THE FUTURE OF DISASTERS: INTERESTING TRENDS FOR INTERESTING TIMES

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INTRODUCTION

In January 2000 the International Decade for Natural Disaster Reduction ended, a decade that paradoxically had been marked by a wide variety of disasters notable for their increasing cost and impact on the human and animal populations of the planet. The decade was not marked by the single cataclysmic events that had marked prior years – the incredible losses of life in the 1970 Bay of Bengal Cyclone, approximately 500,000 people (Longshore 1998, Davis 2002), or in the 1976 Tangshan Earthquake, some 750,000 people (Ritchie 2001) – or the sustained losses of life that occurred in the famines of the late 19th century – possibly 61.3 million people in the 1876-1879 and 1896-1900 events (Davis 2001). And the one truly catastrophic natural disaster that did occur, the 1991 Bay of Bengal cyclone that killed 139,000, in some limited ways demonstrated the success of mitigation and preparedness measures in reducing death tolls (Davis 2002).

However, the decade saw the clear emergence of disasters as billion dollar events, with substantial economic and political impacts. For example, four of the five hurricanes that proved most expensive ($3 billion or more) occurred in the decade 1990-1999; six of the top ten ($1.5 billion in damage or more) were 1990-1999 storms. Hurricane Andrew’s (1992) cost is estimated at $26.5 billion (Jarrell 2001).
And the decade, and succeeding years, clearly demonstrated that disasters resulting from conflicts are of equal significance to natural disasters in terms of their human toll. Genocide, ethnic cleansing, and ethnic and religious civil wars in the former Yugoslavia, Chechnya, and East Timor have attracted considerable attention (Pelton 2002). However, more significant in pure numerical toll and in its long-term steadfastness of purpose is the genocide of Burundi and Rwanda. During the period 1965 to date at least 1.2 million have died in at least six distinct Hutu-Tutsi ethnic extermination campaigns, most memorably 800,000 in Rwanda in 1994. Some 112,000 people were arrested as genocide suspects in the aftermath (Mills 2002).

THE NEED FOR NEW MODELS

Traditional models of disaster study have long focused on disasters as fitting within three relatively neat and predictable categories, which can be described as natural, man made, and national security (United States. Federal Emergency Management Agency. Emergency Management Institute. 1989). This structure tends to focus thought on one event and to classify that event as being of a particular class. In reality, disaster today, and I would suggest in the future, is increasingly a messy combinations of events. However, arriving at that conclusion has not been a simple step.

In 2002 I started an effort at the University of Richmond to develop an academic disaster research database – The Disaster Database Project. In working with our Academic Technology Services staff, particularly with Suzanne McGinnis, it became obvious to both of us in the process of designing the database that the traditional model did not capture relationships between disasters. At the most basic, we suggested a
renaming of events, keeping the traditional category of natural disasters, but substituting human systems failures and conflict based disasters for the man made and national security categories (Green 2002). Less this seem trivial, consider the questions “is the failure of a dam due to flooding a disaster man has made or one that has happened to something that man has made” and “is genocide conducted to increase the control of the ruling ethnic group a national security disaster or a national security success?”

The next step was to understand that today’s routine events may be the future’s disasters and that a disaster of one type may be tomorrow’s disaster of another type. Two examples should suffice. On 9 July 1982 Clipper Defiance, a Pan American Airways Boeing 727 accelerated down runway 10 at New Orleans Moisant International Airport, lifted off, and seconds later, at approximately 4:08 pm, crashed into the suburb of Kenner, Louisiana. Based on available meteorological information, crew training, warning systems, and prevailing understanding of the atmosphere, the flight crew’s decision to attempt a takeoff into rain, windshear, and thunderstorm activity was reasonable. It was also fatal to 144 people aboard and 8 on the ground (Job 1996). Is this a natural disaster or a human systems failure? In 1982 with limited scientific knowledge of microbursts and no airfield systems that could detect them, it is difficult to fault the air traffic control system, weather forecasting and warning system, or aircrew – ergo a natural disaster. Today, I would suggest that the same event would be a human systems failure because understanding of microbursts and their effects is widespread, aircrews are trained in recognition and avoidance (Caracena 1990), and detection systems ring major airports. Such transitions from an uncontrollable natural event into a controllable human
failure have implications for how we manage response to and recovery from such events as well as how outcomes are regulated and litigated in the future.

Clipper Defiance provides a clear-cut example of changes in taxonomy as knowledge evolves. Far less clear-cut, and far more troubling in its implications for the future, is the case of routine practices which emerge as disasters, primarily environmental in nature. Take the case of Love Canal, an abandoned electric power generation canal in the City of Niagara Falls, New York. Between 1905 and 1942 municipal dumping, followed from 1942 by the dumping of industrial wastes, created a toxic dump of gargantuan proportions – some 43 million pounds of identified chemical waste alone. When the dump was sealed in 1953 it was clear that the wastes represented an ecological disaster (Davis 1998). But at what point did the understanding of the hazards involved set in? What we consider to be industrial waste, and even hazardous goods, were not generally well understood prior to the 1950s, as the explosion of ammonium nitrate fertilizer at Texas City in 1947 demonstrated (Minutaglio 2003). The implication is that today we may well be treating seemingly harmless materials in routine ways that in 20 or 30 or more years will prove to serve as the genesis of equal or even larger environmental disasters.

The final step is the requirement to begin to understand future disasters as events coupled with other events as packages of disasters. Probably the most instructive example of this is a common developing world model – civil war and humanitarian disaster followed by natural disaster and another humanitarian disaster. Mozambique provides an instructive case study – the first component was a war of liberation followed by a civil war that extended from 1965 through 1994. The impact of this war can be
inferred from the casualty figures for the years 1984 through 1988 – 100,000 killed and 300,000 starved to death (Bloomfield 1999, Mason 2001). In 2000 this devastated country with a ruined infrastructure and a much diminished human capital faced first, in early February, heavy rains and devastating flooding, followed at the end of February by the impact of Tropical Cyclone Eline which eventually forced 100,000 people to evacuate and trapped an estimated 7000 in trees (BBC News 2000). In February 2001 the floods returned, affecting over 400,000 people (Mason 2001). In July 2002 a Cholera epidemic ravaged Cabo Delgado province, and by the end of 2002 approximately 1.8 million of the country’s citizens were reported to be at risk of starvation in a general African famine. The sequence continues – in January 2003 over 100,000 persons were displaced in a new round of flooding (Green 2003). Although this might seem to be an exceptional case, it is not, suggesting that examinations of disaster futures should consider the linkage of sequences of disasters and an examination of the multiplicative effects of their impacts.

This is particularly important when disasters are viewed in a broader context. Events such as the Rwanda genocide of 1994 are often held at arms length when disaster specialists discuss the morally clean impacts of earthquakes or tornadoes or aircraft accidents or even the morally compromised cases of industrial pollution. However, the combination of civil war, the destruction of infrastructure, the extermination of the intelligentsia and other human capital of nations, and environmental damage creates conditions that make developing countries uniquely susceptible to natural disasters and human systems failures. As a result, in the 21st Centuries we have come to live with refugee crisis as a constant drain on resources, as large populations flee internally and externally across borders from both natural and conflict based events (Green 2003). At
the same time, these conflict based disasters have contributed to the development of aid dependency in nations, disrupting social and cultural systems and agriculture and commerce to the degree that one continent is largely dependent on international aid for the continued existence of its population and its governments (Lancaster 1999, Maren 1997).

INTERESTING MICRO TRENDS

Once we have dealt with the issues of adjusting our models and taxonomies to allow for a better understanding of disasters in the macro sense, it is worth noting that within disasters there are some interesting trends. As noted above, the cost of disaster events increases with every event. Some of this is clearly the impact of normal inflation on the value of money. However, there is more at work than inflation, and these trends will clearly continue. The increasing penetration of technology in every form of endeavor means that the cost of replacing disaster losses includes not only the cost of buildings and tools and clothes and bedding and food (the 19th century problem), but also the replacement of complete technology architectures and infrastructure. At the same time the explosion of knowledge and the development of subspecialization in all forms of work means that individual workers hold an intellectual capital for their organizations that is of equal value to any physical resources and the loss of which is difficult or impossible to replace (Barbash 2003). The protection of components, people, and the linkage of specialists and technology represents a significant challenge for emergency managers and business continuity professionals for the future.
At the same time, we face increasing concentrations of people and resources in places at risk. The trend toward megalopolises is well documented – the impact of the attacks on the World Trade Center shows the infrastructure, financial, and human vulnerabilities that result from what was essentially a limited scale disaster involving only a complex of neighboring buildings in such a major city. Consider in contrast the impact of a Category V hurricane in combination with a warming fed rise in sea levels in the same city.

But changes in where people live and work does not just impact large cities. As part of a student led research study of the potential impacts of coastal storms on jurisdictions in the southeast United States, I was not surprised at data or students developed that showed steady population growth. However, I was surprised to see property valuations double in the last decade (increasing potential economic impact), to see poverty levels at 20 percent of the population, and to see approximately the same significant levels of disability (with poverty and disability being potential markers for at risk populations). The evacuation of three million people on the approach of Hurricane Floyd in 1999 (United States. Department of Transportation. Federal Highway Administration.) shows clearly how difficult the warning and population protection processes have become. More people at risk drives longer lead times for decisions, and increases the potential for a rapidly developing event to get inside decision timelines with catastrophic consequences. This linked problem of concentration of people and resources, the decisions needed to protect them, and the challenge of improving early warning may well be the most significant challenge for the future of population protection in any nation.
AND DANGEROUS DISTRACTIONS

The recent focus in the United States on terrorism does not bode well for our national capability to manage disasters in the future. Although the attack on the World Trade Center alone qualified as one of the most fatal disaster events in United States history with approximately 2800 killed (in contrast the Galveston Hurricane of 1900 killed between 6,000 and 12,000) (Longshore 1998, Green 2003), this death toll does not make the top ten of 20th Century disasters, probably not even the top 100 or 500. Assurances that the recent restructuring of government around a new Department of Homeland Security will not adversely impact disaster response are commonplace, but the reality in government is that programs are controlled by the budget, and that the glut of today’s money is in counter-terrorism. Over the long term, it is not unreasonable to expect that the shift in emphasis will lead to a return to a parallel of the days when civil defense programs focused only on nuclear attack and the use of civil defense supplies to deal with disaster impacts was not an accepted practice (Anderson 1978).

The all-hazard model of emergency management, carefully fostered from the establishment of the Federal Emergency Management Agency in 1977 through the Clinton administration (Drabek 1991), is potentially in trouble. Given the demands of preparation for terrorist attack and the complexity of the technical issues involved, jurisdictions and individual departments and agencies will focus on doing that which they are mandated to do by their funding. Assurances that preparation for terrorism will inevitably improve preparation for all types of disasters are not comforting – at the most basic level, investing in chemical weapon detection capability or building bioterrorism
laboratory capability does not translate into being able to fill sandbags faster when the river is rising.

This is not to say terrorism in the United States is not a real threat. It is certainly one many nations have lived with on a daily basis for decades – Northern Ireland, Columbia, and Israel and Palestine all provide current examples. The challenge for the future is to place these events in a rational context and to devote appropriate resources to deal with real, as opposed to perceived, threats. If terrorism continues, and it certainly will, clearly communicated preparations to deal with specific events, such as smallpox or anthrax attacks, can reduce the probability of such attacks. Paradoxically, they do not necessarily reduce the overall threat of terrorism – anti-abortion advocates conducted 1700 attacks on women's reproductive health clinics using cars, axes, sniping, arson, bombs, and other conventional tools of terrorism from 1977 to 1994 (MSNBC.com), more than any other form of terrorism within the United States.

CONCLUSION

The futures of disasters does not require the postulation of meteor strikes (Frankel 2000), super storms (Bell 2000, Hunter 2003), or even unusually powerful storms (Maslin 2002). Sufficient challenges exist if we only attend to what the last decade demonstrated in terms of existing trends for common events. Success in meeting these challenges, and in preparing for the outlier events, depends on recognizing the potential for change in how we classify events and on the increasing interrelatedness of disasters in much of the world. At the same time we must prepare for more devastating events as we continue to concentrate resources and people in high risk environments. And, for the
United States, such efforts must be conducted in the context of a rational approach to the threat of terrorism as one of many conflict based disasters.

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