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Enhancing Disaster Recovery: Lessons from Exemplary International Disaster Management Practices

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Enhancing Disaster Recovery: Lessons from Exemplary International Disaster Management Practices

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Abstract

Long-term recovery from disasters presents a formidable challenge to affected communities, requiring sound strategies to restore the health and livelihoods of those affected. This paper examines exemplary practices related to long-term recovery and redevelopment from disasters in other countries, and identifies key themes and promising practices relevant to the United States and other countries. From the eight disasters examined, we find that successful recovery efforts emphasized local empowerment, organization and leadership, and planning for sustainability – three broad approaches that characterized the practices employed by other countries. We believe these practices offer examples that can help to inform disaster management within the U.S., whether contributing to the forthcoming legislatively mandated National Disaster Management Framework or to implement such policy once the document is released. Our analysis suggests three key approaches to enhance disaster recovery: (1) Incorporate long-term recovery goals into disaster response and pre-disaster planning; (2) Expand the knowledge base by incorporating research into recovery and harnessing lessons learned from international experiences; and (3) Develop an outcomes-oriented approach to disaster recovery planning, including the measurement of community-level outcomes. Our findings are broadly relevant to disaster recovery in the United States and in other countries, including Haiti in the wake of its January 2010 earthquake.

KEYWORDS: disaster recovery, lessons learned, global disaster

INTRODUCTION

As the second decade of the 21st century commences, the United States continues to adapt its disaster management framework to the severe challenges brought on by catastrophic events such as the attacks of September 11, 2001 and Hurricane Katrina in 2005. The January 2010 earthquake in Haiti is a somber reminder that natural disasters occur frequently around the world and can cause profound devastation. Such disasters provide a stimulus for all countries to redouble efforts to better prepare for, respond to and recover from such catastrophes.

Recovery from the Haiti earthquake will require time and massive efforts (Dobbins, 2010). Similarly, the lingering disruptions in the lives of U.S. gulf coast residents following Hurricane Katrina are exposing the substantial long-term challenges of human recovery in the region. The goal of disaster recovery is to restore or even improve the health, livelihoods, and security of those affected. As the long-term problems caused by Hurricane Katrina continue to manifest, the lack of successful recovery in the affected areas has become much more salient: decreased levels of population and affordable housing persist, with nine New Orleans neighborhoods retaining less than half of the active residential addresses they did before Katrina (Liu and Plyer, 2009). Recovery in the hardest-hit areas of New Orleans is taking longer than many city residents and community leaders had hoped, as some observers have suggested full recovery may take 8–11 years (Kates, Colten, et al., 2006).

Until recently, long-term recovery from disasters has been neglected as a priority within U.S. disaster management. The Post-Katrina Emergency Management Reform Act of 2006 called for the Federal Emergency Management Agency (FEMA) to lead the development of a national disaster recovery framework within one year of its passage (42 U.S. Code, 2006). In early February, 2010 a draft framework was released, setting out a series of core principles based on recommendations from stakeholder outreach events. This augments the national policy dialogue by focusing greater attention to the difficult task of long-term recovery and key underlying principles: individual and family empowerment, leadership and local primacy, preparation for recovery, partnerships and inclusiveness, communications, unity of effort, timeliness and flexibility, and resilience and sustainability (U.S. Dept. of Homeland Security, 2010a).

Previous studies have provided guidance for recovery strategies for specific sectors, and they have offered a variety of lessons learned based upon experiences recovering from individual disasters such as the South Asian earthquake and tsunami in 2004 (Barakat, 2003; ALNAP, 2005). In addition, past research efforts have highlighted policy gaps in recovery planning and identified impediments to successful recovery (Mileti, 1999; Berke et al., 1993), while more

recent initiatives have gathered lessons on recovery from disasters throughout the globe (Davis, 2006). This paper builds upon our own previous work highlighting exemplary practices in international disaster management as an avenue to inform U.S. disaster management policy (Moore, Trujillo, et al., 2009), by examining in detail illustrative practices specifically related to long-term recovery and redevelopment from disasters across multiple countries, and the principles underlying their effectiveness. Key lessons reported in the previous work validate several of the core principles espoused in the February 2010 draft National Disaster Recovery Framework. As U.S. policymakers finalize the Framework, we provide timely insights and suggestions that we believe broaden the knowledge base from which the U.S. strategy should be drawn, and from which approaches to disaster recovery elsewhere in the world can also be developed.

METHODS

This study proceeded in three parts. First, we examined published documents describing current disaster recovery planning within the United States, identifying strategic deficits and shortfalls as they relate to the recovery from disasters like Hurricane Katrina. Our review included disaster management principles from the U.S. Agency for International Development (USAID), which includes the Office of Foreign Disaster Assistance (OFDA), the principal agency within the U.S. government responsible for international disasters and a useful starting point for identifying an additional knowledge base for informing the forthcoming U.S. disaster recovery strategy. Next, drawing from the full unpublished international case studies reported previously in summary fashion (Moore, Trujillo, et al., 2009), we extracted detailed examples of disaster recovery and redevelopment from eight countries. The criteria for selecting exemplary practices are described in the previous report. Finally, we assessed the implications of the international experiences for the development of the U.S. disaster recovery strategy and their broader applicability across other countries.

RESULTS

Current U.S. Government Disaster Recovery Efforts

Progress toward development of required disaster recovery strategy

The formation in 2009 of a Disaster Recovery Working Group, co-led by the Departments of Homeland Security and Housing and Urban Development, suggests heightened, albeit belated, attention to recovery planning. The working group is tasked to help develop the strategy mandated by the 2006 legislation, with a draft released in February 2010 and a final publication presumably to

follow within several months thereafter (U.S. Dept. of Homeland Security, 2010b). The planning process, even as it reaches its final stages, offers a unique opportunity to explore current shortcomings of U.S. policy and incorporate key principles and strategies gleaned from a broad base of empirical evidence.

Policy context: key federal guidance documents

Currently, the National Response Framework (U.S. Dept. of Homeland Security, 2008b), the National Incident Management System (U.S. Dept. of Homeland Security, 2008a), and the National Preparedness Guidelines (U.S. Dept. of Homeland Security, 2007a) provide the overall structure for domestic disaster management across all stages of the disaster cycle, which the Guidelines define as prevent, protect, respond, and recover:¹

- The National Response Framework (NRF) defines what needs to be done to manage a nationally significant incident, focusing on the role of federal agencies;
- The National Incident Management System (NIMS) defines how to manage such an incident, specifying a command and management process to be used with the National Response Framework; and
- The National Preparedness Guidelines (NPG) identifies how well such management is expected to be done, specifying critical tasks and capabilities.

Although federal guidance for domestic disaster management planning includes disaster recovery, the gap to be filled by the legislatively mandated recovery strategy is evident. For instance, the NRF distinguishes between short-term and long-term recovery, with the former focusing on provision of public health and safety services, restoring interrupted utilities, and providing shelter to displaced individuals, but the latter remaining “outside the scope of the Framework” (U.S. Dept. of Homeland Security, 2008b, p. 43). The NRF lists long-term community recovery as one of 15 Emergency Support Functions (ESF #14), which assign to federal agencies primary and support roles, including coordination, planning, and support for state, local, and tribal governments. However, ESF #14 only conveys administrative guidance to federal agencies, for example to “assess the social and economic consequences ... resulting from an Incident of National Significance,” “advise on the long-term recovery implications of response activities and coordinate the transition from response to

¹ Note: The National Response Framework was originally referred to as the National Response Plan, and before that, the Federal Response Plan. The National Preparedness Guidelines were originally referred to as the National Preparedness Goals.

recovery in field operations,” and “identify appropriate Federal programs and agencies to support implementation of the long-term community recovery plan, ensure coordination, and identify gaps in resources available.” Such an overview of federal agency responsibilities carries no weight of law for disaster management agencies at any level to design effective recovery strategies (Topping, 2009).

Similarly, the National Preparedness Guidelines offers little strategic framework for disaster recovery, although recovery is defined as one of the core homeland security mission areas that the guidelines are intended to address. The guidelines include a Target Capabilities List (TCL), defining 37 specific capabilities that relevant actors should collectively possess to manage disasters effectively (U.S. Dept of Homeland Security, 2007b), including three recovery-related capabilities. However, the activities to achieve these capabilities are largely process-oriented and short term in nature, as evidenced by the types of activities and the time frames for associated performance measures. Moreover, the TCL specifies very general intended outcomes related to disaster recovery but no associated outcomes measures. Overall, the recovery-related capabilities do not constitute an effective results framework defining desired population-level outcomes of disaster recovery efforts.

U.S. government guidance for international disaster management

USAID’s OFDA is charged with providing emergency assistance to foreign countries afflicted by a natural disaster or complex emergency. While disaster management practices within the United States place little emphasis on long-term recovery, OFDA has developed a set of principles and guidance for recovery activities following international disasters. Its *Disaster Reduction: A Practitioner’s Guide* (U.S. Agency for International Development, 2002) provides a frame of reference for OFDA staff and institutional partners to follow as they implement OFDA-sponsored activities. The *Guide* identifies eight “Programming Principles of Developmental Relief,” related to: collaboration/coordination; context-specific conditions; livelihoods; mitigation, preparedness, and prevention; promotion of international standards; systematic information collection; training/capacity building; and use of existing local capacity/local community interaction. The guidelines seek to ensure that short-term disaster response practices incorporate strategies that promote long-term recovery. For example, the principle of livelihoods specifies that OFDA “favors programs that support and encourage the maintenance or rehabilitation of livelihood assets and skills where possible,” and the context-specific principle emphasizes that OFDA-funded activities should strive to preserve social organization and networks (U.S. Agency for International Development, 2002, p. 87). Similarly, by highlighting the use of

existing local capacity and community interaction, OFDA seeks to ensure that programs “incorporate the views, opinions, and experiences of local communities and officials in planning, designing, and implementing programs.” Several of these principles thus convey a strategic emphasis on long-term recovery that involves local communities in the restoration of livelihoods.

Recovery and Redevelopment Experiences from International Disasters

The experiences described below illustrate how government and civil sector agencies in eight different countries sought to recover from natural disasters that occurred between 1985 and 2001. In each example, we briefly characterize the disaster itself and then describe how recovery efforts led to successful, measurable outcomes within the affected populations. Although many reports have cited negative experiences and shortcomings among agencies involved in disaster recovery, we comment only on actions that led to positive outcomes in the affected communities, as a way of focusing on exemplary practices with potential applications to disaster recovery within the U.S. and other countries.

Mexico - earthquake (1985)

On September 19, 1985, Mexico City experienced an 8.1-magnitude earthquake that caused tremendous damage to much of its physical infrastructure, especially the poorly constructed public housing for low-income families. In addition to at least 9,500 deaths, the earthquake damaged over 3,400 buildings, mostly residences, and left 100,000 people displaced from their homes. Economic losses were estimated at \$4 billion.

Time-sensitive agency mandate. Mexico’s government established an autonomous agency to spearhead rebuilding of housing under a two-year mandate and quickly staffed the agency by transferring senior planners and engineers from other ministries. With the clarity of a time-limited mandate, government officials worked quickly and constructively under a shared organizational culture that involved consultation and close cooperation with affected communities and emphasized the time-sensitive nature and importance of the agency’s performance goals. The effectiveness of this policy is evidenced by the rapid completion of more than 45,000 homes within the agency’s two year mandate – an average of 3,220 dwellings per month – and contracts with 1,200 private companies and creation of 175,000 jobs (Kreimer and Echeverria, 1990).

Bangladesh – flooding (1998)

In 1998, a major flood struck Bangladesh, covering up to 68 percent of the country’s total land area for ten weeks. While annual flooding in the country is

necessary for cultivating crops and increasing the supply of fish, this excessive flooding caused 918 deaths and affected 31 million people through damage to roads, housing, infrastructure, and crops. In addition to the scarcity of food and water, annual rice production dropped by 10.5 percent, leading to price spikes and a loss of income.

Re-establishing livelihoods. The Bangladesh Rural Advancement Committee (BRAC) was the largest non-governmental organization (NGO) working in the country when the flood hit. Normally focused on long-term development projects, BRAC responded to the housing and economic consequences of the flood by diverting staff and resources from its normal operations to assist people in getting back into their homes and returning to their regular income-generating activities as quickly as possible. In some cases, BRAC provided in-kind aid to enable restoration of livelihoods rather than cash donations, such as donating seeds to local farmers – helping them to avoid purchasing supplies in a disrupted local market and move ahead to plant grains and vegetables more quickly. Focusing on activities such as agriculture, forestry, farming, fisheries, sanitation, and shelter, BRAC ultimately invested \$680,000 in recovery assistance to 850,000 households, representing 55 out of 64 districts in Bangladesh. BRAC applied its institutional orientation and assets to disaster recovery and helped mitigate the economic impact of the floods, thereby preventing many of those affected from sinking further into long-term poverty (Beck, 2005).

Private sector involvement and food security. Bangladesh's liberalization of trade in rice in 1994 also provided the country with a distinct advantage in recovering from the 1998 flood as compared to the floods a decade earlier. By 1997, private sector imports of rice had grown to about five percent of Bangladesh's total annual rice production of 18.9 million metric tons. Building from this degree of trade integration, Bangladesh was able to rely on private sector imports to compensate for the loss of approximately 0.3 million metric tons of the aus (summer) crop and 1.7 million metric tons of the aman (fall) crop rice in the 1998 flood. In response to the removal of a 2.5 percent tax on rice imports and the expedited processing of these imports through customs, the private sector imported more than 2.4 million metric tons of rice imports, or 85 percent of the total volume imported, between July 1998 and April 1999. The private sector was also able to import this rice and other grains faster than the government, with private sector imports arriving in the country within two to three weeks, while government imports took three to four months to arrive (Beck).

Honduras – hurricane (1998)

Honduras, one of the poorest countries in the Americas, experienced six hurricanes between 1969 and 2001. The most damaging of these was Hurricane

Mitch, which struck in 1998, leading to 5,757 deaths, 441,150 displaced, and 1.5 million affected. Destruction of 35,000 houses, loss of crops and livestock, and damage to other infrastructure such as buildings, hospitals, ports, highways, and bridges, contributed to a total of \$3.6 billion in economic losses, equivalent to 74 percent of the country's annual GDP.

Local hiring. In response to the need for recovery of housing and infrastructure on a massive scale, the National Fund for Social Investment (Spanish acronym - FHIS) worked with local contractors to begin rebuilding, often expediting projects to conduct immediate hiring on site. The use of local labor helped to speed rebuilding efforts, contributing to the completion of 2,200 projects within the first 100 days after the hurricane. In addition, this generated close to 35,000 person-months of employment each month, and covered 30 percent of the country's reconstruction needs in infrastructure – adding up to \$40 million in value. The employment of displaced people in the rebuilding of their own communities – those most affected by the hurricane – helped support individual community members in maintaining their income in the early stages of the recovery. The final value of projects identified or appraised was \$57 million – including an additional 2,500 projects contracted through local labor. This also ensured that funded projects had sufficient labor, while vocational training helped stimulate long-term opportunities throughout the later stages of redevelopment (Telford, 2004).

Community consultation. Local communities were directly included in planning and decisions dealing with their redevelopment. Community members expressed greater satisfaction with the process when they were more involved in the design, reconstruction and redevelopment efforts. Further, community members cited quicker completion of projects, greater responsiveness to their needs, and fewer cases of corruption or profiteering (Telford).

Decentralized agency authority. In response to the scale of reconstruction required, the Honduras government allowed for FHIS to temporarily decentralize its operations by deploying most of the senior staff to temporary regional offices. Forming into emergency response teams within the most heavily damaged areas, agency staff consulted with local communities and municipalities to rapidly determine needs for shelter, potable water, sanitation, and rebuilding of roads. Team members were granted a special authority to act on location, allowing them to rapidly develop plans and initiate projects. This rapid decentralization allowed the agency to adapt to the situation by placing senior decision makers within the devastated areas, allowing them to better ascertain needs and move quickly into project funding and implementation (Moore, Trujillo, et al.).

Expedited project cycle. In addition to the swift deployment of senior staff, FHIS also expedited its routine project cycle, reducing the number of necessary steps from 50 down to eight. This facilitated an accelerated timeline for launching vital

reconstruction projects, and FHIS project officers utilized their authority to hire local contractors on site and approve immediate commencement of work. As described above, the result of these agency adaptations and other successful practices helped FHIS complete 2,200 projects within the first 100 days after the hurricane (Moore, Trujillo, et al.).

Vietnam – flooding (1998, 1999)

Vietnam's growing population is increasingly moving into exposed coastal areas subject to flooding, raising the level of vulnerability to harms caused by typhoons that strike each year. Vulnerability to floods was exacerbated by recent trends in which modern houses were being built with less disaster-resistant materials, such as brick or corrugated iron. Flooding was especially heavy in both 1998 and 1999, when a series of tropical storms caused the worst flooding in more than two decades. The 1999 floods caused 800 deaths, and 55,000 people lost their homes. The agricultural sector suffered the loss of 60,000 hectares of paddies.

Competitive housing redesign. As the FHIS did in Honduras, the Red Cross in Vietnam attempted to involve local labor and materials in rebuilding houses for those left homeless by the floods, while realizing the need to ensure houses were constructed to meet high standards for withstanding future disasters. To achieve both of these objectives, the Red Cross sponsored a housing competition to identify the best locally developed designs for disaster-resistant housing. After introducing a housing design with concrete foundations and a stronger roof, among other features, the Red Cross arranged a competition that attracted the involvement of 15 major local companies. The competition was adjudicated by experts from government, engineers, and aid workers. The panel ultimately decided on a design that successfully replicated that introduced by the Red Cross and could be easily constructed by those intending to rebuild a home for themselves. The concept of sponsoring a competition to induce local participation effectively met the goal of empowering local communities, while at the same time creating incentives to improve the sustainability and resilience of new housing (IFRC, 2001).

Sustainable rebuilding. Although some traditional buildings in Vietnam are resistant to typhoons and floods, many families had turned to building their homes with less resilient materials due to cost. As a result, many residences were left chronically vulnerable to destruction, due to the frequent recurrence of water-related disasters. The International Federation of the Red Cross partnered with the Vietnamese Red Cross to reverse the decline in disaster readiness of housing after the 1998 floods. Their effort to introduce disaster-resistant house-building practices included designs able to better protect lives, food, and valuable belongings necessary to their livelihoods. With the construction of 7,400 homes

using these designs, the agencies provided sustainable, resilient houses to the most vulnerable individuals. The value of these homes was proven when all but one structure withstood collapse during a subsequent flood. Following this, the Red Cross and Vietnamese government built 2,000 additional flood-resistant houses in 16 provinces. The Red Cross also began partnering with Vietnamese companies to construct similar homes, as described above (IFRC, 2001).

Training to improved standards. The efforts to expand sustainable housing served as a catalyst for further innovation among civil society actors, by providing an opportunity to offer regular training to local communities. To capitalize on the ongoing initiatives sponsored by the Red Cross, one locally-based nongovernmental organization offered training to communities in disaster-resistant construction, as well as other types of assistance in strengthening their homes. It combined practical demonstrations with attitude-influencing activities, helping to sustain and institutionalize the process of local capacity building. These programs helped capture long-term benefits for the local community by promoting awareness about the value of disaster-resistant construction, as well as creating institutional knowledge on proper construction techniques (IFRC, 2001).

Mozambique – floods (2000, 2001)

In 2000, southern Mozambique suffered from heavy rains and a series of tropical storms that simultaneously flooded several rivers and, for the first time in recorded history, left submerged an area nearly the size of Belgium and the Netherlands combined. More than 500,000 people were forced to leave their homes and relocate to over 200 sites. One year later, the central provinces of Mozambique were hit hard by prolonged and intense rains. The death toll of the 2001 floods was lower than in 2000 because of the slower onset of the disaster and because water discharges from the local dams could be adequately controlled (IFRC, 2002; Wiles, Selvester, et al., 2005). Combined, the 2000 and 2001 floods killed over 800 people and displaced almost 800,000. Economic losses amounted to \$470 million.

Reducing prior vulnerability. The flood damage and resulting loss of life in southern Mozambique prompted the government to initiate flood-zoning studies and increased regulation of prospective areas for resettlement of flood victims. Following the floods of 2000, the government resettled 43,400 families to areas less vulnerable to floods, ensuring a more secure environment for the population affected. Besides guiding resettlement of flood victims, the government forbids shelter assistance for those who do not resettle in areas certifiably safe from future floods. By setting guidelines and policies to govern the resettlement process, the government provides sustainable solutions for populations to recover from displacement and disruption due to flooding (Wiles, Selvester, et al., 2005).

Cuba – hurricanes (1998–2005)

Cuba experiences hurricanes on an almost annual basis, five of which reached a strength of Category Four or Five between 1996 and 2005. The known impacts of these five storms ranged from 0-16 deaths, 712,000 to 1.5 million persons evacuated and \$87 million to \$1.4 billion in economic losses. The regularity of hurricanes, including severe ones, and potential for physical damages of this magnitude results in an almost ongoing need for massive rebuilding efforts.

Community involvement. With such a regular occurrence of damage to personal and public property, Cuba relies on extensive involvement of local communities in all aspects of rebuilding. By ensuring broad-based engagement at the local level, the reconstruction of houses, schools and other facilities begins immediately. Community members' work is supported by specialized brigades in restoring power, communication and water supplies. In the case of one hurricane, these were restored within a month after the storm's destruction occurred (Thompson and Gaviria, 2004).

India – earthquake (2001)

In 2001, a strong earthquake struck the Indian state of Gujarat, causing 20,000 deaths and injuring 300,000. In addition, 344,000 homes were destroyed, and 888,000 damaged. Economic losses were estimated at \$3.5 billion, with the greatest damages occurring in the district of Kutch.

Standardized house sizes. The Indian government adopted a new policy to allow NGOs to rebuild houses of equal size for each family irrespective of the size of their destroyed homes. The government's policy on housing recovery initially required house reconstruction in three different sizes, depending on the size of the houses before the earthquake, which slowed recovery efforts (Sadasivam, 2001).

Self-built reconstruction. Seeking to apply lessons learned from a prior earthquake several years earlier, a district-wide network of NGOs encouraged households to rebuild their own homes and make use of local labor and materials, similar to the actions taken in Honduras. In addition to promoting economic recovery following the disaster, this effort helped develop local capacity for communities to rebuild their own homes (Sadasivam).

Training and capacity building. The network of NGOs also provided training in earthquake-resistant design techniques to selected members of each village, who then trained others back in their villages. This accelerated the spread of skills needed to rebuild safer homes – 8,000 people were trained in masonry skills in total. In addition to empowering those affected by the earthquake to participate in reconstruction, the training-of-trainers strategy enabled more self-rebuilding of homes and was proven to be highly cost-effective in comparison to the option of

directly allowing the NGOs or other contractors to do reconstruction on their behalf. Moreover, 97 percent of people who rebuilt their houses themselves reported being happy with their homes, whereas only 48 percent of people who were relocated to other houses were satisfied (Sadasivam).

Disaster-resistant model housing. To help disseminate technical skills for reconstruction, the United Nations Development Program (UNDP) supported the construction of 1270 demonstration houses in 74 different villages. Demonstration homes provided useful models that villagers could use to replicate while rebuilding their own homes. The model homes demonstrated the proper retrofitting of new homes, allowing owners to learn the techniques and retrofit their own homes. UNDP understood that reconstruction of homes should meet high building standards to withstand future earthquakes, but a key barrier to the success of this strategy was the lack of trained engineers and masons to aid in meeting these standards. UNDP addressed this by sponsoring the quick construction of seismically safe demonstration houses for use as models to the villagers. The emphasis on building disaster-resistant homes was a vital component in ensuring the long-term sustainability of the recovery efforts, and served as an effective complement to the strategy of self-construction and training of villagers promoted by UNDP. To further incentivize proper construction techniques, villagers had to incorporate the seismic safety standards into their reconstruction designs to receive financial compensation from the government. The overall strategy was highly cost-effective, relative to previous cases in which homes were relocated or rebuilt by outside contractors. It also conferred multiple benefits on the security of those affected: sustainable homes were successfully rebuilt by villagers, while villagers gained needed support and added capacity to do the rebuilding themselves (Sadasivam).

Iran – earthquake (2003)

The city of Bam, Iran suffered a devastating, 6.7-magnitude earthquake on December 26, 2003. Since most of the city's buildings were constructed with mud brick materials, the infrastructure was ill-suited to withstand such a large force, leading to the collapse of 85 percent of all buildings. Out of a population of 120,000, almost all survivors were left homeless.

Communication. After the initial response and rescue efforts, the UNDP initiated publication of a bi-weekly community newsletter to disseminate critical information about the recovery activities to all those affected by the earthquake. This included feedback for authorities and donors on the current needs of the community, and responses from the community regarding prospective projects relating to the recovery. The newsletter was instrumental in providing information on the job opportunities, shelter availability, entitlements for victims, tips to

promote safety and reduce risk, and information on health services. Community members also used the newsletter as a forum to express concerns about redevelopment. Further, UNDP trained 52 local volunteers in reporting and journalism, then involved them in the process of production and distribution. The newsletter's production was later taken on by the local municipality. Other community organizations were motivated to start up their own newsletters to cover the earthquake recovery efforts. The creation of the newsletter greatly facilitated the flow of information in the aftermath of the earthquake, while both training local residents in journalism and creating a way for the community to express itself. These factors promoted the overall engagement and empowerment of the local population in its recovery from the disaster (UNDP, 2005).

Synthesis

The international experiences described above reflect three broad approaches to successful disaster recovery: *local empowerment*, *organization and leadership*, and *planning for sustainability*. The following section elaborates on these three categories further, and Table 1 displays the exemplary practices within each.

Practices that emphasized ***local empowerment*** targeted many of the long-term economic and social challenges facing communities recovering from disaster, such as disruption of income-generating activity and social routines that underpin the basic self-sufficiency of a developing community or region. These practices helped minimize the likelihood of chronic dependency that can hamstring recovery within poor or developing communities by returning individuals to economically productive routines and helping affected communities participate actively in a substantial amount of rebuilding activities.

Practices that demonstrated innovative ***organization and leadership*** reflected insightful approaches to overcome typical bureaucratic impediments to disaster recovery. Agencies that made timely, adaptive changes to structures and processes were more efficient and ultimately more effective in restoring infrastructure and livelihoods.

Countries that promoted smart rebuilding standards through the use of training, capacity building, and properly structured regulatory incentives were also able to ensure that long-term redevelopment of housing and infrastructure was not only ***sustainable***, but that conditions within affected communities were improved beyond those that existed prior to the disaster. These practices ultimately improved long-term development outcomes and community resilience, while reducing or eliminating previous vulnerabilities.

Table 1. Exemplary practices associated with key disaster recovery strategies

Strategy	Country (Disaster)	Exemplary Practice
Local Empowerment	Honduras (Hurricane)	<ul style="list-style-type: none"> • Local hiring to rebuild • Community consultation
	Bangladesh (Floods)	<ul style="list-style-type: none"> • Re-establishing livelihoods • Private sector involvement
	Cuba (Hurricane)	<ul style="list-style-type: none"> • Community involvement
	India (Earthquake)	<ul style="list-style-type: none"> • Self-built reconstruction • Training and capacity building
	Vietnam (Floods)	<ul style="list-style-type: none"> • Competitive housing redesign
	Iran (Earthquake)	<ul style="list-style-type: none"> • Communication
Organization and Leadership	Honduras (Hurricane)	<ul style="list-style-type: none"> • Decentralized authority • Expedited project cycle
	Mexico (Earthquake)	<ul style="list-style-type: none"> • Time-limited institutional mandate
	India (Earthquake)	<ul style="list-style-type: none"> • Standardized house sizes
Planning for Sustainability	India (Earthquake)	<ul style="list-style-type: none"> • Disaster-resistant housing
	Mozambique (Floods)	<ul style="list-style-type: none"> • Reducing prior vulnerability
	Vietnam (Floods)	<ul style="list-style-type: none"> • Sustainable rebuilding • Training to new standards

Each of the practices identified above addressed the long-term needs of populations affected by natural disaster, while also meeting the immediate challenges of restoring disrupted communities and repairing heavily damaged infrastructure. The strategies adopted by other countries in their disaster recovery efforts led to a variety of specific, positive outcomes that could be credited to the exemplary practices undertaken by each country.

DISCUSSION

Our review of current disaster management policy within the United States indicates that long-term recovery has been specified as a priority but has not yet been addressed sufficiently in federal guidance. We find that the challenges of recovering from disasters over the long term, while formidable, can be responsive to effective planning. Although published guidelines for recovery activities outline coordinating roles among state and federal agencies for the delivery of public assistance programs, they exhibit a lack of strategic focus on the desired community-level outcomes of recovery activities and the selection of appropriate metrics for defining successful recovery. Until the release in February 2010 of the draft National Disaster Recovery Framework, no documentation existed to identify or highlight key principles to guide recovery planning within the United States government, and the lack of a comprehensive results framework for

recovery inhibited the ability to set expectations, measures, and priorities for successful long-term recovery. The draft Framework begins to address many of these deficiencies and fill key gaps in policy and practical guidance. From our examination of disaster recovery in other countries, we offer three recommendations that might inform national disaster recovery policy in the United States and beyond:

1. Incorporate long-term recovery goals into disaster response and pre-disaster planning.

Our analysis of international disaster experiences shows that responses to the immediate needs of affected populations in responding to disasters should be integrated with the long-term needs of recovery. Planning for and promoting an early emphasis on recovery ensures that livelihoods are restored in addition to vital services, and that short-term interventions do not conflict with the goals of promoting self-sufficiency and sustainability within the affected communities. Programs that empower affected communities to take on reconstruction through local market channels and community involvement showcase the value of emphasizing long-term recovery within disaster response and short-term recovery operations. In addition to meeting immediate needs such as housing and reconstruction of infrastructure, such strategies have been shown to be cost-effective and sustainable, while greatly enhancing the self-sufficiency of disaster-stricken communities. Similarly, taking a long view of recovery entails the need to mitigate the vulnerability of communities to future disasters. Disaster-resistant reconstruction techniques and proper risk assessment during the rebuilding or relocation process improve the long-term security of a population exposed to repeated natural disasters.

2. Expand the knowledge base by incorporating research into recovery and harnessing lessons learned from international experiences.

Effective planning is spurred by sharing of information on disaster management experiences. In our previous study, we suggested that disaster planning would be enhanced by identifying, documenting, and archiving exemplary practices (Moore, Trujillo, et al., 2009). Others have suggested the need for expanded research into long-term recovery (Rubin, 2009), including increased funding for such research. Currently, FEMA maintains the Lessons Learned/Information Sharing database (<https://www.llis.dhs.gov/index.do>) as a way to catalog after-action reports and other documents pertaining to homeland security. With the ongoing development of a national disaster recovery framework, there is an opportunity to consider how to further broaden the knowledge base, archive

valuable information in a readily searchable format, and thus increase access to exemplary disaster management practices. We suggest that international experiences with disasters are rife with untapped opportunities to learn from and apply exemplary practices in disaster recovery. The experiences we describe here represent useful examples of how gathering lessons learned in other countries can help broaden knowledge and understanding of recovery, thereby better informing strategy development for use within the United States. Further, these same lessons are more broadly applicable beyond the United States. Our analysis of international experiences led to identification of strategies that *promoted local empowerment* of affected communities during the recovery and redevelopment stage following disasters; employed *innovative approaches to organization and leadership* of recovery efforts that countries exploited to enhance the speed and effectiveness of recovery efforts; while also *planning for sustainability*, to reduce vulnerability to future disasters. Our review shows that the systematic collection, documentation, and dissemination of exemplary practices from a wide scope of disaster experience helps identify and establish key principles that can enhance the impact of recovery operations.

3. Develop an outcomes-oriented approach to disaster recovery planning, and plan for measurement of outcomes.

A successful strategy for disaster recovery must also move beyond merely monitoring the processes and outputs of disaster relief and recovery operations and define a broad set of desired objectives against which real community-level outcomes can be measured. A recent study by Chang (Chang, 2009) discusses the important characteristics of a well-defined results framework, as well as the criteria for selecting relevant indicators for comparisons either across disasters or within specific disasters. She posits that a results framework should identify measures of disaster recovery outcomes that are meaningful for policy and decision making in the affected community. Selected indicators should have universal application across national settings but be sensitive to important differences in local cultures; data should be readily available; and measurement of each indicator should be standardized, allowing for meaningful comparisons across multiple settings. Appropriately defined measures would be useful in assessing the effectiveness of efforts to achieve desired outcomes. Moreover, establishing standards, or target achievement levels, would further specify desired outcomes. By better understanding priorities for long-term recovery, how desired outcomes would be measured and levels to be achieved, government agencies could work cooperatively with local community-based civil sector organizations to better design activities to achieve desired results. While more studies are needed to better model and predict patterns of long-term recovery, disaster

management planners would reap substantial benefits from solid planning – to include a clearly defined set of goals, specified desired outcomes and ways to measure the outcomes of disaster recovery efforts.

CONCLUSION

Our examination of U.S. disaster recovery efforts builds upon our previous work in extracting and highlighting exemplary practices from an untapped reservoir of experience with disasters in other countries, with the ultimate goal of identifying lessons that could be used to inform and refine disaster management practice in the United States and elsewhere around the world. Both that work (Moore, Trujillo, et al.) and the more detailed findings reported here validate several of the principles outlined in the draft National Disaster Recovery Framework released in early 2010. Moreover, the principles and recommendations described here may coincide with a window of opportunity to tap new sources of knowledge to inform the new Framework before it is finalized or further inform disaster management policy once the final document is released. A promising policy environment will offer adequate guidance on long-term disaster recovery and convey sufficient detail on the intended results and measurable indicators of their achievement. While not claiming to articulate specific elements for inclusion into U.S. disaster policy, our analysis points to a new range of sources to inform disaster management planning and provides practical examples of successful disaster recovery experiences from other countries.

The U.S. government is poised to make significant strides with the articulation of a strategy to address long-term recovery from disasters. We find that effective planning for recovery is a vital component of disaster management, helping not only to restore the health and safety of affected communities, but also to build community resilience to future disasters. International experiences with disasters present a variety of valuable lessons for U.S. disaster recovery, as we illustrate here, including the three key themes of local empowerment, innovative organization and leadership, and planning for sustainability. A U.S. disaster recovery strategy built using a results-oriented framework and encompassing these themes will go a long way to filling the current policy gap in this area. Moreover, such a strategy will likely be more generally applicable, including the long-term recovery from the devastating January 2010 Haiti earthquake.

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