Disaster Resistant Universities:
In Search of Strategies for Resilient Higher Education Institutions

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The Disaster Resistant University Initiative: A Brief History

The Pre-Disaster Mitigation (PDM) program was authorized by section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5133, as amended by section 102 of the Disaster Mitigation Act of 2000 (DMA), Pub. L. 106-390, 114 Stat. 1552.

Funding provided to the Disaster Resistant University (DRU) program was granted by Congress under a special rule to set aside moneys from Pre-Disaster Mitigation funds to be allocated specifically for universities to develop a planning strategy for vulnerability reduction. This special consideration to universities was an exceptional opportunity for institutions of higher education to engage in mitigation planning allowing them to place serious emphasis on understanding their vulnerabilities and motivate them to search for ways to overcome these vulnerabilities. The first prototype pre-disaster mitigation disaster resistant university project was conducted at University of California at Berkeley. Under Mary Comerio’s guidance, Berkeley took charge addressing its shortcomings related to the physical infrastructure of the university especially with regard to earthquake hazard.

In Fiscal Year (FY) 2000, under different funding authorities, FEMA selected six pilot universities to explore even further what benefits an institutionalized mitigation strategy would yield to academic institutions. The selected institutions were Tulane University, University of Alaska/Fairbanks, University of California/
Berkeley, University of Miami, University of North Carolina/Wilmington, and University of Washington. These universities were at the forefront and made great strides to initialize planning strategies and in so doing, ensured that their campuses were moving toward becoming disaster resistant. For example, *Building a Disaster Resistant University* (2003) developed by the University of California/Berkeley and revised by the University of North Carolina/Wilmington in conjunction with FEMA, has been serving peer institutions as a road map in achieving disaster resistancy.

The prototype project was successful to the point that the federal government prompted a second round and a widening of the initial planning initiative for mitigation reduction to be institutionalized with funding from FY 2002. Guidance for the proposals was based on Pre-Disaster Mitigation (PDM) grant funding with the exception that the competition would be restricted only to universities. This restriction avoided the competition between unequal contenders namely counties and their Local Mitigation Strategies. Most likely counties’ projects would have been deemed as more pressing in terms of vulnerability reduction and would likely have ranked higher than projects belonging to the local universities/colleges. In other words, universities and colleges would have been competing for funding with other projects within the county jurisdiction, and furthermore later would have competed with other counties’ projects at the national level. Setting up a special funding pool for DRU ensured that universities would only be competing among their peer institutions nationwide.

Under the Consolidated Appropriations Resolution, Public Law 108-7, 2003, $150 million was authorized by congress for the PDM grant program to be awarded on a competitive basis and without reference to State allocations, quotas, or other formula-based allocation of funds. Later, FEMA made available $3.6 million from FY 2003 and FY 2004 combined PDM budget of funds as DRU grants to State, Local and Tribal governments for pre-disaster mitigation activities. FEMA funds were available specifically for 13 universities to be able to receive up to $100,000 in planning funds towards the creation of a mitigation plan. In addition, $500,000 was set aside for universities with prior demonstrated commitment to hazard mitigation activities through DRU.
The Philosophy behind the DRU Initiative

Recent times have seen the increase of natural disasters and the rising economic and social burden these incidents cause at the local, national and even the international levels. According to Godschalk, et al. (2004), the frequency and severity of disasters have increased to the point that federal disaster declarations have increased 56% in the last decade. According to LiveScience (2004), the cost of 62 natural disasters in the U.S. from the droughts of 1980s to Hurricane Isabel in 2003 in normalized 2002 dollars exceeded $367 billion.

Of course, since the September 11, 2001 terrorist attacks, the four hurricanes affecting Florida in 2004, and Hurricane Katrina on August 29, 2005, these previous expenditures lose their former salience. According to Munich Re (2004), Florida was hit by all four severe storms within the space of just a few weeks, resulting in economic losses of almost US$60 billion and insured losses exceeding US$28 billion. For the sake of comparison, the 1992 hurricane season gave rise to economic losses of US$30 billion and insured losses of US$18 billion as a result of Hurricane Andrew. According to the Worldwatch Institute (2005), losses in 2004 exceeded $100 billion for the second time ever.

To minimize these costs, many scholars have called upon the government and the public to move forward in the implementation of policies and practices of natural hazard mitigation to attain community sustainability and disaster resistance with the goal of avoiding the perpetual vicious cycle of disaster and reconstruction. The first nationwide hazard assessment conducted by Gilbert White and the second assessment coordinated by Dennis Mileti, clearly identify the relationship of synchronicity and symbiosis with development and mitigation for sustainable growth and community resiliency. Planners, flood plain and emergency managers, and environmental groups have voiced their concern for unchecked growth in sensitive areas, and called upon ways to minimize the impact that hazards may inflict on the growing communities. In the mid 1990s efforts under the leadership of FEMA’s director James Lee Witt were made to this effect; for example, the mitigation legislation enacted under the Stafford Act including but not limited to flood plain management,
flood insurance, community rating, post disaster mitigation, elevation, relocation and retrofitting programs, etc. Subsequent changes in the legislation allowed better and more efficient mitigation via the enactment of the Disaster Mitigation Act of 2000.

Since its conception pre-disaster mitigation has been a spearhead for innovation; pilot projects such as Project Impact were put to the test under this philosophy. The Project Impact initiative was intended to “demonstrate the economic benefits of pre-disaster mitigation to States, local communities, business and individuals” (FEMA 1998). Mitigation was also formulated around the concept of “partnerships to reduce public reliance on response and recovery and place emphasis on mitigation, preparedness and disaster management” (FEMA 1998, p. 3). Mitigation activities have since made their mark and are beginning to demonstrate their impact in community resiliency and economic terms. The Multihazard Mitigation Council (2005) in a recent independent study concluded that, “on average, one dollar spent on mitigation saves society an average of four dollars.” This translates into federal dollars saved from the disaster funds that are freed for other purposes. FEMA has been working for over a decade in mitigation related activities and to date has obligated nearly $1.5 billion on PDM and post-disaster mitigation programs.

Disaster mitigation is part of the all hazards approach/philosophy of emergency management and disaster reduction (Drabek and Hoetmer 1991, Waugh 2000, Haddow and Bullock 2006). FEMA’s Mitigation Program was conceived to induce, motivate and assist States and communities to engage in the implementation of sustained vulnerability reduction program activities. The concept was aimed at benefiting communities by achieving an overall reduction of risk for the population, buildings and infrastructure. The benefit for the federal government and the country as a whole was the possibility of reducing expenditures via public assistance to communities, and in so doing reducing their expectation and reliance on funding from actual disaster declarations.

FEMA’s Pre-Disaster Mitigation Programs exist without disaster declaration. The following PDM programs are enhancing the local capacity to resist endemic hazard thus reducing vulnerabilities to disasters: National Flood Insurance Program, NFIP Community
Rating System, the Flood Mitigation Assistance Program, Hurricane Program, National Earthquake Hazard Reduction Program, Performance Partnership Agreements, State Hazard Mitigation Program, Community Assistance Programs, Homeowners Rehabilitation and Weatherization Programs (FEMA 1998).

The Disaster Resistant University Program plays its part in the natural disaster mitigation philosophy for it fosters planning and project implementation toward vulnerability reduction for universities, a cornerstone of American society. The Disaster Resistant University program philosophy is based on formulating strategies or plans to develop a hazard assessment and loss estimation for the university; assess the economic impacts of those hazards to the university community; create a mitigation and risk management plan to overcome the possible losses; and devise a model for vulnerability and risk reduction tailored for universities so that it could be adopted by a wide range of institutions of higher education.

The PDM Disaster Resistant University Program application is consistent with the planning criteria outlined in 44 CFR 201.6 (b-d). Some of the activities exemplified in the call for bids are as follows:

- **Risk Identification**: Identification of hazards and vulnerabilities, an estimation of potential losses to campus facilities
- **Identification of potential mitigation actions and their priority for implementation**
- **Identification of ways to foster communication with neighboring jurisdictions regarding disaster mitigation through measures such as**:
  - University collaboration activities involving faculty and/or students
  - Use of campus facilities for posting emergency procedures
  - Disaster exercises on university grounds or in conjunction with the community.
- **Identification of a broad range of sources for funding and technical assistance to sustain loss reduction and risk communication activities in the future**
- **Development of a Business Continuity Plan for central administrative, teaching, and research functions**
A university consortium may request funds to carry out “model" planning activities that would be used by members of the consortium. Multi-hazard mitigation planning must primarily focus on natural hazards but may also address hazards caused by non-natural forces (FEMA 2003a).

**Broader Impacts of the DRU Strategy**

Colleges and universities carry a great burden in that they are the fertile ground for long term community development; development which takes place both in terms of material or tangible growth via basic or advanced research and engineering processes that yields patents, contracts etc., as well as more intangible products such as human capital, general knowledge, social change, etc. Similarly, state and private universities are centers of gravitational economic growth, because their campuses concentrate wealth, not just in terms of their state-of-the-art- facilities, such as labs and concert halls, including the modern technologies housed in them, but also in the knowledge and entrepreneurial spirit that their faculty and students possess. Universities have the unique organizational function in society to advance progress and civilization, where in the arts, in the sciences, in engineering, business or medicine, long-term public investments are trusted to these study houses to advance research and development for a better future. Furthermore, universities are arguably the most important organization in a community for they centralize in a dynamic way the established and the new, the traditional and the modern, the contemporary and the futuristic within their cloisters. For example, young and old are on the campus working together, people that impart knowledge and people that seek the same, and all sectors of society are represented in the various colleges such as musicians, mathematicians, social scientists and veterinarians, to name a few. Disruption of activities caused by natural or human made emergencies and disasters may cause the loss of property, lives, and economic gain, costs that may not be easy to quantify and may be hard to recover. Furthermore, a disaster may cause loss of future earning, loss of future human capital development thus impairing long term development at the
community level within which the university resides and with negative effects that may spill over to the entire nation.

According to Mary C. Comerio (2000, p. 4), “Not only are universities unique organizations that serve their communities and states, but the federal government also has a significant economic and social investment in them. Annually, federal agencies fund about $15 billion in university research. Much of the research is multi-year, and the value of ongoing research is obviously higher. Much American progress is fueled by academic research results.”

This sum differs quite substantially from FEMA’s Disaster Resistant University Grant Guidance (2003b, p. 1) that reports the annual federal investment in research and financial aid to higher education institutions is over $65 billion. Last but not least are the private investors, endowments and bequests which have supported community development via higher education activities through the local universities and colleges since the early republic. Table 1 includes figures for the top 15 endowments of universities and colleges around the nation in 2004-2005 (National Association of College and University Business Officers 2006).

Table 1: Select College and University Endowments, 2004-2005

<table>
<thead>
<tr>
<th>University</th>
<th>Endowment</th>
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<tbody>
<tr>
<td>Harvard University</td>
<td>$25,473,721</td>
</tr>
<tr>
<td>Yale University</td>
<td>$15,224,900</td>
</tr>
<tr>
<td>Stanford University</td>
<td>$12,205,000</td>
</tr>
<tr>
<td>University of Texas System</td>
<td>$11,610,997</td>
</tr>
<tr>
<td>Princeton University</td>
<td>$11,206,500</td>
</tr>
<tr>
<td>Massachusetts Institute of Technology</td>
<td>$6,712,436</td>
</tr>
<tr>
<td>University of California</td>
<td>$5,221,916</td>
</tr>
<tr>
<td>Columbia University</td>
<td>$5,190,564</td>
</tr>
<tr>
<td>Texas A&amp;M University System and Foundations</td>
<td>$4,963,879</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>$4,931,338</td>
</tr>
<tr>
<td>Emory University</td>
<td>$4,376,272</td>
</tr>
<tr>
<td>University of Pennsylvania</td>
<td>$4,369,782</td>
</tr>
<tr>
<td>Washington University in St Louis</td>
<td>$4,268,415</td>
</tr>
<tr>
<td>Northwestern University</td>
<td>$4,215,275</td>
</tr>
<tr>
<td>University of Chicago</td>
<td>$4,137,494</td>
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</tbody>
</table>
Thus, it is imperative for the sake of the communities in which they are located that universities make the necessary steps to ensure a degree of resistance to disasters. Resistance to disasters in turn will ensure sustainable growth, one that may not be jeopardized by imponderables from the natural or technological environments, not to mention the danger that may be posed by terrorism. Mileti, et al. (1999) has addressed the philosophical and pragmatic importance of the application of the concept of resiliency at the community level to ensure sustainable growth. On this note it can be argued that universities should set the example and adhere to vulnerability reduction and mitigation practices to ensure their vital roles as leaders in the communities that support them. Sustainable communities are those that have sustainable universities, and sustainable universities drive their communities toward sustainable development.

While universities have concentrated effort in the past 100 plus years to be leaders in engineering progress, they have not paid much attention to the consequences they may face in disasters. Universities have been busy growing and have disregarded until very recently their vulnerabilities to hazards. It may be argued that universities have not had the need to protect their facilities, for their fast forward developmental capabilities may have offset in the past the need to harden and protect the infrastructure. Continued change and new and expanded facilities every ten to twenty years did not present a strong economic argument to plan for disaster resiliency, in part because obsolescence may have offset this conservation philosophy. But history has shown us that in the last twenty years the costs of natural calamities universities have faced in the Pacific and the Atlantic coasts of the United States have been high. Not only the physical cost of reconstruction, but the costs related to the loss of wages, revenue losses, and their multiplier effect in the community are outstanding. For example, the 1989 Loma Prieta earthquake caused Stanford University to spend over $300 million in building repairs over 10 years, and some infrastructure was not back in operations five years after the event. The City University of New York, although not directly affected by the terrorist attack of September 11, 2001, reported losses pertaining to cancelling classes, clean up for dust, etc. and expenditures related to communication...
and comforting of students and parents who lost their confidence in the safety of attending the school.

FEMA has awarded billions in disaster assistance to public and private universities in the United States. Private insurance carriers have paid out substantial sums to the universities as well. But disasters have negatively impacted universities in terms of business interruption costs and loss of revenues, figures which are difficult to quantify, FEMA estimated that these costs are well into the hundreds of millions of dollars (FEMA 2003b).

**Limitations of the DRU Strategy**

The Disaster Resistant University program has limitations in that it was established as a branch of Pre-Disaster Mitigation. Being so, the universities and programs may have experienced difficulties in complying with the strict regulation and modus operandi by which jurisdictions are bound. The Disaster Resistant University Program grantee institutions may have been constrained in developing cutting edge strategies utilizing students, or innovative ways of planning based on the assets that universities have. They may have become limited by the regimented procedures such as following the cross walk for cost benefit analysis. These limitations may also be attributed to the standardization FEMA uses for all of these projects in an effort to have consistency and accountability. Standardization in evaluation is a healthy and fair practice. When applied to Disaster Resistant University projects, it could contradict the essence of what universities and research stand for, ingenuity, imagination and inventiveness of alternative ways to reach vulnerability reduction.

There have been substantial differences in the ways universities that received the Disaster Resistant University grants conceived and managed projects. In some cases, the DRU program has been managed by practitioners from the safety or emergency management campus office, and in other cases it has been envisioned and developed by faculty of an academic program. For instance, the University of Miami and University of Washington DRU programs were managed by professional staff while the University of California at Berkeley and North Dakota State University were managed by faculty. In the
first case, practitioners treat the grant solely to advance mitigation, especially tangible brick and mortar projects, and follow the established FEMA criteria to the letter to ensure deliverability. Whereas in the second scenario, although the grant may have prompted the scholars to achieve tangible results related to brick and mortar projects, it may also have prompted faculty to achieve vulnerability reduction via more intangible results such as increasing awareness of the university population. These goals may have been sought in more unconventional ways (at least according to FEMA standards) via the development of human capital, e.g., service learning activities performed by students. Both strategies, although achieving similar deliverables for the grantor, are diametrically opposed; they require different approaches, management techniques, trained vs. untrained employees, paid vs. volunteer labor, dedicated vs. ad hoc personnel. The former would be solely focused on accomplishing the end result and most likely would hire a consulting firm that had mastered the way FEMA reviewers review the results, while the latter would be focusing on the process of research, educating students and developing alternative and innovative ways of creating a mitigation plan of action for the university. In other words, the philosophy behind the grant treatment would be different depending upon if DRU was set up and carried out by the university safety office than if it was managed by faculty of an academic unit.

If the process and products of the sub grantees (Disaster Resistant Universities) are treated the same by the supervising institutions namely the State (grantee) and the grantor (FEMA), giving no leeway in the execution of the grant process or in the deliverables, the spirit and the magnitude of the Disaster Resistant Universities Program may be undermined. Further research may need to be conducted to determine the degree of satisfaction with and the tangible and intangible growth attained by the parties involved. In all, the Disaster Resistant University program now is no longer a separate program within PDM and local universities must compete within the Local Mitigation Strategy for prioritization on each individual project they may have, making it very difficult, near impossible, for them to obtain funding.
References


