this call, the government meets these claims as the reinsurer of last resort. This layering strategy is a way to decrease the risk that each insurer bears and add two layers of protection before government intervention is necessary.

Israel

Israel experiences frequent terrorist attacks, but its terrorism insurance is very different than the United Kingdom's. Two programs in Israel are administered by the government and cover lives and property in the event of an attack. The "Property Tax and Compensation Fund" is funded by national property taxes that have been levied on businesses.[217] It covers claims on property damage that are a direct result of a terrorist attack, based on property value preceding the attack. Indirect damages are covered through private insurance. The Law for the Victims of Enemy Action is administered by the National Insurance Institute (similar to our Social Security Administration) and covers life and health insurance in case of an attack. This statute also extends to visitors and tourists.[218]

Spain

In Spain, both natural and man-made catastrophes fall under one umbrella: Consorcio de Compensacion de Seguros.[219] Consorcio is a pool that was established in Spain in 1941, following the Civil War, and is executed by the Ministry of Economics and Finance. The Spanish system is obligatory, with premiums paid to the state based on property values. The insurance covers everything associated with a catastrophe, including business interruption insurance for terrorist attacks.[220] Reinsurance rates depend on the type of building insured (industrial premises are charged a higher percentage than commercial premises).[221] The private market can and does sell catastrophe insurance, but contributions must be made to the pool. Even though the pool paid out $5.6 billion between 1971 and 2003, it was still operating with a surplus at the time of the

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[216] Reinsurance (Acts of Terrorism) Act 1993 (c. 18), 1993 c. 18, from http://www.opsi.gov.uk/acts/acts1993/Ukpga_19930018_en_1.htm. Accessed Dec. 3, 2006. Please note that the Pool Re does not extend to Northern Ireland.

[217] "Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers."

[218] "Federal Terrorism Reinsurance: An Update."

[219] From Consorcio homepage http://www.consorseguros.es/ and *Disaster Recovery Journal* online http://www.drj.com/special/wtc/w3_066.htm. Accessed Jan. 2, 2007.

[220] Presentation at the Organisation for Economic Co-operation and Development conference on catastrophic risks, 2004.

[221] Michel-Kerjan, Erwann, and Buckhard Pedell, *Terrorism Risk Coverage in the Post-9/11 Era: A Comparison of New Public-Private Partnerships in France, Germany and the U.S.* WP#2004-029. October 2004.

July 11, 2004, terrorist attacks.[222] The damages from the terrorist attacks of March 11, 2004, were mostly covered by the pool, and it was not exhausted (damages were estimated at $47 million).[223]

Japan

Japan has an earthquake-specific risk insurance scheme. This policy was established in 1966 and emphasizes public-private risk sharing. Industry pool arrangements are mandated in this program, but individual participation is voluntary, as earthquake insurance is offered as a supplement to fire insurance.[224] There are three tiers of compensation in the event of a major earthquake, as depicted in Figure 4.

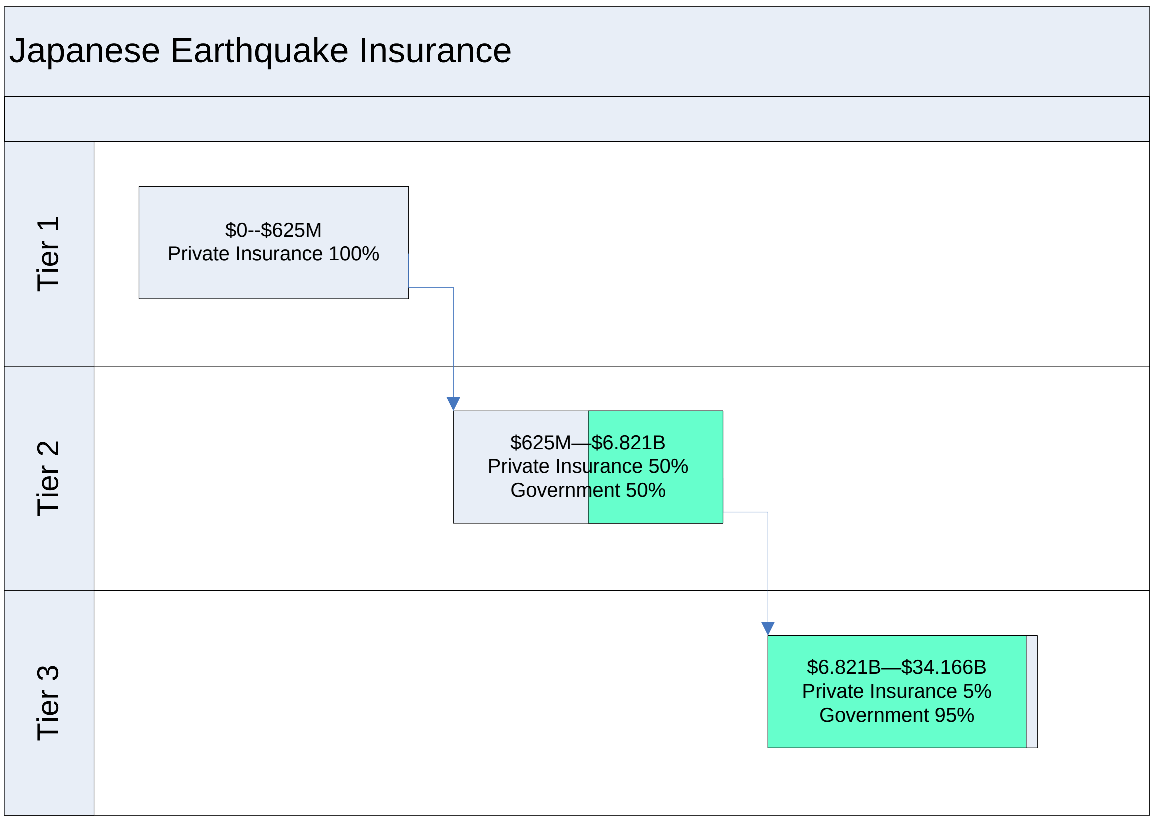

Figure 4: Japanese Earthquake Insurance Model.

In case of a major earthquake, the private insurers cover the lowest tier of damages ($0 to $625 million) by themselves. If the damages are between $625 million and $6.821 billion, private

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[222] "Federal Terrorism Reinsurance: An Update," p. 22.

[223] Mitchell, Rick, "Madrid Bomb to Cost €35 Million," *Business Insurance*, posted Jan. 4, 2007. http://mobile.businessinsurance.com/palm/breakingnewsarticle.mvc?articlelink=cgi-bin/news.pl?newsId=9161. Accessed Nov. 6, 2006. "Federal Terrorism Reinsurance: An Update," p. 22.

[224] "Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers," p. 7.

insurers cover half, and the government covers the other half. Ninety-five percent of claims in excess of $6.821 billion are covered by the Japanese government.[225]

The Japanese system is a true partnership between the insurance industry and the government, established to cover the most frequent catastrophic event in the country. Although industry participation is mandatory, the government takes on excessive losses in case of a mega-catastrophe, unlike the California Earthquake Authority. The tiered system helps spread the risk throughout the country and economy.[226]

Developing Countries

In poor countries, personal property losses are much smaller than in wealthy countries. If earthquakes of the same magnitude hit a small village in China and San Francisco, the value of the damage would be greater in the wealthier state. That being said, wealthier countries levy more taxes than impoverished ones and are often in a better position to assist in post-disaster recovery. For example, after the 2004 tsunami, insurance played a small role in financing recovery, as insured losses were only 5% to 7% compared to overall economic losses.[227] This minor role of insurance has been the case following major disasters in most developing countries, because the amount of insured property is so low. Because insurance and government usually play a very small role in these disasters, recovery is often funded by charity and international contributions and moves slowly.

Swiss Re studied both man-made and natural insured losses from 1970 through 2004 worldwide and found a general trend of increasing insurance payouts over time. It also highlighted the 40 most expensive events and the 40 deadliest events in that period. Figure 5 outlines those results.[228]

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[225] "Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers," p. 7.

[226] Ibid.

[227] King, Rawle O., "Tsunamis and Earthquakes: Is Federal Disaster Insurance in Our Future?" Washington, DC: Congressional Research Service Report RL32847, April 6, 2005 (updated Nov. 7, 2006), p. 5. http://www.ncseonline.org/NLE/CRSreports/06Dec/RL32847.pdf.

[228] Swiss Re. Sigma No 1/2005, pp. 34-35.

Costliest in terms of insured losses, excluding life & liability insurance			Costliest in terms of lives lost (includes dead and missing)		
Event Name and Year	Insured Loss	Country	Event Name and Year	Deaths	Country
	2004 USD m				
Hurricane Andrew, '92	21,542	US, Bahamas	Storm and Flood, '70	300,000	Bangladesh
September 11th, '01	20,035	US, Bahamas	Tsunamis in Indian Ocean, '04	280,000	Indonesia, Thailand
Northridge Earthquake, '94	17,843	US, Bahamas	Earthquake, '76	255,000	China
Hurricane Ivan, '04	11,000	US, Caribbean	Tropical cyclone Gorky, '91	138,000	Bangladesh
Hurricane Charley, '04	8,000	US, Caribbean	Earthquake, rock slides, '70	66,000	Peru
Typhoon Mireille/No 19, '91	7,831	Japan	Earthquake, landslides, '90	50,000	Iran
Winterstorm Daria, '90	6,639	France, UK	Earthquake destroys 85% of Bam, '03	26,271	Iran
Winterstorm Lothar, '99	6,578	France, CH	Earthquake in Tabas, '78	25,000	Iran
Hurricane Hugo, '89	6,393	Puerto Rico, US	Earthquake, '88	25,000	Armenia
Hurricane Frances, '04	5,000	US, Bahamas	Volcanic eruption-Nevado del Ruiz, '85	23,000	Columbia
Tsunamis in Indian Ocean, '04	5,000	Indonesia, Thailand	Earthquake, '76	22,084	Guatemala
Storm and floods in Europe, '87	4,988	France, UK	Earthquake in Izmit, '99	19,118	Turkey
Winterstorm Vivian, '90	4,613	Western/Central Europe	Dyke burst in Morvi, '79	15,000	India
Typhoon Bart/No 18, '99	4,582	Japan	Earthquake in Gujarat, '01	15,000	India, Pakistan
Hurricane Georges, '98	4,091	US, Caribbean	Flooding following monsoon rains, '78	15,000	India
Hurricane Jeanne, '04	4,000	US, Caribbean	Cyclone 05B Orissa, '99	15,000	India, Bangladesh
Typhoon Songda/No 18, '04	3,585	Japan, South Korea	Flooding in Bay of Bengal & Orissa, '71	10,800	India
Tropical storm Allison, '01	3,381	US	Tropical cyclone in Bay of Bengal, '85	10,000	Bangladesh
Thunderstorms, tornadoes, hail, '03	3,292	US	Floods, mudflows and landslides, '99	10,000	Venezuela, Columbia
Explosion on platform Piper Alpha, '88	3,195	UK	Tropical cyclone Bay of Bengal, '77	10,000	India
Great Hanshin earthquake in Kobe, '95	3,065	Japan	Earthquake, '85	9,500	Mexico
Winterstorm Martin, '99	2,722	Spain, France, CH	Earthquake in Maharashtra, '93	9,475	India
Hurricane Floyd; floods, '99	2,677	US, Bahamas	Hurricane Mitch, '98	9,000	Honduras, Nicaragua
Hurricane Opal, '95	2,603	US, Mexico	Great Hanshin earthquake in Kobe, '95	6,425	Japan
Severe floods across Europe, '02	2,535	Europe	Typhoons Thelma and Uring, '91	6,304	Philippines
Forest fires, '91	2,358	US	Earthquake, '74	5,300	Pakistan
Hail, floods and tornados, '01	2,347	US	Floods and landslides, '01	5,112	Brazil
Blizzard, tornados, '93	2,289	US, Mexico, Canada	Accident in Bhopal, '84	5,000	India
Hurricane Iniki, '92	2,154	US, North Pacific Ocean	Earthquake in West Irian, '76	5,000	Indonesia, Thailand
Explosion in a petrochemical plant, '89	2,019	US	Earthquake, '72	5,000	Nicaragua
Hurricane Frederic, '79	1,958	US	Earthquake in Fars, '72	5,000	Iran
Hurricane Fran, '96	1,927	US	Earthquake; oil pipeline damaged, '87	5,000	Ecuador
Tropical cyclone Fifi, '74	1,916	Hondurans	Earthquake in El Asnam, '80	4,500	Algeria
Floods after rain in Central Europe, '97	1,883	Poland, Czech Republic	Ferry collides with oil tanker, '87	4,375	Philippines
Hurricane Luis, '95	1,860	Caribbean	Earthquake in Takhar, '98	4,000	Afghanistan
Spring storm with several tornadoes, '0.	1,759	US	Storms and snow in Ardekan, '72	4,000	Iran
Hurricane Gilbert, '88	1,746	Jamaica, Mexico	Earthquake in Van, '76	4,000	Turkey
Hurricane Isabel, '03	1,730	US, Canada	Typhoon Linda, '97	3,840	Vietnam, Cambodia
Winterstorm Anatol, '99	1,701	Denmark, Sweden	Flooding in Punjab, '92	3,800	India, Pakistan
70 tornadoes in Midwest, '99	1,684	US	Earthquake, tsunami Moro Golf, '76	3,739	Philippines

Figure 5: 40 Costliest (in Terms of Insurance) and 40 Deadliest Catastrophes 1970–2004.[229]

The costliest events, on the left, were in developed countries where insurance is prevalent, with 23 of 40 (highlighted in yellow) directly affecting the United States. The deadliest events, on the right, were in developing countries, many of which lack warning systems, mitigation strategies, adequate emergency response capability, and healthy insurance industries. The two exceptions—extremely costly and deadly disasters, highlighted in rose—are the 2004 tsunamis in the Indian Ocean and the Great Hanshin Earthquake in Kobe, Japan.

[229] Ibid.

State-Specific Programs

Just as some countries are at higher risk for particular disasters, some states are at greater risk of natural hazards. As private insurers will not cover flood insurance in flood zones across the country, they will not cover earthquakes in California or hurricanes in Florida. In these two cases, the states have intervened and ensured that insurance would be available for these hazards.

California Earthquake Insurance

The California Earthquake Authority was established after the Northridge earthquake of 1994, when California insurers realized that the premiums collected from earthquake insurance were not sufficient to cover the claims from a major earthquake. When insurers tried to stop covering earthquakes, the state of California struck a bargain with them: Insurers could exclude earthquake coverage as long as 70% of the industry would join the Earthquake Authority.[230]

The California Earthquake Authority is a limited-liability pool (LLP), which means that insurers transfer all risk to the pool and the pool has no claim on government resources in event of a major earthquake.[231] It is a multilayer scheme, and participating insurers agree to pay $717 million initially, followed by additional payments of $2.15 billion and $1.434 billion if certain levels of loss occur.[232] This pool system is riskier than government-backed pools, because any claims above the pool's resources will not be paid. As of 2005, only 13% of California property owners were covered by the California Earthquake Authority.[233] The premiums that have been collected are probably not sufficient to cover the losses from a catastrophic earthquake.

Florida Hurricane Insurance

Florida is at an incredibly high risk for hurricane damage (specifically wind damage), and most private insurers will not cover hurricane losses in the state. Since Hurricane Andrew, the Florida Hurricane Catastrophe Fund has provided "reimbursements to insurers for a portion of their catastrophic hurricane losses."[234] The fund is in effect a reinsurer of last resort, to encourage insurers to keep operating in the state. The threshold for this fund was initially $6 billion in damages but has been dropped to $3 billion, and the upper limit of this fund started at $16 billion

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[230] "Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers."

[231] Jaffe, Dwight, and Thomas Russell, "Extreme Events and the Market for Terrorist Insurance," January 2001, for presentation to the National Bureau of Economic Research Insurance Conference, February 2002. http://faculty.haas.berkeley.edu/jaffee/Papers/JRInsFeb02.pdf.

[232] "Terrorism Insurance: Alternative Programs for Protecting Insurance Consumers," p. 10.

[233] King, Rawle O., "Tsunamis and Earthquakes: Is Federal Disaster Insurance in Our Future?"

[234] Florida Hurricane Catastrophe Fund website. http://www.sbafla.com/FHCF/about.asp. Accessed March 7, 2007.

but is now $32 billion. Unfortunately, the fund contains only $1 billion at this time and may not be sufficient to cover claims in a large hurricane.[235]

Repetitive or excessive losses have driven the insurance industry out of the state. To provide insurance to people living in high-risk areas, the Florida legislature merged two insurers in 2002 to create the Citizens Property Insurance Corporation,[236] which was established to ensure that properties in high-risk areas could be covered in the event of a hurricane. Assets of the corporation are tax exempt so that the pool is as prepared for a catastrophe as possible.

The Florida Department of Financial Services has a task force that is working to find a solution to the insurance problem.[237] Stringent building code standards and advanced hazard mapping are two of their most successful undertakings, but the state is still assuming huge financial risks in case of a large hurricane.

Comparisons and Options for the U.S. Government

The United States can learn from the international community and its own domestic disaster financing programs. The most successful programs in the international community are accomplished by public-private partnerships, through either government intervention in the insurance market or taxation schemes. To pre-position itself to pay less in case of a mega-catastrophe, the U.S. Government may want to establish a comprehensive financing scheme.

Pool Re in the United Kingdom is a model for terrorism insurance. The first layers of financing are completely covered by the insurance industry. However, when the event is large enough to deplete the pool as well as a fraction of the firms' yearly profits, the government steps in as a last resort. This situation could work well in the United States. By offering Federal support as a final backstop instead of an immediate option, the U.S. Government could discourage moral hazard, allow the insurance mechanism to operate, and save tax dollars, while encouraging continued faith in the government's ability to protect its people in a terrorist event. A pool system would also help the insurance industry in the United States by "expand(ing) the industry's ability to write coverage and absorb losses by increasing the diversification of risk."[238]

The Spanish relief system has worked well for all catastrophes in Spain, while operating at a net gain for the government. This system would probably not be accepted in the United States, however. Consorcio was initiated shortly after the civil war as a tax on all properties and was never repealed. It would be difficult to pass such a measure in the United States because of the

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235 "Flirting With Disaster: Florida's Bet Against Mother Nature Puts Its Environment and Economy at Risk," *Washington Post*, March 5, 2007, p. A14. http://www.sptimes.com/2007/03/09/Opinion/Florida_is_flirting_w.shtml.

236 Citizens Property Insurance Corp. website. http://www.citizensfla.com/gen_info.asp. Accessed March 7, 2007.

237 Hurricane Insurance Task Force website. http://www.fldfs.com/hurricaneinsurancetaskforce/. Accessed March 7, 2007.

238 "Federal Terrorism Reinsurance: An Update," p. 15.

very different political climate. Also, Spain is much smaller than the United States, has a less diverse geographical area, and is subject to different catastrophes. In the United States, it would be easier to partner with the insurance industry because of the wide geographic distribution and variety of mega-catastrophes (diversification of risk is easier to accomplish).

The California Earthquake Authority and Florida Hurricane program could gain insight from the Japanese program. With mandatory participation of the whole insurance industry, the risk is distributed throughout the country. Japanese citizens also know that if an earthquake hits in Japan, their property will not be rebuilt or recovered if they do not have earthquake insurance. The tiered system encourages the insurance resources to be expended without making the industry insolvent, then increasing government intervention to bail out the industry.

Finally, the international study shows that there is more wealth at risk in a developed country and that many of the most expensive catastrophes have taken place in the United States. Some of this wealth can be shielded by mitigation measures and by building codes, but even more of it is covered by a healthy insurance industry. The insurance industry has paid for an incredible amount of property loss in the past 30 years owing to mega-catastrophes. The study also shows that developed countries as a whole do not experience the loss of life that underdeveloped ones do in case of a mega-catastrophe.

CONCLUSIONS AND RECOMMENDATIONS

From the government's point of view, a successful recovery achieves post-event economic stabilization, recovery and reconstruction, and reduction of vulnerability to future events, while encouraging continued faith in the government. These concepts are difficult to measure, but HSI has taken the first steps by studying historical mega-catastrophe recovery efforts and reviewing the evolution of government intervention in financing recovery.

HSI's analysis clearly indicates that disaster financing has evolved over the past hundred years, from the huge role of self-financing and minimal role of government in the Chicago Fire to the hundred-billion-dollar Federal expenditures after 9/11 and Katrina. Not only have Federal expenditures increased over the years, but they have also become easier to obtain. The inevitability of government bailout has created a moral hazard, where people expect the government to pay for the replacement of their homes or properties, regardless of whether they implement mitigation strategies.

By studying the evolution of disaster assistance, HSI found that the government has become more involved in the disaster process for a number of reasons, including the Great Depression and the devastation wrought by several mega-catastrophes. In their role as a protector, the Federal Government and military have covered losses from war damage and terrorism. The government has also become involved in times where a catastrophe is not covered by the insurance industry because of repetitive losses or unpredictability. It has also executed successful buyback programs in flood zones.

Through specific case studies, HSI learned about how societal conditions and geography play a role in the recovery process. Chicago and San Francisco were centers of trade and commerce when the mega-catastrophes affected them. Their successful recovery was essential to the economic vitality of the nation, and the recovery process was expedited by quick insurance payouts and well-organized charity.

In all of the case studies, HSI showed that insurance or lack thereof has significantly impacted the recovery process. In cases where insurance was available, the insurance industry paid claims. After the event, however, insurers adjusted their policies to reflect lessons learned by either requiring mitigation or refusing to cover the event in the future.

A unique case study, 9/11, showed that the U.S. government needs to establish a financing recovery strategy for terrorist or war damage events. Currently, the government and insurance industry are debating the future of TRIA and other options that include public-private partnerships. The government should look to the experience of other countries in these cases in order to create the best strategy possible.

The best way to finance recovery from a mega-catastrophe is to minimize the role of the Federal Government. Heavy government intervention provides the wrong incentives—it encourages moral hazard, discourages self-reliance, and discourages private-sector innovation and intervention. Political pressures can have a profound impact on the amount and timeliness of Federal disaster outlays (and charitable donations). These pressures add complexities to the recovery process. The Federal Government may be able to minimize these political pressures and the government's role in determining outlays by partnering with the insurance industry, states, and the private sector. These partnerships could come in many forms, including reinsurance or tax incentives. In particular, we offer the following recommendations.

Require Mitigation

If citizens choose to rebuild in hazard-prone areas following a disaster, the buildings they erect should be strong enough to withstand another disaster. However, it is unreasonable to expect them to build everything to withstand a 1,000-year storm or a 9.0 earthquake. The government needs to set standards that are stringent enough to discourage moral hazard but lenient enough to be within the realm of economic possibility.

The Federal Government should once again consider mitigation a requirement for post-disaster assistance and enforce this requirement. Throughout the years, mitigation as a requirement for Federal disaster assistance has waxed and waned. When mitigation strategies are required or encouraged as a condition for grants, then states and localities are more apt to enforce them. It is difficult to quantitatively measure the impact of mitigation on disaster expenditures, but they inevitably decrease the amount of time, resources, and finances required to recover after a major catastrophe. In effect, they increase resilience.

The Federal Government should continue to educate its citizens about natural and man-made hazards, making clear the risks associated with certain geographical areas. Oftentimes, residents in hazard-prone areas do not voluntarily undertake loss prevention (that is, mitigation) measures because they do not judge the risk sufficiently high to warrant the expenditures.[239] According to research, the Federal construction of levies can make the public feel safer than they actually are in case of a catastrophic natural disaster such as a flood or hurricane.[240]

Provide Tax Incentives

The Federal Government should consider property taxes proportional to wealth at risk. Issues of equity will grow as more taxes are used to rebuild damage in hazard-prone areas. Along those lines, the government might also consider giving tax breaks to those in high-risk areas who undertake and complete mitigation projects, instead of raising their taxes because their homes are more valuable. Another option is to create a Federal Disaster Tax Fund to pre-fund disaster relief, with those living in higher-risk areas contributing more to a hazard-specific portion of the fund.

Offer Catastrophe Bonds

Catastrophe bonds (“cat bonds”) are another option for covering the costs of a catastrophic event. Investors get a high rate of interest before the specified disaster strikes. If the specified catastrophe occurs, insurers or reinsurers (this could include the government) will be partly or

[239] Kunreuther, Howard. “Disaster Mitigation and Insurance: Learning From Katrina,” *Annals of the American Academy of Political and Social Science*, 604, March 2006, p. 209. http://opim.wharton.upenn.edu/risk/downloads/06-05-HK.pdf.

[240] Ibid.

fully forgiven from making interest and principal payments on the bonds.[241] Investors see catastrophe bonds as a way to diversify portfolios, because their risk is not correlated with market returns. Prices for cat bonds have fallen and volumes have risen as confidence in loss projection has increased. The government could pre-fund more of the disaster recovery process by increasing the prevalence of these bonds (perhaps by acting as the insurer or reinsurer of last resort).

An alternative to single-event catastrophe bonds would be cat bonds that cover the risk of multiple events. These securities would require that more than one disaster occur before an investor loses principal. For example, a bond could be sold that combined the risk of a hurricane in Florida with an earthquake in Japan.[242]

Encourage Insurance

The Federal Government would do well to recognize the huge role of insurance in mega-catastrophe financing. The most successful recovery programs in the United States and abroad have involved public-private partnerships. In the United States, the insurance industry has been an incredible resource in financing recovery, as shown by the huge role that it played in the aftermath of 9/11. In other countries, insurance pools have been very successful. When insurers can’t or won’t insure because the risk is either too high or too unpredictable, the government should intervene. This intervention should be minimal and should not crowd private insurers out of the market.

Next Steps

Further research should analyze the effectiveness of specific recovery financing schemes. The goals of these schemes are to achieve post-event economic stabilization, recovery and reconstruction, and reduction of vulnerability to future events, while encouraging continued faith in the government. If the government can measure how effective different schemes are, it can create the best possible portfolio of recovery financing options.

These measures of effectiveness cannot be performed if data are not available. For example, how do you measure post-event economic stabilization? To be considered “stable,” how should an economy perform? Perhaps one way to assess this is to identify economic indicators and local economic health.

As another example, measuring vulnerability to future events may prove difficult. Some mitigation strategies serve dual benefits in making infrastructure more resilient to any mega-catastrophe, while some strategies are hazard specific. Also, in the case of terrorism, the vulnerability may change based on the resources and motivations of the attacker. Further research could go into determining strategies that are most cost effective based on the number and severity of hazards that they mitigate.

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[241] “Federal Terrorism Reinsurance: An Update,” p. 23.

[242] Ibid.

2900 South Quincy Street • Suite 800 • Arlington, VA 22206-2233