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Faith-Based Organizations in Disaster Relief: Locally-Based Strategies for a Higher Demand Future

A Capstone Project Submitted in Partial Fulfillment of the
Requirements of the Renée Crown University Honors Program at
Syracuse University

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and Renée Crown University Honors
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Abstract

Due to the effects of climate change, natural disasters are beginning to occur more frequently and are causing greater destruction. The American disaster relief system currently relies on a nationally focused, top-down approach. As resources become more and more limited, it is expected that disaster relief fatigue will occur, required local communities to take a larger role in their disaster relief processes. Right now, major player in both local and national disaster relief are Faith-Based Organizations (FBOs), who provide many crucial services before and after disasters

This paper develops an economic model of the rebuilding stage of disaster relief in order to examine the prioritization and resource allocation problems it faces. Through a series of case studies, the model is applied and used to point out a series of systems and methods by which local FBOs have, and might further be able to play larger and more significant roles in disaster relief.

Executive Summary

Natural disasters occur when natural hazards, which are “severe and extreme weather and climate events that occur naturally in all parts of the world” (WMO, n.d.) interact with human society, creating damage and destruction. Since ancient Rome, human society has worked to respond to and recover from disasters, creating systems usually based around a central government, but involving numerous non-profit organizations that play equally vital roles. In the United States, FEMA, the Federal Emergency Management Agency, coordinates disaster relief on behalf of the federal government, while numerous organizations including the American Red Cross, Salvation Army, and other members of the National Voluntary Organizations Active in Disaster (NVOAD) community serve as nonprofit actors.

Disaster relief occurs in a series of stages: Mitigation and preparation, which aim to reduce the effects of future or impending disasters; response, which focuses on the immediate aftermath of a disaster – rescuing survivors, tending to the wounded, providing food and shelter, and restoring basic social services like utilities and running water; rebuilding, which centers on the rebuilding of private homes and businesses and takes about 3-5 years; and, recovery, which is the long-term process of restoring infrastructure and “helping communities heal and return to a state that is similar to, or even improved from, pre-disaster conditions” (NYDIS, 2014a).

As climate change affects the global temperature and sea levels, natural hazards are expected to become more frequent – more heat waves, hurricanes, and floods – and as human society becomes more vulnerable because of the same effects of climate change, these natural hazards are expected to become larger and more powerful disasters when they collide with human society. Because of this increased burden on society, disaster relief fatigue is expected to develop as national attention and response cannot be focused on each and every disaster. Therefore, communities will need to develop local solutions for disaster relief.

Already operating as major players in the local and national disaster relief scene are Faith-Based Organizations (FBOs), which range from massive nonprofits like the Salvation Army, to local churches and religious groups. Due to a number of factors, including the moral impetus to help the needy imparted by every major faith tradition, the organization flexibility and capacity to shift focus to provide for the needs of a community after a disaster, and often the physical space or financial strength to provide key resources for their local communities, FBOs are important players in disaster relief, and as disaster relief fatigue pushes the burden onto local communities, FBOs will be able to bear a significant portion of the responsibility.

Resource distribution becomes a major issue in the rebuilding phase of disaster relief, something handled almost exclusively by local organizations. Various phases of rebuilding a home require different amounts of resources and labor, and

central organizing case management organizations must make decisions about where to allocate resources. These resources are allocated based on a perception of need, which is itself a function of vulnerability of the family and the damage to the home in question. National organizations often don't have the information to be able to understand which homes are more vulnerable than other, and instead use a need threshold level to distribute resources when they are in charge; conversely, many local organizations lack the proper training to understand the damage levels of these homes, and focus their prioritization on their understanding of local families vulnerabilities.

In the case that an organization can properly identify both damage and vulnerability levels, it becomes clear that a triage-based case management system would prioritize homes with high degrees of damage that belong to highly vulnerable families, and that low vulnerability families with superficially damaged homes can wait to have their homes repaired. Thus, the remaining homes are prioritized based on the community's collective, unspoken preferences for providing reconstruction.

A number of different FBOs that operate on the local scale for rebuilding can provide insight into how to handle prioritization and resource distribution. Some, like ServeMoore, found ways to use resources that were in excess to repair homes that would otherwise have to wait, or that were not traditionally helped as a part of the disaster relief system yet could not completely recover on their own. Other

organizations, such as the Baptist and Methodist churches, provide hierarchy and training to help facilitate responses on a local scale. No matter what the method, these case studies show that by focusing on local organization's strengths, communities can find ways to reduce their need for national support, thus creating systems resistant to disaster relief fatigue.

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Preface: What Started it All

This project all began with the Hillel at Syracuse University Alternative Spring Break program I participated in back in March 2013. Myself and 10 other students joined the Jewish Disaster Response Corps (JDRC) for five days of work in Joplin, MO, helping the community rebuild and recover from the devastating tornado that ripped the city apart that previous May. In addition to week of flooring, spackling and putting up molding, we met with survivors, first responders, and social service providers. Combined with a driving tour of the hardest hit areas, and videos of the storm it self, their stories hit home.

As my emotional connection to this community grew, I began to notice patterns in what it was we were actually doing there. We were staying in the basement of an Evangelical Church, where the bunks had been built in the aftermath of the tornado by a group of Mennonites. We ate lunch every day at a second church, which fed all of the volunteers in the area. Many of the initial warehouses and shelters that we learned about had operated out of churches. There was a clear trend here – and I needed to understand why.

My introductory economics courses provided me the basic level of knowledge I needed to start examining my question: Disasters created a public

goods problem – that is, the public good of disaster relief was being underprovided. Churches – and religious organizations in general – were stepping in to provide the necessary services. It made inherent sense to me – religious organizations were based in faith, and that provided non-market encouragement to provide relief.

Travelling to Moore, Oklahoma on a second JDRC Alternative Spring Break in March of 2014, I started to realize that it was more than just the moral impetus of faith that spurred churches to become major actors in disaster relief. In Oklahoma I started to ask questions and quickly found answers. Why did this church get involved? They had a large gym to use as storage for vital supplies. Why did the Methodists take charge of case management? Their church offered disaster response training and had a system of volunteers in place. I began to find that pastors found it easier than many others to put aside their duties for a few days, or to take on an extra workload for a month or so. I began to find that physical spaces were almost as big of a motivating factor as the teachings of the faith groups they housed. And I found that there were yet bigger questions to be answered.

Thus, this Capstone project began. I started reading all I could. I started bouncing ideas off of anyone who would listen. I met with local chaplains here at SU, and reached out to my limited contacts, who at the time were more or less just the two full-time employees of the JDRC. It seemed like I had only ever met people with emotional attachments to these disasters – not the people who made the practical decisions to help the recovery effort. Fortunately, I applied for and received a Crown

Award through the Reneé Crown Honors Program, which allowed me to travel back to Joplin and Moore in January 2015 to meet some incredible people over five days of research.

These five days – over two dozen hours of interviews – provided me the research boost I needed to bring this project to where it is today. Over the last semester, with the help of an incredible advisor and the honors staff, I took two years of curiosity and attempted to turn it into seventy or so pages of information and exploration. I hope that this paper can help those communities working right now to recover from a disaster, and all those who may face such tragedy in the future.

Acknowledgements

There is a long list of people who deserve thanks and praise for what they have done to help me along with this undertaking. First and foremost, the largest thank you must go out to Prof. Pete Wilcoxon, who suffered through my ramblings in our bi-weekly meetings for the past year and a half (if I hadn't written down the wrong time and missed the meeting, that is). Without Prof. Wilcoxon, this paper would have no economic backbone, and no clear direction. I've never before worked with someone who can so easily take my jumbled thoughts and help me see the single sentence that can summarize it all. Thank you for everything.

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I would be remiss not to thank all of the wonderful people who took time out from actually providing disaster relief services to talk to me about what they do. First and foremost, thank you to Adina Remz and Sam Kanofsky from the JDRC – you continue to be role models in all possible ways. Your help and guidance, as well as

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In Joplin:

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Jillian, for putting up with many, many long nights of writing. Last but not least, thank you to my parents, who helped send me to Joplin and Moore on those ASB trips; and for not only giving up one of their precious weeks with me so I could travel for research, but for helping to plan the trip – and perhaps most importantly, helping re-book flights, hotels, and rental cars as the American aviation system continually and consistently tried to prevent me from getting anywhere.

Premise

Natural disasters make the news frequently; information on how to help is publicized as quickly as possible. Millions upon millions of dollars are raised overnight to help the damaged area of the country or the world. As climate change causes disasters to become more frequent and more destructive, what will happen to the disaster sites that can't make the news? What will happen to the towns and cities where large, national voluntary organizations or federal agencies cannot provide the same level of aid that they do now? Who will step in to fill the void?

This paper presents a suggested solution to this problem: Local, faith-based organizations. The following chapters will examine the causes of disasters and the systems that work to prevent and respond to them; climate change and its effects on natural disasters; faith-based organizations, and their roles in disaster relief. Further, it will examine an economic model and a series of case studies to present best practices and suggestions for responding to disaster when disaster relief fatigue has set in. This model and these case studies are not meant to be proscriptive; rather, they aim to provide insight into the mechanism of the rebuilding phase, and to provide an example of one structure for providing disaster relief services.

Section 1: Natural Disasters and Disaster Relief

Natural Disasters: Definitions and Dynamics

Natural Hazards

Natural hazards¹ are defined by the World Meteorological Association (WMO) as “severe and extreme weather and climate events that occur naturally in all parts of the world” (WMO, n.d.). Natural hazards include drought, tropical cyclones, floods, landslides and mudslides, blizzards, avalanches, sandstorms, thermal extremes (heat waves and cold snaps), thunderstorms, lightning, tornadoes, forest fires, severe storms, volcanic eruptions, and more. More generally, natural hazards occur from the “ongoing geological processes of our planet” and often have “sudden onset” (Kieffer, 2013, p. xiv). Natural hazards cause “immediate and major change on the surface of the earth” as a result of dynamic changes within the earth, or in its atmosphere (p. 8) By most definitions, a natural hazard can occur with or without interaction with human society. A natural hazard, such as a hurricane (a form of tropical cyclone), can form over the Atlantic Ocean and never make contact

¹ Others would use the term “natural phenomena” in this place; for the purpose of this piece, the term “hazard” will represent a natural event outside of its interaction with human populations. In particular, the Organization of American States uses this terminology, with the term “natural disaster” being reserved for situations of “unacceptably large” levels of destruction or fatalities (OAS, 1990).

with land or cause any harm to human property. Once it does “touch ground” and affect humanity – be it through destruction of human life or property – a natural hazard is considered to be a natural disaster.

Natural Disasters

When natural hazards intersect with human society, natural disasters occur. Like a tree falling in a forest, if a tornado happens in an uninhabited area it is not a disaster but just a hazard, or perhaps just weather, much as the tree makes no sound.² From a geologic perspective, “disasters occur when accumulated energy is suddenly released in a way that harms humans” (Kieffer, 2013, p. 23). By its most basic definition, a natural or hazard or weather event only becomes a disaster when it “results in significant harm to lives and/or property, as well as disruption to normal patterns of living” (NYDIS, 2014a).

Dynamics of Disasters

Natural disasters are caused by changes in the dynamics of the Earth’s crust, plates, atmosphere and bodies of water. They can be broken down into three broad categories (Evans, 2011).

1. Ones caused by the movement of the Earth
2. Weather-related disasters

² Sound is a perceived quality; the vibrations from the tree would go unperceived and therefore no sound would be made.

3. Secondary or Supplementary disasters

The first type of disaster is those caused by the movement of the earth, and are otherwise known as geological disasters. This category includes earthquakes, volcanic eruptions, and tsunamis. These disasters, resulting from the unpredictable movements of the Earth's tectonic plates, tend to come without warning and generate some of the most devastating results. Generally, all that can be done to ameliorate the effects of these types of disasters is to prepare ahead of time and build resilience as a community, especially through building and structural codes.

The second type of disaster, which is associated with weather, includes tornadoes, hurricanes, other storms, and extreme temperature events. While still highly unpredictable, there is usually significantly more warning with these types of disasters. The amount of warning time can vary – hurricanes and tropical storms tend to move slowly, giving a few days warning in some cases and allowing for evacuation. Tornadoes fall at the other end of the spectrum, as they develop quickly and their paths can be highly unpredictable. While warning systems are in place, the national average for warning time is just 13 minutes, enough usually just to get to a shelter or a safer space (Heberton, 2014). Much like tectonic disasters, preparation is the most important way to reduce damage.

Secondary or supplementary disasters come along with or are the result of other disasters. Flooding, for example, might come along with a hurricane, or result

afterward due to damage caused to natural or human systems, best exemplified by the breaking of the levies in New Orleans after Hurricane Katrina (Penuel and Statler, 2011, p. 323). In this case, the majority of the damage came not from the hurricane itself but the resulting floods that left almost 80% of the city underwater (Shughart, 2011, p. 522).

Disaster Damages

In all of the above cases, disasters occur quickly and leave devastating, lasting results that require immense collective effort to repair. Damage occurs to both personal and public property, and in addition there may be deaths and injuries. In the United States alone, natural disasters have caused almost 3000 fatalities, and upwards of \$92 billion in damage in 2009-2013 (NWS). Natural disasters tend to disproportionately affect minorities and other groups who tend to be of lower socioeconomic status (PBS).

Even those with full home insurance will often find that reconstruction after a disaster may cost more than they can provide. Oftentimes insurance will not cover the costs of staying in a hotel, needing to miss work or change jobs. In a fairly specific example, in Moore, OK, many families with full insurance could not move back into their homes because local ordinance required a fence and tree on a residential property in order for it to be fit for habitation; homeowners insurance often didn't cover this (M. Bewely and C. Fox, Personal Communication, January 9th, 2015). Frequently, things such as sheds and patios are also not covered. In response

to the significant economic need created by disasters, an entire sector of the economy has developed to provide assistance to those in need after they hit

Disaster Relief

After a disaster strikes, the damage it causes needs to be addressed. The following section examines the processes by which society responds to and recovers from natural disasters.

History of Disaster Relief

For almost as long as there has been government and a public sector, there has been disaster relief. One of the earliest specific accounts of disaster relief comes from perhaps the most famous volcanic disaster of all time – the 79 AD eruption of Mt. Vesuvius. Pliny the Younger’s firsthand account gives us a glimpse into ancient views of disaster relief. Pliny the Elder set out to rescue trapped villagers and perished along the way. At his behest, the Roman government helped with recovery and rebuilding efforts with a lowering of taxes and provision of financial aid, a precedent that had been set by Caesar himself (Hughes, 2012, p. 72-73).

The modern era of disaster relief is often said to have begun in 1863. That year, Henry Dunant founded the committee that, in 1919, eventually became the International Federation of Red Cross and Red Crescent Societies. Since then, it has become one of the largest disaster relief organizations in the world, with 186

national societies (Penuel and Statler, 2011, p. xxix-xxx). From that point, a number of more formalized disaster relief organizations and societies formed, including USAID, the British Disasters Emergency Committee, a number of UN-based organizations, and hundreds of national and local groups (p. xxx-xxxii).

Disaster Relief in the United States

History of Federal Disaster Relief

In the United States, disaster relief remained a fairly localized and decentralized process until the later part of the twentieth century. Government-sponsored disaster relief efforts are generally considered to begin with the Congressional Act of 1803, which provided aid to the town of Portsmouth, New Hampshire after it was ravaged by fire (PBS, n.d.; Penuel and Statler, 2011 p. 731, FEMA 2008). For more than a century, this was the extent of government involvement – individual dispensations by over one hundred individual pieces of legislation on a case-by-case basis (FEMA, 2015).

Through a series of acts in response to the effects of the Great Depression in the early 1930s, federal disaster relief became more centralized and procedural. The Reconstruction Finance Corporation (RFC), formed by President Hoover, was given the charge of dispensing funds in response to disasters (Penuel and Statler, 2011 p. 731). Similarly, in 1934 the Bureau of Public Roads was given authority to rebuild federal roads post-disaster, and through the 1965 Flood Control Act, the Army Corps

of Engineers was given flood control and response responsibilities. (FEMA, 2015). Eventually, most of these tasks were further centralized under the Federal Disaster Assistance Administration, overseen by the Department of Housing and Urban Development.

The system of federalized disaster relief that we see today was implemented by the Carter administration, through the Disaster Relief Act of 1974, which established the process of Presidential disaster declarations, and Executive Order 12127, which took the more than 100 federal agencies with disaster relief responsibilities and centralized them under the new Federal Emergency Management Agency (FEMA, 2015). In 1988, the Stafford Act gave statutory authority to the agency, amending the Disaster Relief Act of 1974 to coordinate Presidential declarations with FEMA's disaster relief activities (ibid).

In 2003, FEMA was incorporated into the newly formed Department of Homeland Security, with most of its functions merged into the larger department. However, after the disastrous response to Hurricane Katrina in 2004, FEMA was reorganized as a unique, mostly independent entity under DHS. It is in this form that FEMA exists today; functioning more or less like it did pre-2003 (Penuel and Statler, 2011, p. 202; FEMA 2015).

History of Voluntary Disaster Relief

Disaster relief in the United States also involves a large array of local, state, and national entities including local governments and non-profit organizations that work side-by side with FEMA in local communities, joined by communal organizations in their efforts.

The beginning of the history of volunteer organizations in disaster relief in the United States can perhaps be most specifically pinpointed in 1881, when Clara Barton spearheaded the formation of the American Red Cross, which was legitimized by the American signing of the Geneva Convention in 1882 and by the granting of a congressional charter in 1900 (Red Cross, n.d.; Texas Impact, 2006). One of the first disasters the newly formed American Red Cross responded to was the 1889 flood in Johnstown, Pennsylvania. The Red Cross acted in tandem with the local relief efforts, under the coordination of the federal government (Penuel and Statler, 2011 p. 291).

From that point on, the Red Cross and other groups were heavily involved in all major disasters in the US. The 1906 San Francisco earthquake saw an overwhelming response, with the Red Cross and other groups, including some spontaneously formed citizen groups setting up soup kitchens and temporary shelters around the area, providing unnecessary overlap of services (ibid). From this point, the rise of more structured, established organizations began as part of the creation of a national response network.

After Hurricane Camille decimated the Gulf Coast in 1969, a number of problems with the existing disaster relief system in the US were revealed, perhaps most significantly that minorities were being treated unfairly by voluntary organizations (Texas Impact, 2006). As a response, in 1970 the Red Cross and six other organizations came together to form the National Voluntary Organizations Active in Disaster (NVOAD) to better coordinate relief efforts in an attempt to curb duplication and standardize service provision for all (ibid; Penuel and Statler, 2011, p. 293). It is under this NVOAD-centered system that disaster relief in the private and voluntary sector operates today.

The Disaster Relief System

The remainder of this paper will focus specifically on responses to natural disasters domestically in the United States. The following section seeks to explain and describe the systems used and processes followed after a major disaster occurs.

Stages of Disaster Relief

In discussion of disaster relief, a standard vocabulary is needed to break down the various phases of the process. These phases or stages are part of the larger cycle of disaster relief³, presented here in a linear order. These phases are fluid and overlap; there is no set length of time for each stage, nor are there hard start and end points. For the purposes of this paper, however, the cycle of disaster

³ Also referred to as the cycle of disaster management.

relief is broken down into four stages to be spoken of independently: Mitigation and Preparation; Response; Rebuilding; Recovery.

Mitigation and Preparation

The stage of mitigation and preparation⁴ focuses on preparing for the next possible disaster. Mitigation is defined as “reducing or eliminating the future effects of a disaster,” through the creation of systems and infrastructure that is prepared to withstand or minimize damage (NYDIS, 2014a). This can be accomplished in a variety of ways, including risk-reduction projects like the construction of levies or improvements to key infrastructure and resource lifelines (FEMA, 2011, p. 81).

Preparedness refers more specifically to an area’s readiness for an impending disaster. This includes establishing who is responsible for what during an emergency, coordinating strategies for resource provision, and planning for further leadership structures (NYDIS, 2014a). Though most heavily focused on the in the immediate period before a disaster, preparation is not just a short-term goal; local and national governments and organizations work every day to prepare for disasters.

⁴ Often, these are considered to be two different stages. For the purpose of understanding and discussing specific responses to disaster, they are herein effectively the same stage and will be presented as such.

Response

The response phase of disaster relief begins immediately when a disaster begins, and includes search and rescue efforts during and immediately after a disaster, as well as the provision of food, medicine, shelter, and other basic necessities in the moments and days just after a disaster (Penuel and Stateler, 2011, p. 97). The main goals of the response phase include “saving lives, protecting property, and providing for public welfare” as it pertains to the damage of a disaster (NYDIS, 2014a).

The response phase is perhaps the most publicized stage of the disaster. It is at this point that the majority of donations are received; for most major disasters, television coverage is almost guaranteed, further supporting the funding of relief efforts as unaffected citizens tend to respond emotionally to destruction and loss of others (Penuel and Statler, 2011, p. 97). It is during the response phase that a declaration of disaster, whether local/mayoral, gubernatorial, or presidential, would be made. It is important to note that a declaration of disaster does not start the response phase; rather, it initiates the government-sponsored and coordinated aspects of disaster relief.

Rebuilding

The rebuilding stage of disaster relief is an intermediate but highly significant phase of the cycle⁵. In most cases, the rebuilding phase is a specific type of recovery, in which the focus on the return to normalcy of life is centered on physical rebuilding of homes, businesses, and other structures. Generally, this phase involves a number of unique actors, adding insurance companies, local contractors, and more specialized nonprofits on to the existing list of government and nongovernment entities already working on-site from the response phase. Rebuilding starts as the response phase winds down, and usually takes from 3-5 years to complete.

Recovery

Long-term recovery, herein referred to as simply as recovery, focuses on “helping communities heal and return to a state that is similar to, or even improved from, pre-disaster conditions” (NYDIS, 2014a). Major activities in this stage include restoration of infrastructure, restoring health, social and community services, and promoting economic development and re-development (FEMA, 2011, p. 81). Recovery is the longest and most fluid of the stages of the disaster relief cycle; by

⁵ Depending on the source, this phase may be known as part of the recovery phase (Penuel and Statler, 2011, p. 98), “short-term recovery” (NYDIS, 2014a) or “long-term recovery” (FEMA 2011). Others would refer to this phase as “reconstruction” (Disaster Definitions, 2008, p. 29).

many views, recovery starts the moment a disaster hits and ends only at the next disaster; for the purposes of discussion, this and other papers frame recovery as generalized recovery of society after immediate response and through the period where the economy and community has reached a stable level of normalcy or near-normalcy, as defined by the local community itself.

The National Disaster Recovery Framework lays out four possible conditions for a “successful” or “completed” recovery phase. The community:

- Successfully overcomes the physical, emotional, and environmental impacts of the disaster;
- Reestablishes an economic and social base that instills confidence in the community members and businesses regarding community viability;
- Rebuilds by integrating the functional needs of all residents and reducing its vulnerability to all hazards facing it.
- Demonstrates a capability to be prepared, responsive, and resilient in dealing with the consequences of disasters (FEMA, 2011, p. 13).

Major Players in Disaster Relief

Although every disaster presents different challenges and requires different solutions, there are a number of constants, especially in regards to the various major players involved in the relief cycle. Who exactly is involved depends on the scale and scope of the disaster, but in a major natural disaster – one with a Presidential

declaration of disaster – it is likely to see all if not most of these major players.

Described below are the major categories of actors in disaster relief situation, with a discussion of their roles, as well as further information about specific actors in each category.

State and Local Government

At the onset of a disaster, the most immediate response begins with the local government. Before any local government resources can be mobilized, there must be a declaration of disaster from the mayor or a similarly empowered local official. After this point, any organizations assigned responsibility as part of a local disaster management plan are *activated*⁶ and begin to implement their assigned tasks, which begin with those of the response phase – search and rescue, provision of basic human needs, and eventually the restoration of basic services and utilities. After activating any necessary actors, the local government may serve as a coordinating body. Often, other groups will step in to fill coordination and leadership roles, while the local government will “step back” to facilitate the actions of those who are often better suited to certain tasks.

⁶ Activation is a sector-standard term used to refer to the process by which an organization or entity becomes involved in any stage of the disaster relief cycle. For almost all governmental agencies, activation requires a declaration of disaster at the proper level of government. Many non-profits and NGOs sign *Memorandums of Understanding* (MOUs) with government or other non-government entities to determine their conditions of activation. Still other groups may self-activate; this tends to pose challenges in coordination that will be discussed later.

The local government plays a large role in the recovery phase, as the restoration of a degree of normalcy often involves the passing, changing, or suspension of certain laws or regulations, temporarily or permanently. It is not unusual that during this phase, the local government works create a recovery scenario that allows for more effective mitigation and preparation.

On the state level, things look more or less the same. Depending on the scale and scope of a disaster, a state government may need a request from local authorities to step in, or a governor may make an executive declaration of disaster on his or her own based on specific, predetermined criteria⁷. In regards to functioning during the stages of disaster relief, the state government works similarly to a local government, with roles varying situationally.

All states have a State Emergency Management Agency (SEMA) that functions in a highly similar manner to FEMA, whose function is described below:

FEMA and the Federal Government

The federal government tends to take a more hands-off approach to disaster relief than state or local governments. In order for the Federal government to

⁷ In most cases, a spontaneous gubernatorial declaration of disaster requires a multi-locality disaster of a significant level of damage.

become involved in the disaster relief cycle, a Presidential declaration of disaster must be requested by the local or state government; only once one is issued will FEMA or other federal entities activate in response to the disaster.

FEMA's role in disaster relief is outlined by their mission statement:

"FEMA's Mission is to reduce the loss of life and property and protect communities nationwide from all hazards, including natural disasters, acts of terrorism, and other man-made disasters. FEMA leads and supports the nation in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery and mitigation" (FEMA, 2008).

FEMA works to achieve its mission through six specific goals: (Koenig, 2006):

1. "Prepare" – Working with states and localities to figure out how to handle a breakdown of essential services, reviewing States' Emergency Operations Plans, and providing various training opportunities for elected officials and professionals.
2. "Respond" – Once a federal declaration is issued, FEMA works with local authorities to get emergency equipment and teams where they are needed; provides food, water, shelter, and medical services; and works with local authorities to quickly restore essential services and utilities.

3. “Recover” – Focusing mostly on the “Rebuild” stage, FEMA provides loans and grants to help rebuild homes, business, and infrastructure.
4. “Mitigate” – FEMA works with local authorities in their mitigation planning, and provides grants and loans to fund mitigation projects.
5. “Risk Reduction” – works with the Federal Insurance Administration to provide affordable insurance to American citizens.
6. “Prevention” – FEMA works with local entities to set building codes and other regulations to become more resilient to natural disasters.

When not directly responding to a disaster, FEMA works with state and local agencies on its Prepare, Mitigate, Risk Reduction, and Prevention goals. After a declaration of disaster is made, FEMA establishes a Disaster Field Office, led by a Federal Coordinating Officer and the State Response Team. Using any and all pre-prepared plans, the Field Office works to provide the services necessary to accomplish its “Respond” and “Recover” goals. This often includes the mobilization of emergency response and search and rescue teams, and the evaluation of damage in order to provide proper funding through grants and loans.

Non-Profit Organizations

Government at any level does not and cannot provide every service and resource necessary for disaster relief. In these cases, “nonprofits directly supplement and fill gaps where government authority and resources cannot be applied” (FEMA, 2011, p.21). Non-profit organizations⁸ take a number of forms and provide a wide variety of services.

Nonprofit organizations can range in size from large, national or multi-national groups like the American Red Cross, which is itself an affiliate of the international Red Cross/Red Crescent network and provides a wide array of services, to smaller, more niche groups like NECHAMA: Jewish Response to Disaster, which is a smaller American-Jewish organization that focuses on providing tools and assistance to those rebuilding their homes in local communities after a disaster. No matter the scale or scope of the organization, nonprofits are unified by their dependence on volunteers and charitable donations, which create unique challenges and opportunities as compared to other major actors that make them an important part of the disaster relief sector.

⁸ Though usually considered to be a specific subset of “non-governmental” organizations, for the purposes of this paper, the two terms will be considered synonymous.

Section 2: Climate Change and Natural Disasters

Introduction

The Intergovernmental Panel on Climate Change Fifth Assessment Report, completed in November 2014, states that human influence on the climate system is clear and that increased disruption to our climate will increase risk of severe, pervasive impacts (IPCC Press Office, 2015). Warming of our climate system is “unequivocal,” and its observed effects are persistent: warming of the ocean and atmosphere, decreased global snow and ice, sea level rise, and increased concentration of greenhouse gases (Alexander et. Al., 2013, p. 4). The sections below seek to give a brief overview of relevant expected and current effects of climate change.

Effects of Climate Change

Global Temperatures

One of the core aspects of climate change is global warming, or the increased average temperature of the Earth, relative to historical average. At current rates of greenhouse gas emissions combined with other contributing global factors, global surface temperatures are expected to increase by at least, 1.5 C from 1850-1900

mean temperatures, with some models projecting at least 2 C or more above these levels (Alexander et Al., 2013, p. 20).

Such a rise in global average temperatures mean a “virtually certain” increase in extreme high and extreme low temperatures, accompanied by a “very likely” increased occurrence of heat waves and other extreme temperature events (ibid). Heat waves, cold snaps, and other extreme weather events often become disasters in their own right

Sea Level and Ice

Since 1950, there has been significant retreating of glaciers and retreating of sea ice, resulting in sea level rise. It is “very likely” that sea ice, glaciers, and spring snow levels will all decrease during the 21st century as a result of increased global temperatures (p. 24). Thermal expansion and glacial melting account for the majority of the expected increase in sea level, which is expected to increase at a growing rate over the next century (p. 25). Higher sea level leads to larger storm surges and increased flooding in conjunction with hurricanes and other disasters.

Atmosphere and Weather

Average global precipitation is expected to increase during the 21st century. It is “very likely” that extreme precipitation events will increase in frequency and

intensity over the course of this century. El Nino-Southern Oscillation and Monsoon effects are expected to increase in area and intensity as well. (p. 23).

Climate Change and Natural Disasters

It is nearly certain that climate change will continue on for at least the next century. Even if global emissions were cut to zero right now, we would continue to experience the effects of climate change for a prolonged period. These effects, current and expected, are already having and will continue to have a profound effect on natural systems around the world, subsequently affecting natural hazards and disasters, as well as affecting societies' ability to respond to these disasters.

Impact on Risk, Vulnerability and Exposure

A number of climate change induced factors are increasing the risk of natural disasters. According to the IPCC, risk from climate change stems from vulnerability (lack of preparedness) and exposure (being in harms way) overlapping with natural hazards (IPCC Press Office, 2014, p. 1). With "very high confidence," climate scientists have identified "significant vulnerability and exposure" of many humans to the increasing effects of climate change (Field et Al, 2014, p. 7)

In assessing risk, the IPCC WGII has identified five reasons for concern (RFCs). Three of them apply very specifically to natural disasters: RFC 2 addresses increased risk from extreme events, including extreme temperatures and

precipitation, which can quickly become natural disasters. RFC 3 raises concerns about uneven distribution of impacts, noting that risks are unevenly weighted towards disadvantaged people in particular. RFC 5 notes that large-scale singular events, like the melting of the Greenland ice sheets, could exacerbate current situations quickly and intensely (p. 13).

As explained above, increasing magnitudes of global warming have increased the probability of “severe and pervasive impacts” to human society (IPCC Press Office, 2014, p. 2)). Increased extreme weather events, combined with increasing areas of vulnerability are expected to increase both the frequency and intensity of natural disasters.

Take for example coastal or low-lying areas. As sea levels rise, these areas are already facing the threat of flooding and submergence; as the frequency and intensity of hurricanes and tropical storms increases as well, these factors are expected to combine to create exponentially larger destruction. Similar exposure-vulnerability combinations exist for various other regions.

Impact on Disaster Relief

The most important impact of climate change on disaster relief will come from the increase in frequency and intensity of natural disasters. A number of other challenges caused subsequently or concurrently, will also emerge. Climate change and natural disasters both already disproportionately affect the disadvantaged; the

effects of climate change will create more and more-disadvantaged populations, requiring even more relief services after a disaster hits (Field et al, 2014, p. 21).

From a relief provision standpoint, one of the most significant effects of climate change will be “disaster relief fatigue,” the idea that as disasters become more frequent and more destructive, societies’ ability to respond will become strained. More destructive and more frequent disasters will require more resources; simultaneously, increased frequency will decrease the availability of those much-needed resources.

Disaster relief fatigue will present itself in a variety of ways, from funding and volunteer shortages, to overextension of government and nonprofit groups. Coordination will become increasingly difficult, both due to overextension and increased destruction in each disaster area. In order to ameliorate the effects of these various factors, new methods and strategies for disaster relief must be implemented. In the remainder of this paper, I present the case for an increased role of local, faith-based organizations in disaster relief operations in order to combat climate change-induced disaster relief fatigue.

Section Three: The Case for Faith

Introduction

In disaster relief, Faith-Based Organizations have played a major role for decades. Quakers, Mennonites, and the Salvation Army have each been running disaster relief operations for over 50 years, and every major religious denomination in the United States has had some active part in disaster relief in the past 30 years (Koenig, 2006,). Almost 75% of NVOAD's membership is Faith-Based, and each organization tends to specialize in 1-3 aspects of relief, almost exclusively during the response and rebuilding stages. Many of these specific roles will be discussed throughout this paper, particularly in Section 5.

Faith-Based Organizations: An Overview

Even with globally declining church attendance and affiliation with faith, Faith-based organizations continue to play a major, and often growing, role in society. Faith-based organizations run many of the social-service nonprofits that keep our urban populations from being forgotten; they sponsor education from pre-school through graduate study⁹; and they provide critical relief efforts after

⁹ In fact, almost every institute of higher learning in the United States founded before 1900 was related in some way to a faith-based group.

disasters. Despite their prevalence in society, they are not always visible, well known, or understood.

Definitions and Categories of Faith-Based Organizations

Faith-based organizations (FBOs) are a significant subset of nonprofit organizations. Churches and similar houses of worship (“Institutions of Faith”) are not considered to be FBOs by definition; however, they can, and do, act as FBOs in their mission work and engagement with the community and world at large.

Generally, FBOs are divided into five broad categories (Clarke, 2006):

1. Faith-based representative organizations or apex bodies – these FBOs handle doctrine and govern the adherents of their religion; they serve as representatives to other organizations and governments on behalf of their populations. Examples in this category include the Vatican/Holy See, the World Muslim League, or Baptist General Convention.
2. Faith-Based Charitable or Development Organizations – these FBOs provide social services, work towards international development, and collect and coordinate donations for charitable causes. These organizations run the gamut of size and scope – anything from a local

church soup kitchen to the Salvation Army falls into this category.

3. Faith-Based Socio-political Organizations – these FBOs deploy faith as a motivator for social and political change. Organizations in this category would mostly include faith-based political parties, and some advocacy and lobbying groups.
4. Faith-Based Missionary Organizations – these FBOs serve to spread their respective faiths through engaging with other communities and seeking converts. These may be stand-alone agencies, like the African Muslim Agency, or may be arms of Faith-Based Representative organizations, like the highly structured missionary arm of the Latter Day Saints movement.
5. Faith-Based Illegal or Terrorist Organizations – these FBOs engage in illegal activity or armed conflict in the name of faith. Terrorist groups like Al-Qaida or Boko Haram make up this category.

It is important to note that it is possible, much like an Institution of Faith can act as any of the five types of Faith-Based Organizations, any FBO, regardless of its primary categorization, may act at times or through specific arms as any other type of FBO.

The Role of Faith-Based Organizations in Disaster Relief

Faith-Based Charitable Organizations

When it comes to Faith-Based Organizations in disaster relief, the work is done by groups in the category of Faith-Based Charitable Organizations, or by other FBOs (usually Representative Organizations, but sometimes Missionary Organizations) and Institutions of Faith acting as Faith-Based Charitable Organizations, whether through temporary conversion of their goals and missions, or through existing, spontaneous, or re-purposed outreach arms of their organizations.

When not responding to a disaster, many of these FBOs already provide critical social services. Many local congregations host or house food pantries, homeless shelters, or soup kitchens. Catholic Charities manages a number of charitable programs, including refugee resettlement; the Salvation Army famously runs its warehouses and thrift shops; and local and national groups alike do community service and fundraising in the name of the needy.

It is important to denote at this time four major subtypes of Faith-Based Charitable Organizations, and how they will be referred to subsequently:

1. “Disaster Relief FBOs” or “Faith-Based Disaster Organizations” – charitable, nonprofit organizations of any faith that specialize in disaster relief as their main form of engagement; used to refer to organizations that operate on a

national scale.

2. “Charitable FBOs” or “Faith-Based Charitable Organizations” – charitable, nonprofit organizations of any faith that specialize in service provision other than disaster relief, but are acting as part of the disaster relief process; used to refer to organizations that operate on a national scale.
3. “Local congregations,” “houses of worship,” or more generally “churches” – charitable, nonprofit organizations of any faith that mainly serve as places of worship and religious function, that may or may not act as part of the disaster relief process.
4. “Local FBOs” – charitable, nonprofit organizations of any faith of a local or regional scale that provide social services or other charitable activities on a reduced, local scale.

The Case for Faith-Based Organizations as a Solution for Disaster Relief Fatigue

The Impact of Faith

Faith-Based Organizations present a number of unique advantages that allow them to excel in charitable works, and specifically in disaster relief. A Red Cross poll after 9/11 found that over 60% of respondents would seek help from a spiritual

caregiver in a disaster situation, as compared to 45% who would seek out a physician, or 40% who would seek out a mental health professional (Koenig, 2006, p. 22). Similar polls have shown again and again that a majority of Americans turn to religious leaders for “comfort, guidance, and wisdom” (NYDIS, 2014). This plays a major role in the service provision aspect of disaster relief, as local congregations tend to become ideal organizations for service providers to connect with those in need.

From a moral or cultural standpoint, it makes sense that Faith-Based Organizations would succeed in charitable circumstances. Nearly every major religious tradition has texts and beliefs that support, encourage, or even require charity. Judaism teaches *tikkun olam* – “healing the world;” Christ preached compassion and aid for the downtrodden; one of the five pillars of Islam is charity. Though many of these teachings have evolved into societal mores of a secular variety, Faith-Based Organizations continue to play a central role in influencing charitable behavior.

Disaster expert Francis Gunn provides a list of reasons as to why Faith-Based Organizations are so prominent and successful in disaster relief service provision. In many communities, these organizations, local or national, serve as the primary means of spiritual and social support for community members. From an emotional standpoint, faith-based organizations are representative of “divine intervention” to many victims, and are signs of “power, protection, and healing.” As institutions,

faith-based organizations emanate stability, something that disaster victims are drawn to in their times of turmoil, and their messages are structured in such a way that they become easily accessible to victims (Koenig, 2006, p. 15).

Faith communities, as extensions of faith-based organizations, also provide many advantages to the work of FBOs. There is a tradition of FBOs coming to aid the needy; their actions tells victims “you are not alone in this.” Meanwhile, from a practical standpoint, faith communities have networks to help move and provide resources and services, and are significantly more likely to stick around after other nonprofits and emergency services providers leave (Koenig, 2006).

Faith-Based Organizations are also important providers of spiritual and emotional care during disasters. NVOAD’s emotional and spiritual care committee has a set of points of agreement on provision of spiritual care; spiritual care providers work closely with medical and mental health professionals to provide well rounded, comprehensive care from the moment a disaster strikes through the recovery period. Many national charitable FBOs, as well as representative organizations, offer training for clergy to serve as spiritual care providers in disaster situations. Interfaith groups like NYDIS also provide more generic versions of the same trainings, often working to make sure that spiritual care providers do not cause unwanted or uncomfortable circumstances while providing care.

Local Congregations

From a more practical standpoint, FBOs tend to provide easily accessible opportunities to do good. Studies have shown that frequency of attendance at religious services correlated positively with emergency assistance – independent of age, income, and congregational friendships (Koenig, 2006, p. 12). The study concluded that in addition to religious motivation for doing these charitable activities, religious bodies were particularly influential by providing concrete opportunities for their members to help disaster victims.

The structure of local congregations provides important advantages to their provision of disaster relief as well. Local congregations tend to be centered in a church or other physical structure – in many southern and midwestern cities, but in major coastal urban areas as well, these are large, if not the largest structures in the area – that for most of the week goes unused or severely underutilized. These structures therefore frequently serve as warehouses, soup kitchens, food pantries, temporary shelter for victims and volunteers, or meeting places for volunteers and organizers. Many of these local congregations tend to have pre-existing infrastructure (i.e. buildings with bunks or kitchens) that allow them to readily begin providing services at a moments notice.

The advantages of local congregations extend to the staff as well. Most of the staff – clergy or lay – at local congregations does not have specific, day-to-day tasks as would, say, an accountant. This means that in times of disaster, many of these

local leaders can transfer some or all of their efforts to disaster relief more easily than people in most other professions. This is important, because it allows those leaders to run operations out of their already pre-advantaged locations, or to go out into the community to provide other services. For example, after the West Virginia Floods of 1972, many ministers found themselves very involved in relief work even sixteen months after the floods had receded (Koenig, 2006).

The Case for Faith

It is clear that Faith-Based Charitable Organizations, in their many shapes and sizes, provide innumerable and immensely important services during times of disaster. National organizations have access to deep coffers and willing donors; local congregations have the resources – space, infrastructure, and labor – that are necessary to provide key services quickly and effectively. As the following section will show, the local approach to disaster relief allows for optimal deployment of resources; faith-based management of these resources will be shown to be the most efficient at this maximization for those reasons.

Section 4: An Economic Model of Local Disaster Relief

Choice-Making Optimization

Introduction

This section presents a working economic model of disaster relief provision in order to uncover and explore the driving costs and organizational and coordination needs of providing disaster relief in a local setting.

The Local Perspective

If you speak to anyone with a background in disaster relief, they'll all give you the same mantra: All disasters start locally, and end locally. Whether it is a small local fire or a major, multi-state tornado with a Presidential declaration of disaster and billions of dollars in aid, the work that happens occurs locally. National organizations have to adapt to local terrain, while local organizations have to learn to provide disaster relief services, but it all happens on the local stage. Thus, this model will examine service provision and resource allocation on a local scale.

The Model

Assumptions Made

For the purposes of this model, all disaster relief will occur in one contained locality. Regardless of the source, all funds, tools, etc. can be used by or provided to any provider as best optimizes their use.

The Big Picture

Disaster relief can be, at its most basic form, be broken down as to be composed of four major “stocks” – Capital Stock of Public Infrastructure, Capital Stock of Private Homes and Business, Consumption to meet basic human needs, and spiritual wellbeing. This model seeks to explore the resource allocation and prioritization processes that govern the replenishing of the capital stock of private homes and businesses.

The Capital Stock of Private Homes and Businesses

While investment in public infrastructure is simply funded through public money, investment in the capital stock of public infrastructure is composed of private funds, which include personal savings, insurance claims, and FEMA grants, and charitable funds, which are intended to cover the gaps in what private funds can afford. As private investment is directed by the entity it belongs to, it is these charitable donations that pose the coordination problem that is at the center of disaster relief activity.

Zooming in on disaster relief provision, the provision of K_H , the Capital Stock of Private Homes and Businesses, can be viewed as an incremental, period-based function. Each period T_t to T_{t-1} is of equal length, each with its own individual, limited amount of resources to make some amount of investment I_{T_i} to increase the capital stock.

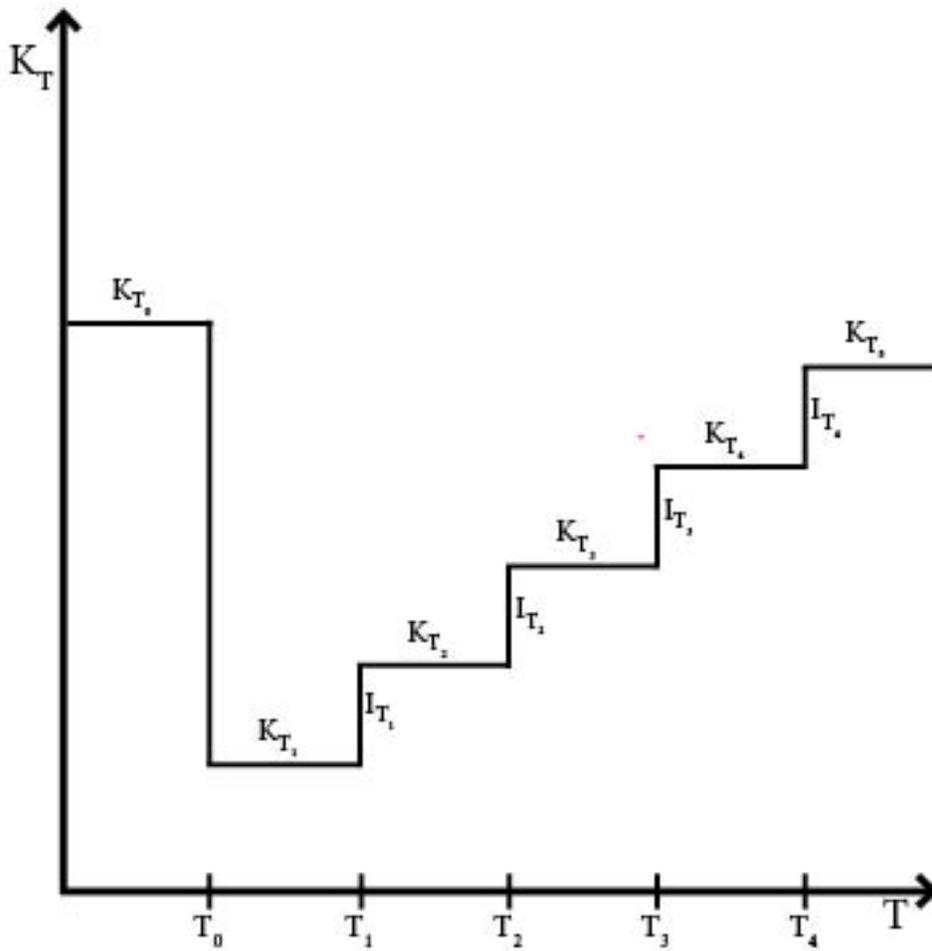


Figure 1 - Capital Stock of Private Homes and Businesses

In each period there are, therefore, coordinating, budgeting, and prioritizing decisions that need to be made. The question is, then, how and by what means to make these decisions.

The Investment/Production Model

Consider a tornado that has spiraled its way through a small midwestern town. In its wake one would find private homes and businesses in various states of disrepair. In this case, the capital stock K_H is made up of stock levels of Highly Damaged (H), Moderately Damaged (M), Superficially Damaged (S), and Undamaged (U) buildings, such that a home categorized as H can be repaired to level U only by first being repaired to level M and then P , as illustrated below:

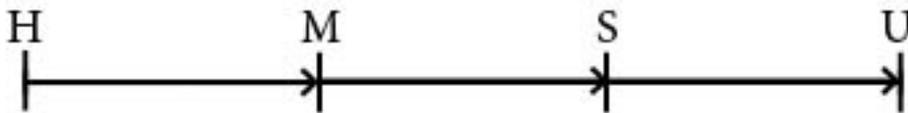


Figure 2 - Private Home Rebuilding Investment Sequence

In this case, in order to repair one home from highly damaged to a moderately damaged level, one must start with a highly damaged home, and will require five skilled laborers and ten units of materials to complete. These investments produce a building of improved status by the following Leontief (Fixed-proportion) production functions:

$$I_{M_t} = \min \left\{ N_{H_t}, \frac{L_{SK_t}}{5}, \frac{W_t}{10} \right\}$$

Equation 1

$$I_{S_t} = \min \left\{ N_{M_t}, L_{SK_t}, \frac{L_{UN_t}}{5}, \frac{K_{T_t}}{5}, \frac{W_t}{10} \right\}$$

Equation 2

$$I_{U_t} = \min \left\{ N_{S_t}, \frac{L_{UN_t}}{7}, \frac{K_{T_t}}{7}, \frac{W_t}{5} \right\} \text{ OR } I_{U_t} = \min \left\{ N_{S_t}, \frac{L_{SK_t}}{2}, \frac{W_t}{5} \right\}$$

Equation 3 and 4

Where N_{H_t} , N_{M_t} , N_{S_t} , and N_{U_t} are the number of buildings of the indicated level of damage at time t ; L_{SK_t} is skilled, trained labor; L_{UN_t} is “unskilled” or “untrained” labor that has no specific training in construction or disaster relief; K_{T_t} is the capital stock of tools, measured in number of tools; and W_t is the amount of consumable supplies needed to complete the required repairs. Each of these production functions can be assumed to take the same amount of time to complete.

There exist two functions for I_{U_t} because the repair actions are simple construction processes, and could be done quickly and at low resource cost by two skilled laborers (Equation 4), or more slowly and inefficiently by a larger group of unskilled laborers (Equation 3). In reality, skilled laborers are either unavailable or assigned to functions that require them without alternatives, so Equation 3 represents almost every case.

There also exists a stock level of each type of home,

$$N_{H_t} = N_{H_{t-1}} - I_{M_{t-1}}$$

Equation 5

$$N_{M_t} = N_{M_{t-1}} + I_{M_{t-1}} - I_{S_{t-1}}$$

Equation 6

$$N_{S_t} = N_{S_{t-1}} + I_{S_{t-1}} - I_{U_{t-1}}$$

Equation 7

$$N_{U_t} = N_{U_{t-1}} + I_{U_{t-1}}$$

Equation 8

Where the stock level N of a specific number of homes at a certain level of damage at a point, t , is equal to the number of homes at that level before the previous round of investment, plus the number of homes invested in and rebuilt to the current level, minus any homes that were repaired to a lower level of damage in the same period.

A Small-Scale Example

In the case of this midwestern tornado, we can predict that some amount of each of the above resources flows into the area in varying amounts. The question then becomes how to maximize production by the distribution of these resources.

With the above information in mind, there are a few basic strategies that might be employed. One might attempt to take as many homes as possible from High

damage to Undamaged. This would mean performing each repair (production function) sequentially on one home at a time, and then moving on to the next. This leads to a number of resource allocation problems.

If one instead focused on moving every home from Highly Damaged to Moderately Damaged, and then to Peripherally Damaged and so on, this would ameliorate the problem of wasted time, as multiple I_M production functions can occur simultaneously. The problem here becomes a scarcity issue; I_M intensively uses L_{SK} , and there are usually only a limited number of these skilled laborers. Likewise, there are wasted resources, as the I_M function does not require any L_{UN} or K_T , which are certain to be present at the time of production. These problems reoccur at each stage of rebuilding.

It becomes apparent at this point that the optimal process for rebuilding should involve a mix of each production function occurring simultaneously in each stage of rebuilding. This leads to important tradeoff decisions; Assuming all other resources are unlimited, for instance, one must decide between assigning five skilled laborers to repair one Highly Damaged home to Moderately Damaged or to assign them each to repair a total of five Moderately Damaged homes to a Peripherally Damaged level.

As no resource can possibly be unlimited or essentially unlimited at all points during the rebuilding phase of disaster relief, resource constraints begin to play into

the decision-making process. Take for example a decision made in the early stages of rebuilding, when funding for supplies is overwhelming and essentially unlimited, as is the number of untrained laborers available for work. If there are the same five skilled laborers, the decision to produce one Moderately Damaged home or five Peripherally Damaged homes comes down to whether or not there are five tools available for use.

Furthering the Example

Let's return to the example of our midwestern town. Imagine a town with 16 private homes, arranged in a four-by-four grid as such:

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

Figure 3 - Representative Town Grid, Pre-Tornado

In equilibrium, the town has a collective stock of sixteen undamaged houses, each with its own level of vulnerability (in parentheses):

A (4)	B (3)	C (1)	D (3)
E (2)	F (1)	G (2)	H (4)
I (4)	J (3)	K (4)	L (2)
M (3)	N (2)	O (1)	P (3)

Figure 4 - Representative Town Grid, with vulnerabilities

At time zero, a disaster pushes through, damaging a number of the homes:

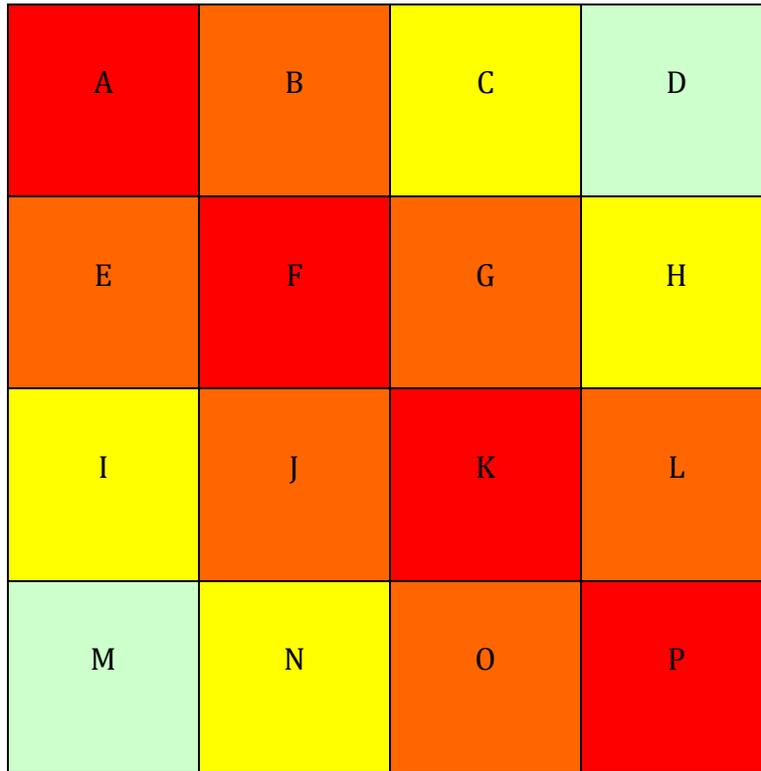


Figure 5 - Representative Town Grid, Post Disaster

Those homes shaded in red (A, F, K, P) sustain High damage; those in orange (B, E, G, J, L, O) sustain moderate damage; those in yellow (C, H, I, N) sustain peripheral damage; and those in green (D, M) sustain no damage and remain in an undamaged state.

If a federal agency such as FEMA were to arrive in town to assist in disaster relief, how would they go about prioritizing the rebuilding process? Remember that FEMA does not provide direct relief, so this is not a perfect case, but FEMA does provide the resources for rebuilding through grants and loans. The FEMA system calls for the setting of a threshold of damage, and providing resources to all

households whose damage breaks that threshold. If money doesn't run out at that point, a lower threshold is set and the process begins again.

Once a home has been shown to be above the threshold for providing aid, the household in FEMA's eyes is now essentially no different from any other that has damaged above the threshold. In the case above, homes A, F, K, P appear to FEMA not much more different than they do on this page: they are all homes that have sustained high damage; they have no other qualities.

From this viewpoint, resource provision again becomes a simple question of bringing Highly damaged homes to become undamaged. Using this threshold system, FEMA can allot enough resources to make sure each home can be completely rebuilt. It leaves the coordination of these resources to the free market, which tends to be efficient on an individual basis, but takes a long time and is less efficient from a macro standpoint.

On top of this, one would know that all homes and all households were not created equal. Just as certain groups are left more susceptible to disaster than others, every household has a certain level of vulnerability to disaster that makes it more or less resilient when a disaster hits.

Reexamining our midwestern town, we realize this is the case here. Each household has a level of vulnerability, increasing between 1-4, that affects its ability

to sustain itself after a disaster. With a fuller picture, our midwestern town now looks like this:

A (H, 4)	B (M, 3)	C (P, 1)	D (U, 3)
E (M, 2)	F (H, 1)	G (M, 2)	H (P, 4)
I (P, 4)	J (M, 3)	K (H, 4)	L (M, 2)
M (U, 3)	N (P, 2)	O (M, 1)	P (H, 3)

Figure 6 - Representative Town Grid, with Damage and Vulnerability

Originally, FEMA would rank these homes in order of their level of damage, so that you'd have:

A, F, K, P, B, E, G, J, L, O, C, H, I, N, D, M

Someone from the local community would likely approach the situation differently. Knowing each of the affected homes well, but not fully understanding

how to assess damage, they would likely take the approach of ranking homes by vulnerability, resulting in:

A, H, I, K, B, D, J, M, P, E, G, L, N, C, F, O

In both cases A and K are among the first four helped, and N and C and among the last five. Human experience would expect this to be the case. In the case of ranking order by vulnerability, home P, which is highly damaged, ends up in the second half of repairs behind homes D and M, which although equally vulnerable are completely undamaged.

The likely answer is that prioritization should be based on need. How does one determine need? Presented below are the two approaches so far:

Order	Damage	Vulnerability	Need
1	A	A	A
2	F	H	K
3	K	I	P
4	P	K	B
5	B	B	J
6	E	D	E
7	G	J	G
8	J	M	L
9	L	P	H
10	O	E	I
11	C	G	O
12	H	L	P
13	I	N	N
14	N	C	C
15	D	F	D
16	M	O	M

Table 1 - Prioritization Order for Rebuilding

It becomes apparent that a third system, “Need” might best sort and prioritize these homes. Vulnerability, together with degree of damage, creates a level of need per household that can better be used to make decisions about resource provision.

Need (N) in this case can be defined as such:

$$N = f(D, V)$$

Equation 9

Where D is degree of damage (H, M, L, U) and V is vulnerability (1-4) to disaster.

A Graphical Example

It’s a bit easier to see now that there is a wide range of need in this situation. In a continued attempt to establish a triage system, it is helpful to plot these homes on a chart representing Need, with Vulnerability on the X-axis, and Damage on the Y-axis:

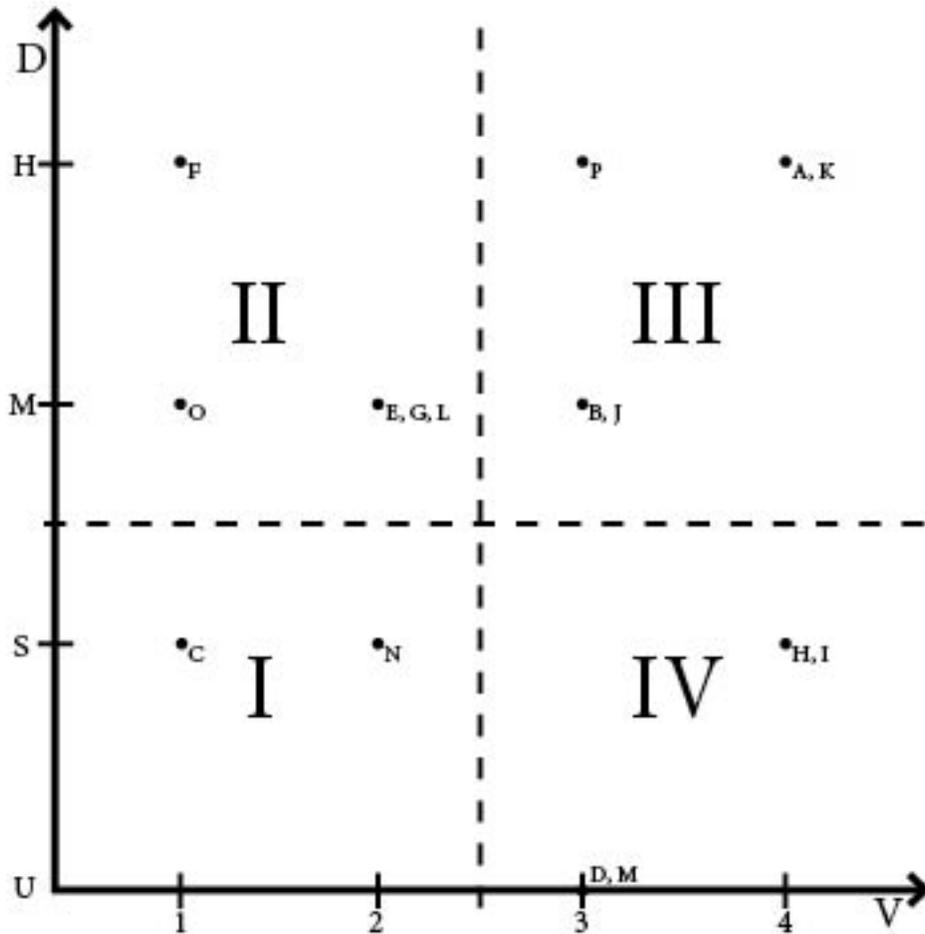
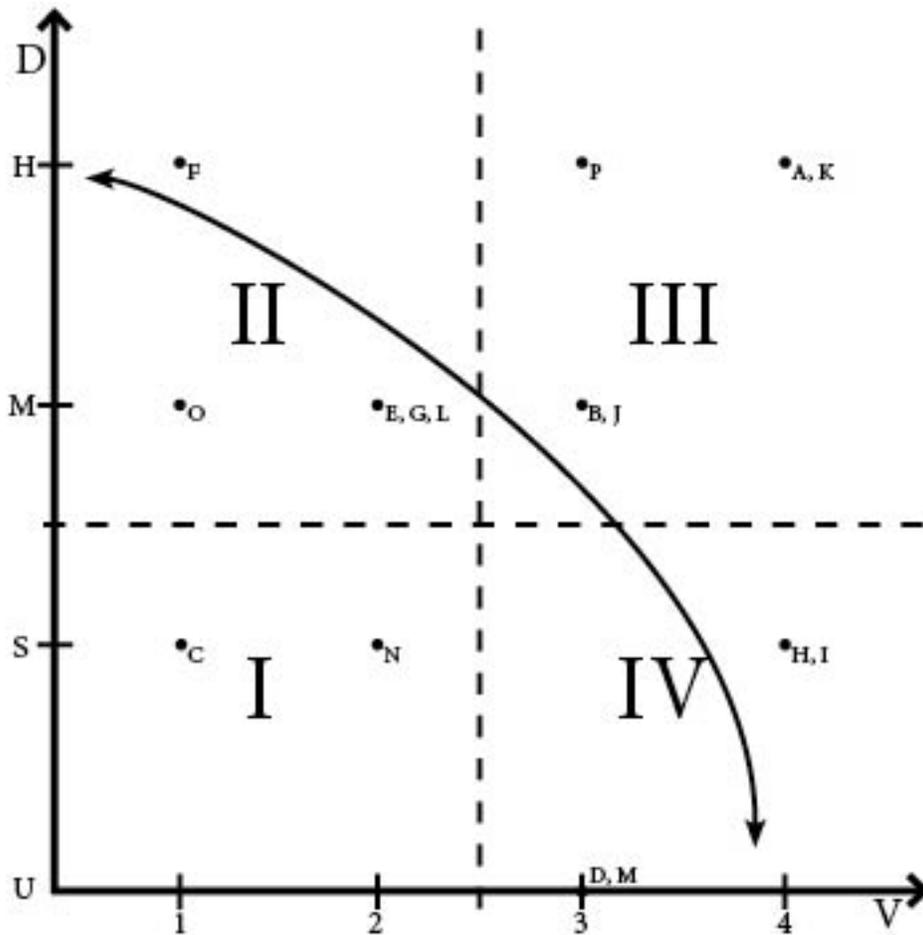


Figure 7 - Need Plotted with Quadrants

In this case, it becomes apparent that the best place to start is still with A and K, and the rest of quadrant III. In a triage situation, where those doing the coordination can see both Vulnerability and Damage, this is the clear place to start, as it is crucial to put a family with high need back into their homes quickly.

It becomes equally clear that homes in quadrant I can be saved for last. With low levels of damage and low vulnerability they will be alright without help for a while, while the resources needed to repair their homes can be devoted elsewhere.

With this initial triage completed, it can now be seen that the homes in quadrants II and IV remain to be dealt with. How does one prioritize these homes? This answer can only be derived by the community, based on their collective preferences for addressing need in each specific situation. Therefore, there exists some indifference curve that represents the community's preferences, as such:



Using the approach detailed in this model, the following chapter uses case studies to explore various manifestations of community's indifference curves and prioritization schemes, and the methods by which they make decisions and implement their plans.

Section 5: Case Studies and Examples

This chapter presents a number of case studies and examines them using the economic model presented in the previous chapter. Specifically, it discusses at the resource distribution and prioritization problems facing the rebuilding phase of disaster relief. Each case study presents an FBO that is organized on the local level, and explores strategies used by these organizations that can be used to combat disaster relief fatigue.

ServeMoore

The story of ServeMoore goes like this: When the tornado ripped through Moore, Oklahoma, thousands of volunteers with no prior experience or training, appeared, ready and willing to work. The Red Cross turned them away – they only wanted those that were already trained, and they didn't have the resources to train many more. ServeMoore, not yet a full organization, started up with a plan: Get all of these volunteers together to try to do something – anything.

Two days after the storm had hit, the organizers of ServeMoore had close to 5000 volunteers clear the debris out of a local cemetery in just a matter of hours. From that point on, the group used their local connections to optimize the productivity of these “unskilled” workers in a number of ways – from using large

numbers to complete more menial tasks quickly, to finding things that they were in fact skilled at. Using the local connections that the organizers had, they used other locally-involved volunteers to help reach out to the community and cut through red tape, allowing the rebuilding process to start earlier for more and more homes (M. Bewely and C. Fox, Personal Communication, January 9th, 2015).

ServeMoore is a perfect example of how local knowledge can combine with external experience and resources to fill major gaps in the disaster relief system. By using community connections to cut through red tape, ServeMoore made extremely efficient use of SUVs (Spontaneous Unskilled Volunteers)¹⁰ by focusing on projects that were low degree and low immediacy of need – like building sheds and fences, which were key to helping families move back in and resume their lives.

Perhaps the most significant thing that ServeMoore did was realize that due to a local ordinance that itself had roots in a prior tornado, residents could not move back into their homes, even if they were totally completed, so long as there was not

¹⁰ Spontaneous Unskilled Volunteers (SUVs) are an industry term for good-hearted, well-intentioned people who show up at the site of a disaster ready to offer their help, but are not trained by or affiliated with any present organization, and thereby, when collected in mass numbers as they tend to be, become a problem to organizers as they have policies that prevent these unaffiliated volunteers from working under their organizational banner (N. Holderby and T. Layton, personal communication, January 7th, 2015).

a tree and a fence in their yard. Using its masses of volunteers, ServeMoore acquired the minimal funding it needed to purchase the necessary materials and tools, and put its workforce on the task, helping families overcome a small but significant obstacle in their recovery.

Tying this in to the economic model presented in the previous chapter, ServeMoore found itself working at the bottom of the quadrant graph (Figure 7) – at homes that were nearly at the undamaged level. At this point, prioritization was easy to do because they, as local residents, were able to figure out the level of vulnerability of each individual home. It used what resources it had in abundance – unskilled labor – to make up for what it lacked in other resources, allowing it to work using the I_{U_t} production function.

NECHAMA

NECHAMA's motto is that they're just "guys with tools" who come in to help establish locally focused rebuilding and recovery solutions. NECHAMA is not local, and understands that it cannot have a clear picture of vulnerability; thus it is similar FEMA in its information, but differs in its approach. NECHAMA's mission is to provide the two things that local organizations don't have – experience and tools.

NECHAMA's model is essentially to drive a van with some experts and a whole lot of tools into a disaster area, provide some brief training and advice, and

then leave the tools to be used by the local community (B. Driscoll, personal communication, December 18th, 2014). These tools are often key to speeding up the recovery process, as tools tend to be a limiting factor.

In terms of the experience it brings, NECHAMA seeks, successfully, to provide the local organizations that can measure and understand vulnerability with the information and tools they need to rate and assess damage, so as to help with the prioritization process. This serves as a “condensation point” for local organizations, around which they can begin to create systems of organization for the rebuilding process.

St. Bernard’s Project/Rebuild Joplin

Rebuild Joplin formed to tackle a pretty common problem: National organizations did a great job clearing up debris in the city and giving out grants and funding to rebuild, but no one was leading the rebuilding. The St. Bernard’s Project, which grew out of a local response to Hurricane Katrina, sent a representative to Joplin to help organize a case-management system in the style that they use, and thus Rebuild Joplin was born. Case-management systems are used in disaster relief as they are in many social-services situations – to prioritize cases and to optimize the effects of limited resources by managing their distribution – something inherently important to disaster relief.

Rebuild Joplin's main strength is that it uses local people to solve local problems. These locals, with training to understand damage assessment, use their knowledge of local vulnerability to help manage cases, and distribute limited resources over the many, many projects that face them. Due to this perfect combination of experience and local knowledge, Joplin shattered all expectations, completing its rebuilding in under three years (R. White, personal communication, January 7th, 2015; S Brady, personal communication, January 7th, 2015).

Baptists

The Baptist General Convention strategy of having local teams prepared to mobilize at any time is another key example of how a larger, national organization can support and help coordinate local response, while also showing how local-to-local response can help optimize resource use during the response phase (S. Patterson, personal communication, January 7th, 2015).

The basic framework involves each sector, down to county or even sub-county or sub-city levels, to have its own established, dedicated response force. The Baptists are particularly known for their debris-removal skills, and each team has its own equipment, which often includes some fairly heavy machinery. By having multiple teams in a nearby areas, this allows quick response to local disasters, not only by the team assigned to that area, but by any nearby team that may be called in.

The hierarchical structure of the Baptist disaster relief system is loose, and puts much of the responsibility and decision-making on the localities themselves. Local teams receive training and best practices from coordinating officials “up the chain of command,” but must call upon their higher-ups to do any work before they would step in. Once called upon, however, the governing bodies can quickly and effectively coordinate a response, or even move higher up the chain if necessary to acquire more resources on behalf of the locality that needs them.

Methodists

The Methodists, like the Baptists, are a prime example of how a larger national structure allows for thriving local responses. The Methodists consider disaster relief to be their specialty in ministry, and use a rigid hierarchical structure to establish systems of response. On the local level, a team of volunteers reports to a church-level coordinator, who reports to a town or city coordinator, who reports to a county-level coordinator and so on.

Perhaps the most effective part of the Methodist system is that their organization provides multiple levels of rigorous training for volunteers. Often, entire congregations will have some level of training. This system guarantees that when a disaster hits, there will be skilled laborers ready to respond and work. Combined with their hierarchical system, this is why Methodist institutions tend to take up case-management rolls in disaster-hit communities (C. Perinunger, personal

communication, May 5th, 2014; M. Gaudreau, personal communication, January 8th, 2015).

Mennonites

The Mennonites are perhaps the best example of where local can't do it all. They come in and frame as many houses as possible in a short number of days. By providing massive amounts of skilled labor early in the rebuilding process, they are able to repair a large number of highly damaged homes to a moderately damaged level, using the nearly unlimited amount of materials (W) that are available to them during that period of time.

One of the lessons that usually gets passed on from disaster-hit area to disaster-hit area is to let, if not invite, the Mennonites to come in and do this, as they do it well, and they maximize the use of their resources in doing so. For a local team to try and coordinate, train, or teach others to do this would be a waste of time, resources, and energy.

Section 6: Conclusions

No disaster is the same, and no community is the same after being struck by a disaster. What worked in Moore is different than what worked in Joplin, which is different than what worked after Katrina, and Sandy, and Andrew. Yet it is the common strands in each community's recovery that may provide direction for future communities. As climate change causes disasters to occur more frequently and to create more damage, and as disaster relief fatigue becomes a major problem for our nation, we will need to find new strategies that work for communities where resources might be scarcer.

The lessons learned from these case studies of local FBOs can be emulated not only by other local FBOs, but by other local nonprofits, and even by state and local government. The examples and economic model presented can serve as a guide for local communities to optimize their recovery strategies. Whether a local church finds that the ServeMoore model allows them to make use of a large number of SUVs and a lack of skilled labor and tools; or, that in preparation for future disasters a statewide nonprofit chooses to create a hierarchical training and organizational system like that of the Methodists, what matters is that they create systems and solutions that can operate with minimal funding or help from the nation at large.

If just one local organization in each of our nation's most vulnerable cities

can learn from these examples and create a system within which they are prepared to respond, the future of disaster relief may be shifting towards a brighter one.

Works Cited

- Alexander, L. et al. (2013). *Climate change 2013: The Physical Science Basis: Summary for Policymakers: Working Group I Contribution to the IPCC Fifth Assessment Report*. Geneva: WMO, IPCC Secretariat.
- Clarke, G. (2006). Faith matters: Faith-based organizations, civil society and international development. *Journal of International Development*, 18(6), 835-848. Retrieved November 3, 2014, from Wiley Online Library.
- Climate Central. (2012). *Global weirdness: Severe Storms, Deadly Heat Waves, Relentless Drought, Rising Seas, and the Weather of the Future*. New York: Vintage Books.
- Disaster Definitions. (2008). In *The Johns Hopkins and International Red Cross Red Crescent Public Health Guide for Emergencies* (2nd ed., pp. 24-43). Geneva, Switzerland: International Federation of Red Cross and Red Crescent Societies.
- Evans, M. (2011, May 14). Natural Disasters. Retrieved February 19, 2015, from <http://www.earthtimes.org/encyclopaedia/environmental-issues/natural-disasters/>
- FEMA. (2008). *FEMA: Prepared, Responsive, Committed*. Washington, D.C.: U.S. Dept. of Homeland Security, FEMA.
- FEMA. (2011). *National Disaster Recovery Framework: Strengthening Disaster Recovery for the Nation*. Federal Emergency Management Agency.

- FEMA. (2015, January 31). About the Agency | FEMA.gov. Retrieved February 6, 2015, from <https://www.fema.gov/about-agency>
- Field, C. et. Al. (2014). *Climate change 2014: Impacts, adaptation, and vulnerability : Summary for policymakers*. Intergovernmental Panel on Climate Change.
- Heberton, B. (2014, April 24). 13 Minutes: The Average Warning-Time Before a Tornado Hits. Retrieved February 28, 2015, from <http://www.theatlantic.com/technology/archive/2014/04/13-minutes-thats-the-average-warning-time-before-a-tornado-strikes/361195/>
- Hughes, J. (2012). How Natural is a Natural Disaster? *Capitalism Nature Socialism*, 23(4), 69-78. Retrieved July 22, 2014.
- IPCC Press Office. (2014, March 31). A Changing Climate Creates Pervasive Risks but Opportunities Exist for Effective Responses - Ipcr Report Mon, Mar 31, 2014 Responses Will Face Challenges with High Warming of the Climate. *IPCC Press Release*. Retrieved March 2, 2015.
- IPCC Press Office. (2015, February 23). IPCC presents findings in Nairobi. *IPCC Press Release*.
- Kieffer, S. (2013). *The Dynamics of Disaster*. New York: W. W. Norton & Co.
- Koenig, H. (2006). *In the Wake of Disaster: Religious Responses to Terrorism & Catastrophe*. Philadelphia: Templeton Foundation Press.
- Low, P. (2013, May 29). Natural Catastrophes in 2012 Dominated by U.S. Weather Extremes. Retrieved February 7, 2015, from <http://www.worldwatch.org/natural-catastrophes-2012-dominated-us-weather-extremes-0>

- New York Disaster Interfaith Services (NYDIS). (2014). Disaster Basics for Faith Communities. *Disaster Tip Sheets for NYC Religious Leaders*.
- NWS. (2013, July 3). List of Extreme Weather Fatalities. Retrieved February 12, 2015, from http://www.nws.noaa.gov/om/hazstats/resources/weather_fatalities.pdf
- Organization of American States (OAS). (1990). What are Natural Hazards? *Disaster, Planning and Development: Managing Natural Hazards to Reduce Loss*. Retrieved January 24, 2015, from <https://www.oas.org/dsd/publications/Unit/oea54e/ch05.htm>
- PBS. (n.d.). Katrina: The Response. Retrieved March 1, 2015, from <http://www.pbs.org/now/politics/fema.html>
- Penuel, K., & Statler, M. (Eds.). (2011). *Encyclopedia of disaster relief*. Thousand Oaks: Sage Publications.
- Red Cross. (n.d.). Our History. Retrieved January 12, 2015, from <http://www.redcross.org/about-us/history>
- Shughart, W. (2011). Disaster Relief as Bad Public Policy. *The Independent Review*, 15(4), 519-539. Retrieved January 12, 2015, from ProQuest.
- Smith, D., & Sutter, D. (2013). Response and Recovery after the Joplin Tornado: Lessons Applied and Lessons Learned. *The Independent Review*, 18(2), 165-188. Retrieved August 12, 2014, from ProQuest.
- Texas Impact. (2006, January 1). History of Disaster Relief. Retrieved March 1, 2015, from http://texasimpact.org/Disaster_Relief_History

Van Engen, J. (2005, November 11). The Cost of Short-Term Missions. *Catapult Magazine*.

Will Durant (1946). What is civilization? *Ladies Home Journal*: January

WMO (Ed.). (n.d.). Natural hazard. Retrieved February 7, 2015, from http://www.wmo.int/pages/themes/hazards/index_en.html