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ON THE CONCEPT OF RESILIENCE

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The concept of resilience comprises physical, biological, psychological, social, and cultural systems. Resilience has been defined in many ways (for example, see Wisner, et al. 2005), to include an ability to "bounce back" and continue to function; predict and prevent potential problems; improvise and recombine resources in new ways; develop a collective and shared vision of dangers and what to do about them; and constant monitoring of threatening contextual conditions (Kendra and Wachtendorf, 2003). For our purpose, we define resilience as physical, biological, personality, social, and cultural systems' capability to effectively absorb, respond, and recover from an internally or externally induced set of extraordinary demands. The complexity inherent in the concept of resilience derives from these multiple systems in which it can be observed in simultaneity, which often do not have the same levels of resilience, and from the interactions and inter-effects that take place among these systems.

Resilience is both the capacity of a system to react appropriately to moments of crises that have not been entirely anticipated, and its ability to anticipate these crises and to enact, through planning and recovery, changes in the systems that will mitigate their effects. It is a never-ending open process, for the sources of often unanticipated demands that create changes in the known dynamics of the system are multiple. Past experiences

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cannot be used as the only source of information to anticipate them, and imagination, creativity and even luck are needed to succeed in preventing their disastrous effects ..A resilient system is one where there is both an awareness of potential hazards and their physical, biological, psychological, social, and cultural effects, and the taking of action in anticipation of these demands to forestall or minimize them. The development of resilience necessitates a shift in our conceptualizations from discrete strategies to reduce vulnerability and risk to more holistic, integrated, collective approaches to enhance safety and security. The ability of systems to effectively respond to sudden demands is partly a function of conscious awareness, planning, and training. Resilience is a type of cognitive, social, and cultural adaptation of systems to threats ..While not all significant system threats and their consequences can be known, "cultures of safety" can be developed that provide patterns of anticipated effects, actions, and strategies as well as templates for response, recovery, and mitigation.

Disasters are the result of the combined effects of a hazard on a social organization that has a specific set of vulnerabilities and resiliences ..Both vulnerability and resilience fluctuate over time, allowing for the differential impacts of hazards on the built and social systems. Vulnerability points to the need for systems to change. When these changes include preparedness, recovery and mitigation geared to alleviate the effects of specific hazards, resilience increases, which in turn results in the reduction of vulnerability. As a consequence, the reconstitution of the social system occurs, making it safer for individuals, communities, and organizations that are part of it. In the real world, as 1. Nigg reminds us (personal communication to Aguirre, February 20,2006), the changes which enhance resilience take place neither in a linear fashion nor without conflicting

objectives. As Nigg points out, policy changes are often contentious; changes in technology have unintended consequences; demographic transitions can bring their own pressures through changes in resource needs; and the built environment is constantly in need of maintenance and changed usage. The challenge for the incorporation of resiliency is thus to identify what enhances the ability of organizations to effectively rebound, taking into account the actual physical, biological, personality, social, and cultural systems that are present and the limited amount of economic resources that may be available to lessen vulnerability.

Enhancing the resilience of systems is thus an ongoing process not tied to specific disasters and crises ..As indicated previously, these crises reflect the need for mitigation, but to bring about greater resilience is an ongoing process that requires transforming the general culture of a society (Mileti, 1999). You do not "do" resilience after a disaster; you "do" resilience as part of national public planning and administration. You do not "do" resilience solely as a government program or effort, but you "do" resilience also by governments facilitating the inclusion of the disaster agenda into the goals and awareness and desires of people in a national community. From our perspective then, the primary responsibility of governments should be the facilitation of resilience thinking, planning, and programming among the citizemy in their jurisdictions. Unfortunately, at present the thinking is the reverse of what is needed ..Government accepts a responsibility that it cannot fulfill, fails repeatedly in protecting people from harm, and claims exceptional circumstances and acts of God prevented it from succeeding. In the meantime, practical steps to assist people's voluntary organizations that would incorporate resilience into their agenda are not taken.

Governments' efforts need to be redirected away from a military, command and control approach to crisis response which cannot respond effectively to the myriad response-generated demands of disasters, to a less-controlled, more holistic and coordinative approach focused on social networks. To increase resilience would then mean governments facilitating and strengthening independent and coordinated and cooperative social networks that would be the catalysts of social and cultural change in a society through the introduction of mitigation practices. This would be resilience from the bottom up as it were, allowing for myriad mitigation efforts that would be loosely facilitated by governments. Considering the well known stages of disasters-- response, reconstruction, recovery, and mitigation, it is possible to identify networks that at the present time act or could act in all of these phases and that could also bring about cultural change to increase mitigation planning and action which would reduce if not eliminate disaster losses.

As we have argued elsewhere (Aguirre et aI., 2005), there are 17 disaster relevant institutions in which relevant networks can be assumed to operate. They are the family, religion, politics, economy, medicine and health, education, science, law and the courts, risk management, to include insurance as well as the police, firefighting, and other response instrumentalities of the state, mass media and communication, transportation, energy, food, water, leisure and entertainment, construction and other built environment activities, and land use and environmental regulation and protection. Networks of social relations populate these institutions, so that social life in them can be conceptualized as involving social networks acting within and across these institutional boundaries. The job still to be done is to identify the key networks that need to be included in the resilience

and mitigation project and mobilize and coordinate them to eventually change the culture of the society. It is possible to give only a few examples of these networks" In the United States, paradoxically given the contemporary near-hysteria centered on national security, in the response period of disasters there are vibrant regional and national networks of local search and rescue (SAR) voluntary organizations that while not receiving much assistance from governments or inclusion in response planning, nevertheless do most of the successful rescues that take place (Denver, Perez, and Aguirre, 2006). There are also retired medical doctors, teachers, engineers and other professionals, some of them already organized to do voluntary work during disasters that while largely ignored nowadays could also be tapped to strengthen communities, and their ability to respond to disasters and alleviate human suffering. Another example along these lines is the charitable work of networks of religious groups responding to human suffering in the aftermath of disasters ..During Hurricane Katrina in the Gulf Coast region of the United States, these networks assisted and continue to assist the victims of the storm in many different ways, from reconstruction of their homes to resettlement in communities throughout the country. To this day, however, these religious groups respond to disasters but are not included in disaster planning by governments, and are not financially or otherwise assisted to facilitate and strengthen their extraordinary work. Instead, they come, they help, and they disappear. Why not assist in the conventionalization of these networks of church volunteers so that they can improve and coordinate their activities in future catastrophic response and community recovery efforts?

There are also many relevant networks that until now do not define themselves as doing anything related to the resilience and mitigation project that nevertheless could be

proselytized to become part of it. For example, the Parents Teachers Association CPTA) is a voluntary organization linking family and education. Until now, it has never been thought of as a resource to mitigate the effects of disasters. Yet, it could be so redirected, for furthering the welfare of children is its main purpose, and bringing about social change that would increase societal resilience and their safety, such as monitoring the decisions related to the construction of school buildings that would be more resistant to high winds, or designing and participating in more efficient evacuation planning, could be within its purview. Yet another example is fishermen. They very often own boats, which in the aftermath of Katrina were key actors in search and rescuing of victims in the flooded areas; despite their critical importance during the crisis afterwards they disappeared from public view.

In sum, some networks such as SAR local teams and church groups are already in the business of emergencies and disasters even though they are largely ignored by governments, while others such as the PTA and fishermen, probably the majority of networks in society, do not define their activities in ways that incorporate disaster agenda and the value of societal resilience even though their primary purpose could be expanded to include this new set of goals. A government agency or department is needed to encourage both types of social actors and to integrate them into disaster planning and coordination. Its goal would be to encourage voluntary participation of networks in broad social and cultural change to bring about greater resilience through the adoption of mitigation practices. While not all social networks would be interested in participating in this effort, many social networks' central goals and purposes can be extended to incorporate activities germane to the resilience project.

We already know with a great deal of accuracy where the next catastrophes are most likely to occur, the characteristics of the hazards that will produce them, and the nature of the response-generated demands that they will create. This basic knowledge could be used to direct our efforts in developing the network concept. Reflecting the advances in the natural sciences and in the geography and social sciences of risk, The Munich Re Group, an insurance think tank, has identified (2006) the main regions in the United States in which catastrophic flooding is most likely to occur. They are: storm surge in Galveston/Houston, Texas, as well as in the northeast, in particular New York; flood on the lower Mississippi (New Orleans); levee breach in the Central Valley, California, in particular Sacramento; flash floods in the West, in particular Las Vegas and Denver .. Similar information on the basic geography and demography of hazards is available for forest fires, tornadoes, chemical accidents, among others, and could be used to structure mitigation projects that would involve civil society. The specifics of these projects and the types of networks that would be relevant to them should be an important future agenda.

The advantage of creating such change process is enormous. To give two examples: at the present time, one of the recurrent problems in disaster response is the convergence of material and people to the site of disasters. In a vigorous system of networks, people would use these associational arrangements to channel their charity, so that the problem of convergence would be alleviated. Yet another matter until this day umesolved, is the presumed lack of training of volunteers and their lack of credentials, which renders them difficult to integrate into formal first responder organizations at the sites of disasters (Barsky et at, 2006). The activation and invigoration of social networks would allow

governments to provide training and specify functions which would be performed by volunteers who would come to the sites of disasters as part of certified networks of social relations in the response phase of disasters,

Just as these social networks are important in response, they are and could be very important in mitigation. At the present time the search for profit is an extraordinary force creating enormous vulnerabilities in the U.S., as people move to what they perceive are desirable environments, All throughout the coasts, communities are built near the sea and are extremely vulnerable to hurricanes and severe storms. Greater and greater risks are being taken without consideration of the aggregate consequences, Vigorous networks mobilizing people to adopt alternative value systems that would respect the appropriate limits imposed by the natural environment may counter this process in which profit and pleasure-seeking reign as supreme values at present Such concern would then be no longer the preserve of the environmentalist but would reflect a more widespread understanding of the responsibilities of citizenship.

What is needed then is a rethinking of the functions of government. Despite widespread claims to the contrary and the promise of politicians, governments cannot guarantee protection, People are also responsible for their own welfare. Governments can facilitate the invigoration and coordination of networks of people and organizations sharing common interests and complementary visions of the good life, and it can learn from past mistakes in devising effective programs which would use public funding to further the common welfare, not just through the formal instrumentalities of the state, but also through the participation of civil society in projects to mitigate risks. This is the larger vision that is needed. Thus, an important matter of public administration that needs

attention is for the federal, state and local governments to strengthen and coordinate the work of networks, such as the churches and other religious organizations that played such an important role in the reconstruction of the Gulf Coast in the aftermath of the Katrina catastrophe, while preserving their independence, voluntarism, and local roots.

References

Aguirre, B. E., R. R. Dynes, Rory Connell, 1. Kendra. 2005. "Institutional Resilience and Disaster Planning for New Hazards: Insights from Hospitals." Journal of Homeland Security and emergency Management, vol. 2 C 1): Article 1.

Barsky, Lauren E., Joseph E. Trainor, Manuel R. Torres, and R E. Aguirre .. Managing Volunteers: FEMA's Urban Search and Rescue Program and Interactions with Unaffiliated Responders in Disaster Response. Unpublished manuscript, Disaster Research Center, University of Delaware.

Kendra, J. M ..and Tricia Wachtendorf. 2003. "Elements of Resilience after the World Trade Center Disaster: Reonstituting the New York City's Emergency Operations Center." Disaters, 27 (1): 37-53.

Megan Denver, Jaime Perez, B. E. Aguirre. Local Search and Rescue Teams in the United States. Unpublished manuscript, Disaster Research Center, University of Delaware.

Mileti, D.. 1999. Disasters by Design. Washington, o..C.: Joseph Henry Press ..

Munich Re Group. 2006 ..Hurricanes-More intense, more frequent, more expensive Insurance in a time of changing risks. Germany, Order no ..302-04891.