Human Response to Natural Disasters

Dara Nix-Stevenson¹

Abstract
This study elaborates on the connection between socioeconomic status, education, and the ability to respond to natural disasters. Using the aftermath of Hurricane Katrina and other natural disasters as teachable moments, I foreground how uneven access to resources and capital leave some people more vulnerable than others to natural disasters and how marginal communities inevitably bear the accompanying repercussions of who gets what, when, and how much in the postdisaster emergency relief and reconstruction phase. This occurs not necessarily and merely through a “natural” disaster, as the Boxer Day Tsunami or Hurricane Katrina, but through processes of social, political, and economic disempowerment associated with prior racialized histories and inequitable access to cultural capital.

Keywords
vulnerability, natural disaster, social capital, resilience, social justice

Ecological disasters like the U.S. naval occupation of Vieques, Puerto Rico, 1941-2003; the Indian Ocean Tsunami in December 2004; and Hurricane Katrina in August 2005 both underscore and interrogate how vulnerability is conceptualized in Western discourse (Bankoff, 2001). “Vulnerability, in the disaster context, is a person’s or group’s capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard” (Fothergill & Peek, 2004, p. 90). Cannon, as cited in Haque and Etkin (2007), “finds that the major determinants that make people vulnerable (i.e., social, economic and political factors), which determine the level of resilience of people’s livelihoods and their ability to withstand and prepare for hazards are rarely tackled” (p. 276). Environmental disasters do not indiscriminately distribute risk and vulnerability or eliminate preexisting systems of racial and social stratification (Fothergill & Peek, 2004). In fact, these three environmental disasters reveal that people of color and poor people in the United States, U.S.-occupied territories, and around the world are disproportionately and differentially vulnerable because of preexisting systems of stratification. Political ecology research acknowledges the increased marginality and vulnerability of those who are socioeconomically disadvantaged and in particular how poverty, race, and gender intertwine and link with increased exposure to locally unwanted land uses (LULUs) which generally impose negative externalities to local neighborhoods and pose threats to their surrounding in the form of negative impacts as exemplified in the cases of Vieques, Katrina, and the Asian Tsunami (Bryant, 1998). “At issue here is how being poor or disadvantaged affects one’s experiences in a disaster, from risk perception, to the post-disaster reconstruction of lives and communities” (Fothergill & Peek, 2004, p. 90). Thus, the environment is a politicized landscape reflecting “everyday,” “episodic,” and “systemic” dimensions such as those highlighted in Table 1 (Bryant, 1998, p. 84).

Central to this conceptualization of the environment as politicized is the recognition that the environment is constituted through struggles over material practices and over meaning that seek to equip all people and communities with the knowledge to mitigate, improve coping mechanisms, respond effectively, and recover with resiliency against environmental extremes. Yet as Vieques, Katrina, and the Asian Tsunami amply demonstrate, when faced with a social disaster, a disaster predicated upon and exacerbated by structural inequality and human decision making, who recovers is rooted in the choices that society makes and the prioritization of some lives over others. Thus, framing my argument through the lens of political ecology and critical race theory, I contend that social capital is a key factor in moving toward a culture of disaster prevention and risk reduction and that social capital can generate both the conditions necessary for mutual support and care and the mechanisms required for communities and groups to exert effective pressure to influence public policy. This article

¹The University of North Carolina at Greensboro, USA

Corresponding Author:
Dara Nix-Stevenson, School of Education Building, The University of North Carolina at Greensboro, 1300 Spring Garden Street, Greensboro, NC 27412, USA.
Email: daranixstevenson@gmail.com
Table 1. Dimensions of a Politicized Environment.

| Dimensions | Physical changes | Nature of human impact | Political response | Key concept |
|------------|------------------|------------------------|--------------------|-------------|
| Everyday   | Soil erosion, deforestation, salinization | Cumulative and typically highly unequal; the poor are the main losers | Livelihood protests/resistance | Marginality |
| Episodic   | Flooding, high winds/storms, drought | May have general impact but unequal exposure means that the poor are the main losers | "Disaster" relief | Vulnerability |
| Systemic   | Nuclear fallout, pesticide concentration, biological species | Tends to have a general impact | Popular distrust of official "experts" | Risk |

Aims to demonstrate that disaster risk reduction begins at school, conclude with recommendations for policy and programming, and identify key elements needed to build social capital.

Portes (1998) maintains that “social capital stands for the ability of actors to secure benefits by virtue of membership in social networks or other structures” (p. 3). Though they should, all social networks or structures do not guarantee its participants access to social capital. Norris, Stevens, Pfefferbaum, Wyche, and Pfefferbaum (2008) emphasizes that genuine social capital derives from network structures and linkages, social support, sense of community, place attachment, citizen participation, and communication. Within this typology, social capital is translatable to the processes of resiliency and capacity building as well as participatory approaches that mobilize communities to prevent and mitigate disasters. In an analysis of evacuation decisions before Hurricanes Hugo and Andrew, it was found that residents with a stronger social support were twice as likely to evacuate as were residents with weaker social support (Norris et al., 2008). For Pridmore, Thomas, Havemann, Sapag, and Wood (2007), communities with high levels of social capital are characterized by ethical homogeneity, strong leadership that is concerned with the welfare of the whole community, a high degree of trust, a sense of reciprocity, and mutual support leading to wide participation. Social capital, viewed this way, operates from the micro- (individual/family), meso- (neighborhood), city, and macro level (national/global). At the micro level, social capital operates through strengthening social support for individuals and vulnerable households; at the meso- and city level, social capital operates through capacity building that can lead neighborhood committees and community-based organizations (CBOs) participating with local government in proactively addressing local needs; and at the macro level, social capital operates through coalitions of CBOs, nongovernmental organizations (NGOs), and other civil society groups that mobilize community groups for a more just and sustainable world through change in policy and access to infrastructure and resources (Pridmore et al., 2007). These depictions are represented in Figure 1.

Evidence at the macro-, meso-, and micro level in considering the role of social capital operating in postdisaster response and recovery is revealed through survey, focus group, and interview data of Leong et al. (2007) that examined the lives of Southeast Asian Americans as compared with and contrasted with African Americans who were dislocated by the flooding in eastern New Orleans post Hurricane Katrina. Findings suggested that the Vietnamese American community benefitted from greater community capacity/social embeddedness, the advantages members received from their social ties (received and perceived) as well as the three key social-psychological dimensions of social capital (sense of community, place attachment, and citizen participation; Norris et al., 2008). In fact, filmmaker Spike Lee made a similar observation when commenting on Hurricane Katrina and the relief effort when he observed that during the rescue effort, it became evident that most of the people who sought refuge in the Louisiana Superdome or who perched on rooftops awaiting rescue were Black. Lee also proclaimed that what happened in New Orleans should be treated as a criminal act.

Conceptualized this way, Lee’s assertion cannot simply be interpreted through the lens of American meritocracy which celebrates Asian Americans, like the Vietnamese American community in eastern New Orleans, as the “model minority” (Wu, 2002). It is more aptly construed through an analysis of the social capital resources available to the Vietnamese American community—linguistic, resistant, aspirational, familial, navigational, and societal (Leong et al., 2007) at the time Hurricane Katrina struck which contributed to a more vigorous disaster mitigation and preparedness response that was not available to the African American community. Such an analysis suggests to me that if anything is deserving of criminalization, it is the hidden curriculum that operated then and continues to operate at the macro, meso, and micro levels, which prevents disaster risk reduction from being taught in school to all populations and hierarchalizes which populations are most vulnerable. According to Ivan Illich (1970), the hidden curriculum “schools” us and is at the root of extinguishing social imagination and assigning social roles void of social capital. Specifically, Illich states,

The hidden curriculum of family life, draft, health care, so-called professionalism, or of the media play an important part in the institutional manipulation of man’s world—vision, language, and demands . . . Each of us is personally responsible for his or her own deschooling, and only we have the power to do it. (p. 47)
Prevention begins with deschooling ourselves. Awareness is the first step toward action. Awareness can trigger interest, interest can lead to attention, and attention can prompt action. As schools are the best conduit for disseminating collective values, students and teachers can serve as vehicles for building a culture of prevention. Research (International Strategy for Disaster Reduction [ISDR], 2007) reveals diverse ways awareness has been raised among school students, teachers, and their communities in disaster-prone regions of the world such as Bangladesh, Indonesia, Sri Lanka, and Thailand. In these regions of the world, diverse initiatives include training of teachers, bringing disaster risk reduction into the classroom, organizing disaster curricula around disaster risk reduction knowledge, campaigning for disaster safety, and turning school students into catalysts and initiators.

For example, in 2005, in response to the December 2004 tsunami, ActionAid, in partnership with the Sustainable Development Resource Center (SDRC) funded the development of a kit for schoolchildren in the Bungla language that has been distributed with the aid of the Disaster Management Bureau (DMB) of the Bangladesh Government under the campaign “Disaster Risk Reduction Begins at School.” As a part of the campaign, ActionAid launched a participatory and interactive approach to enable children to play a part in the community under the theme “Know Risk = No Risk.” Since early 2006, the campaign has sought to build local capacity and awareness through (a) development and enhancement of learning tools, (b) training of facilitators and teachers, (c) participatory extracurricular activities, (d) testing children’s cognitive response, (e) drawing lessons for scaling up, and (f) school and community workshops. Most importantly, since the introduction of this kit in 2006, by ActionAid partners in 26 primary and secondary schools, youth and teachers have been engaged as disaster risk reduction practitioners by being trained to (a) understand and identify risks and communicate these to others, and explore ways to raise community awareness; (b) engage in participatory hazard risk mapping of their surroundings, community, village, and so on; and (c) engage in family and school risk reduction planning and management (International Strategy for Disaster Reduction, 2007). As another illustration, the December

Figure 1. Types of social capital related to different levels and linked to participation and empowerment.
2004 tsunami in Aceh Province was a catalyst that caused the Indonesian government to take note that children and women are most vulnerable to disasters. In light of this reality and given that a large segment of Indonesian society lacks understanding of hazards and disasters, the Indonesian government decided to equip primary students with some knowledge of natural hazards and risk reduction measures. The project, titled “Disaster Awareness in Primary Schools” (DAPS), was launched in high-risk primary schools in Indonesia in 2005 and is ongoing. The DAPS project first aimed to secure recognition and understanding of natural hazards, including the potential impacts these can have on personal environments and social development. The project also aimed to develop disaster prevention and mitigation knowledge and skills among families, schools, and communities, and knowledge of disaster response measures for extreme situations. The project approach is highlighted in Figure 2.

The ISDR and United Nations has determined DAPS to be a model project for teaching disaster risk reduction in schools because it takes teachers’ knowledge into account in the following ways: (a) It enforces clarity, precision, and perseverance by committing the project team to the rules “Simplify but do not falsify!” and “Don’t hope it works, make sure it works!” (b) information had to be noted down in great detail; (c) a learning by doing approach was applied in engaging participants in practical activities like first-aid courses; and (d) traditional approaches in writing training modules were abandoned in favor of narrative form. As a result, both students and teachers widened their knowledge base and a pupil-centered methodology was adopted (ISDR, 2007). Because evidence indicates that from an early age, young people are capable of insightful and constructive analysis of their experiences of learning in school (Delpit, 1988; Greene, 1988; Illich, 1970; Pedder & McIntyre, 2006; SooHoo, 1993), these campaigns and projects reveal the potential in consulting students as purveyors of knowledge in disaster prevention and reduction.

This evidence bears fruit in the example of Sri Lanka that, like Bangladesh and Indonesia, learned from the December 2004 tsunami and utilized it as a turning point in the history of disaster mitigation to prompt relevant stakeholders to collaborate toward a long-term, comprehensive, and holistic disaster risk management framework with a mitigation-based approach. Sri Lanka’s Disaster Management Act No. 13 of 2005 was developed, providing a solid legislative and institutional arrangement for disaster risk management, which led to the establishment of both the National Council for Disaster Management—under the President of the Republic—and the Disaster Management Center in May 2005, as well as the creation of the Ministry of Disaster Management in November 2005. Recognizing the importance of education in this area, the Government of Sri Lanka has sought to integrate disaster risk management into the national education system. In the spirit of this mandate, teachers have been trained in India on this topic and have helped develop a teacher training curriculum in Sri Lanka which has helped to boost “disaster safety education” in the country (ISDR, 2007, pp. 33-36). In Thailand, disaster risk reduction also became a focal point for child-focused NGOs and aid agencies after the December 2004 Asian Tsunami. As children are known to be the most vulnerable to disasters, Save the Children, a child-focused NGO, initiated in 2006 a
school project called “Child-Led Disaster Risk Reduction (CLDRR) in Thailand Project.” The rationale behind the project which is still in place is that children and youth can play an active role in community affairs that are relative to them (ISDR, 2007).

Such shifts and implementations in the American disaster prevention culture post Hurricane Katrina at the macro (national/global), meso (structural), and city level, like that which has occurred in Bangladesh, Indonesia, Sri Lanka, and Thailand post-Asian Tsunami, would equip schools with the curricular tools to train students as disaster risk reduction practitioners irrespective of the linguistic, resistant, aspirational, familial, navigational, and societal capital of their respective communities. In the Vietnamese community in New Orleans post Hurricane Katrina, their minimal reliance on institutional care along with perceptions of themselves as socially powerful compelled the community to use their social capital to maneuver. Subsequently, because of the network structures and linkages, social support, and social capital possessed by the Vietnamese American community, they evaded the ethos of the hidden curriculum operating in the aftermath of Hurricane Katrina at the macro-, meso-, and city level. Such tools enabled the community to tap into immigrant and pan-ethnic Asian American networks both locally and nationally. Familial capital was evident in the preexisting bonds shared among residents within the Versailles and Village d’I Est Vietnamese American community who immigrated to eastern New Orleans from the same village in Vietnam. Accordingly, the Vietnamese community was able to mobilize this capital in postdisaster evacuation, recovery, and resilience. Resistant capital emerged from the historical specificity of the Vietnamese immigrants in New Orleans as political refugees who were thrust into rebuilding their lives after immigrating to the United States. Navigational capital was exhibited by second-generation Vietnamese American children who, because of their bilingual ability, were savvy enough to navigate bureaucracy related to education, housing, assistance, and medical care in the United State for themselves and their parents which proved indispensable in navigating government assistance, moving into and out of shelters, and locating housing post Katrina (Leong et al., 2007).

It should also be remembered that of the 55% of the prestorm population of New Orleans that were renters, a significant number were African American (U.S. Census Bureau, 2007). While this community possesses a semblance of social, familial, and aspirational capital in their desire to return home, the lack of navigational capital and the extortionate rental market remain key impediments. Because of this, many African American survivors of Hurricane Katrina, who remained or returned, were relegated to residing in formaldehyde-laden Federal Emergency Management Agency (FEMA) trailers that have since been determined by the Centers for Diseases Control to predispose them to a variety of respiratory ailments, some of which have resulted in unnecessary deaths (Centers for Disease Control and Prevention, 2008). Although residents may have received rental vouchers for temporary housing, housing from rent was in very short supply. In the Upper Ninth Ward, 87% of rental housing was flooded and in the Lower Ninth Ward, 75% of rental housing was flooded. Rent levels rose precipitously with such short supply of rental units.

One indicator of rent level is the HUD Fair Market Rent (FMR) standard, which is set at the 40th percentile of rents for the metropolitan area (FMR also dictates the upper bounds of acceptable voucher rents). FMRs have risen by approximately 45 percent since the autumn of 2005, with the FMR for a one bedroom unit rising USD 578 in 2005 to USD 836 in 2007. The lack of housing available for rent, especially at affordable levels, has become an impediment to reconstruction in the low to moderate income neighborhoods of the Ninth Ward. (Green, Bates, & Smyth, 2007, p. 326)

“The federal ‘Road Home’ program, which is intended to provide cash assistance to those whose homes were damaged by the storm, serves only homeowners and not renters” (Katz, 2008, p. 22). What is more, in exploring the postdisaster experience of Latinos in New Orleans, Trujillo-Pagán (2007) explains that their experience reflected their social and political vulnerability as undocumented immigrants and found that they experienced Hurricane Katrina as a racial/ethnic minority as they faced a variety of structural obstacles in accessing relief services, including illegibility and discrimination. Yet social and navigational capital alone is not sufficient enough an explanation.

Based on the analysis of Harris-Lacewell (2007), which utilized a simple regression model to juxtapose the September 11 tragedy with that of Hurricane Katrina to examine the racial disparity in emotional response to Katrina between Black and White Americans, the fact that Black Americans viewed Katrina as a racialized disaster, while White Americans did not, was not based on psychology but rather on the historical and contemporary racial beliefs that shape the political and emotional lives of African Americans.

Racial inequality has persisted into the 21st century. African Americans continue to earn a fraction of their white counterparts, suffer from worse physical health, enjoy fewer educational opportunities, are less well represented in politics [the 2008 election of President Barack Obama being the exception] and popular culture, and labor under persistent racial stereotypes. (Harris-Lacewell, 2007, p. 34)

Thus, the symbolism of the broken levees and the destruction of New Orleans as a city are laden with disillusionment about the contemporary state of African American citizenship. This feeling of second-class citizenship is rooted in a history of colonialism.
Colonialism is the act of a mother-nation assuming political and/or economic control over another, whereby the mother-nation defines the colony’s laws and general administration in addition to acquiring a significant portion of the colony’s generated revenues. The Louisiana area was colonized by the French, the Spanish, and finally the United States as a result of the Louisiana Purchase. Each of these colonizing forces brought with them its own definitions and understandings of race and ethnicity. Thus, the status of people of color in this region varied depending upon the colonizing government. (Miller & Rivera, 2007, p. 24)

In the south, colonialism, as a system of racial and social stratification, evolved during the antebellum era, Reconstruction, the Civil War era, and embedded itself in Jim Crow segregation. Therefore,

The preparations for Hurricane Katrina, and the response afterward, followed the historic pattern of class and racial divides and differential responses; it showed that the intersection of race and class continues to influence the vulnerability of disadvantaged groups to future disasters and clearly influences their capacity to recover. (Cutter & Smith, 2009, p. 31)

The colonial past that unambiguously and systematically impacts contemporary life in the Gulf Coast states, like Louisiana, and undoubtedly influences recovery and reconstruction in New Orleans also shapes the island of Vieques efforts to recover and reconstruct its land after the departure of the U.S. Navy Atlantic Fleet May 1, 2003. Although Vieques is a political municipality of Puerto Rico with its own mayor, between 1941 and 2003, the U.S. Navy Atlantic Fleet owned and managed more land than the municipality itself. Since May 1, 2003, the U.S. Department of the Interior has inherited the position of primary landholder of Vieques and subsequently designated it as the Vieques National Wildlife Refuge. The Vieques National Wildlife Refuge now constitutes the largest wildlife refuge in the Caribbean. The navy was so fond of Vieques because it afforded them the opportunity to practice beach landings, special operations parachute drops, and small-arms target practice in the maneuver area. By their accounts, they could create realistic and integrated scenarios that simulated true combat coordination among different units and countries. Moreover, Vieques occupied a strategic location, with weapons storage space close to Cuba and the Panama Canal (Duchesne Winter, 2007). Although the island was managed by the navy, it was accessible to other military branches that required a practice range as they prepped for combat in the Middle East and the Balkans. Therefore, today Vieques, a poor community of color, stands, like the levees of New Orleans, as emblematic of historical malefiance and exploitation orchestrated by the U.S. Navy for purposes of securing a landscape for waste disposal and/or experimentation with risky technologies (toxic colonialism). The military created several dump sites (LULUs) characterized by inadequate initial site preparation causing pollutants to readily leach into soil and water. Solvents, diesel, fuel, solid waste, and even weapons themselves were thrown into these dumps. There are two known submarine disposal sites in the waters of the Southeast where the contents of photographed barrels remain. Coral reef destruction has also been documented. So synthetic chemicals continue to precipitate on western side of the island and heavy metals are predominant on the eastern side of the island. Presumably on the western side of the island, the military used industrial solvents to clean vehicles and equipment and used lead-based paints (Arbona, 2004). Evidence of environmental racism, the inequitable distribution of environmental hazards based on race, can be seen in lead poisoning in children. In fact, the Federal Agency for Toxic Substances and Disease Registry considers lead poisoning to be the number one environmental health problem for children in the United States (Centers for Disease Control and Prevention, 2005). Furthermore, during the 62 years of military activities, airborne pollutants and pulverized rock particles reached the civilian population through the strong East-to-West Caribbean trade winds, while people might have ingested other chemicals through pollution from aquifers and drinking wells as well as ingestion of plants and animals with high levels of heavy metals. Besides, Dr. Arturo Massol and Elba Diaz have documented high levels of copper, zinc, nickel, cobalt, and cadmium in crustaceans by demonstrating that crustaceans on the bombing range had levels of these metals up to 80 times higher than typical market samples. In the civilian areas, they also found that the crustaceans had levels between 10 and 20 times higher than typical market samples. Experimentation on plants and vegetables revealed high levels of lead, cobalt, and manganese in plants and also found lead and cadmium in pumpkins, peas, pineapples, and yucca (indigenous plants). Massol and Diaz concluded that these heavy metals, originating at the bombing range, continue to travel through the food chain and impact the local diet and health of the Viequenses (Arbona, 2004). So, a central issue that continues to confront Vieques in 2009 is the slow pace of federal property transfer and the commitment of funds for cleanup because Puerto Rico lacks representation in the federal government (McCaffrey, 2002). Colonialism, racism, and socioeconomic marginalization in the Vieques crisis, as in the Katrina crisis, continue to compound difficulties in ensuring that the federal government meets its obligations.

Still, 3 years after Hurricane Katrina, the response to Hurricane Ike of 2008, which struck Galveston, reflect disparities in the ways in which race and class are treated along America’s hurricane coasts.
As a result, most hurricane evacuations have reflected the suburban experience: majority white residents with the resources and private transportation to do so temporarily evacuate the coast, and after staying with family or friends in motels, quickly return to begin the cleanup. (Cutter & Smith, 2009, p. 33)

Although there were several fatalities, mostly White middle-income residents, in Galveston resulting from Hurricane Ike, many residents on the Texas coast determined that the risks of a Category 2 storm did not warrant evacuation and misunderstood that Ike’s storm surge as synonymous with a Category 4 storm such that social capital disparity is reflected in the evacuation experiences during the 2008 hurricane season (Cutter & Smith, 2009). The residents of Galveston were given a choice to evacuate or stay and the residents of New Orleans were not. Research following Hurricane Andrew is also instructive in that it established some relationships between income and preparedness revealing that poorer people could not afford flood insurance even though they were aware of its availability and benefits. Furthermore, it revealed that socioeconomic status impacts who receives formal warning signals (emergency broadcasts and flood sirens) of an impending danger and needs recommendations to evacuate (Fothergill & Peek, 2004). Hurricane Katrina demonstrated that although many heard the storm warnings, few were able to take action because they lacked money for transportation. It is known that many New Orleanians lacked cars. A 2000 census revealed that 27% of New Orleans households, about 120,000 people, were without transportation (Miller & Rivera, 2007). Clearly, socioeconomic status affected both the location of the community and access to necessary resources during this emergency. Poverty can explain the lack of access to fuel, water, and supplies, as well as the inability to evacuate due to a lack of private transportation. “This constellation of factors prevented many people from being able to evacuate on their own. Consequently, most of those stranded in the city were the poor, elderly, sick, and those caring for the sick” (Fox & Gibbons, 2005, p. 518).

This is an issue that needs much attention, policy development, and stakeholder engagement.

Moreover, Fothergill and Peek (2004) maintain that not only does stakeholder engagement increase steadily with income level, but education also combats fatalism and thereby fosters more stakeholder engagement (citizen participation). It is through education that community members gain valuable knowledge and information which translates to power, power that restructures curricula that fosters the acquisition of skills that match immediate needs of rebuilding postecological disaster such as carpentry, masonry, and plumbing, but that can also be used after rebuilding is completed to expand livelihood options and thus enhance navigational and social capital. For example, in New Orleans, these restructured curricula might be taken up by charter schools, religious schools, and newly restored and reorganized public schools. Specifically, “citizen participation is the engagement of community members in formal organizations, including religious congregations, school and resident associations, neighborhood watches, and self-help groups” (Norris et al., 2008, p. 139). Resilience is “the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure” (O’Brien, 2006, p. 74). Citizen participation is strengthened when coupled with resilience as a process. Citizen participation was evident in the post-Katrina recovery and reconstruction of the Vietnamese American community in New Orleans. Thus, enhancing resilience increases stakeholder engagement at all levels. As cited by O’Brien (2006), David McEntire states,

Recognizing the human role in disasters, taking responsibility for action, having a disaster plan, building capabilities to implement the plan . . . and sharing information about recovery priorities are processes that can enhance resilience for an individual, group, community or nation to deal with unique destabilizing events. (p. 74)

Other representative definitions of resilience can be found in Table 2 (Norris et al., 2008, p. 129).

Arguably, if resilience is to be obtained and play a pivotal role in reducing disaster risk, then the dominant paradigm of disaster mitigation and planning must shift away from an outcome-focused paradigm to one that is process oriented. O’Brien (2006, p. 75) offers a framework for this new paradigm in Table 3.

Although the terminology on the left-hand column of Table 3 currently characterizes the U.S. approach, in the case of New Orleans in the aftermath of Hurricane Katrina, it is irrefutable that the future of New Orleans is predicated upon embracing a new paradigm of transformation. It is clear that public education must be the vehicle to foster this paradigm change because education is at the heart of social reproduction and schools anchor communities. “Media also can be engaged to publicize available services and educate the public about typical reactions to disaster” (Norris et al., 2008, p. 140). In addition, in events such as hurricanes and other ecological disasters, an error proof risk communication and crisis communication plan needs to be in place. It is clear that such a communication plan was lacking in Hurricane Katrina and the Asian Tsunami. “While crisis communication aims to reduce negative outcomes associated with a crisis, risk communication messages are intended to encourage the receiver to engage in proactive behaviors ahead of time to avoid threats and negative consequences” (Lachlan, Spence, & Eith, 2007, p. 204). Communication, crisis, and risk linked with social capital lead to human agency (community competence) of which collective action and decision making are components. Articulated this way, multiple pathways exist that lead communities toward
### Table 2. Representative Definitions of Resilience.

| Citation first author, year | Level of analysis | Definition |
|-----------------------------|-------------------|------------|
| Gordon, 1978                | Physical          | The ability to store strain energy and deflect elasticity under a load without breaking or being deformed |
| Bodin, 2004                 | Physical          | The speed with which a system returns to equilibrium after displacement, irrespective of how many oscillations are required |
| Holling, 1973               | Ecological system | The persistence of relationships within a system; a measure of the ability of systems to absorb changes of state variables, driving variables, and parameters, and still persist |
| Waller, 2001                | Ecological system | Positive adaptation in response to adversity; it is not the absence of vulnerability, not an inherent characteristic, and not static |
| Klein, 2003                 | Ecological system | The ability of a system that has undergone stress to recover and return to its original state; more precisely (a) the amount of disturbance a system can absorb and still remain within the same state or domain of attraction and (b) the degree to which the system is capable of self-organization |
| Longstaff, 2005             | Ecological system | The ability of an individual, group, or organization to continue its existence (or remain more or less stable) in the face of some sort of surprise . . . Resilience is found in systems that are highly adaptable (not locked into specific strategies) and have diverse resources |
| Resilience Alliance, 2006   | Ecological system | The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, and feedback—and therefore the same identity |
| Adger, 2000                 | Social            | The ability of communities to withstand external shocks to their social infrastructure |
| Bruneau, 2003               | Social            | The ability of social units to mitigate hazards, contain the effects of disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future earthquakes |
| Godschalk, 2003             | City              | A sustainable network of physical systems and human communities, capable of managing extreme events; during disaster, both must be able to survive and function under extreme stress |
| Brown, 1996                 | Community         | The ability to recover from or adjust easily to misfortune or sustained life stress |
| Sonn, 1998                  | Community         | The process through which mediating structures (schools, peer groups, family) and activity settings moderate the impact of oppressive systems |
| Paton, 2000                 | Community         | The capability to bounce back and to use physical and economic resources effectively to aid recovery following exposure to hazards |
| Ganor, 2003                 | Community         | The ability of individuals and communities to deal with a state of continuous, long-term stress; the ability to find unknown inner strengths and resources to cope effectively; the measure of adaptation and flexibility |
| Ahmed, 2004                 | Community         | The development of material, physical, sociopolitical, sociocultural, and psychological resources that promote safety of residents and buffer adversity |
| Kimhi, 2004                 | Community         | Individuals’ sense of the ability of their own community to deal successfully with the ongoing political violence |
| Coles, 2004                 | Community         | A community’s capacities, skills, and knowledge that allow it to participate fully in recovery from disasters |
| Pfefferbaum, 2005           | Community         | The ability of community members to take meaningful, deliberate, collective action to remedy the impact of a problem, including the ability to interpret the environment, intervene, and move on |
| Masten, 1990                | Individual        | The process off, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances |
| Egeland, 1993               | Individual        | The capacity for successful adaptation, positive functioning, or competence . . . despite high-risk status, chronic stress, or following prolonged or severe trauma |
| Butler, 2007                | Individual        | Good adaptation under extenuating circumstances; a recovery trajectory that returns to baseline functioning following a challenge |
Table 3. Resilience and Disaster Management.

| Dominant paradigm               | New paradigm                |
|---------------------------------|-----------------------------|
| Isolated event                  | Part of development         |
| Risk not normal                 | Risk of disaster/conflict   |
| Techno-legal                     | Social capacity             |
| Centralized                      | Participatory               |
| Low accountability               | Transparent                 |
| Postevent planning               | Predisaster plans           |
| Status quo restored              | Transformation              |

Cross-Cutting Theme: Public Education

Table 4. Ten Actions Needed to Build Social Capital as Part of a Social Justice Process.

| Actions                                                                 |
|-------------------------------------------------------------------------|
| 1. Assessing the context and asking the right questions: The choice of questions is influenced by the expected size and direction of disaster reduction and prevention impacts, the prominence of the issue in the government’s policy agenda, and the timing and urgency of the underlying disaster mitigation and preparedness policy or strategy. |
| 2. Identifying stakeholders: Stakeholder analysis identifies the people, groups, and organizations that are important to consider when looking at disaster reduction and prevention impacts. |
| 3. Developing the capacity of stakeholders to take action and build social capital and cohesion: The expected policy change can only take place if sufficient knowledge, skills, and resources are in place. |
| 4. Assessing institutions and creating opportunity to ensure intersectoral collaboration: Institutions determine the framework in which policy reforms may affect stakeholders in government, private sector, and civil society, and are the main arenas in which stakeholders interact with one another. |
| 5. Strengthening the demand side of governance: Assessing and ensuring people’s participation from the organizational and legal aspect, including a concern with ensuring access to data. |
| 6. Strengthening institutions’ role, function, and structure: Involves organizing and creating critical links between the policy objectives, policy actions, and their impacts on key stakeholder groups within the health and other sectors at various levels. |
| 7. Mobilizing resources: To the extent that they are necessary for social change. |
| 8. Advocate for upscaling and change: Policy and advocacy to relevant stakeholders at different levels. |
| 9. Monitoring and evaluating impacts: Provides an opportunity to set up early stage systems for monitoring. |
| 10. Identifying the appropriate level and type of intervention: Individual, neighborhood, city, etc. |

As feminist historian Gerda Lerner (1986) observes, if we believe patriarchy is the natural state of affairs, we then have no hope of creating a new paradigm or an alternate system. “The disaster of Hurricane Katrina offers a basic tenet for future emergency preparedness planning: when technology and political processes break down, it comes down to human relationships” (Leong et al., 2007, p. 182). Based on the discussion in this article, a checklist of 10 key elements emerges that are prerequisites for building social capital as part of a social justice process. These elements are listed in Table 4 (Pridmore et al., 2007, p. 139).

These 10 key elements are important in building social capital and provide a useful framework, along with adopting new/alternative paradigms that are not complicitous with current economic, education, and political structures, for policy development and practice. Furthermore, they help to realize the contributions that social capital can make toward disaster mitigation and preparedness in a globalized world. Through the lens of social capital, disaster mitigation and preparedness might best be taken up through disaster education integrated into K-12 curricula. Though disaster education has not been fully implemented in K-12 curricula, the theme of “Disaster Reduction, Education, and Youth” is not new having been introduced during the UN World Disaster Reduction Campaign in 2005 as a priority integral to the 2005-2015 Hyogo Framework for Action as part of Priority 3, focusing on the “use [of] knowledge, innovation, and education to build a culture of safety and resilience at all levels” (UNISDR, 2005, p. 53). Accordingly, social actors (activists connected with NGOs who have worked with dedication, empathy, and coalitional consciousness to bring this priority to life at both grassroots and policy levels) are essential to framing this informal and formal education framework, via environmental education, capable of taking on the challenge of disaster risk reduction education.
Figure 3. Community resilience as a set of networked adaptive capacities.
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Author Biography

Dara Nix-Stevenson, PhD, received her doctorate in educational studies with a concentration in women’s and gender studies from The University of North Carolina at Greensboro. While pursuing doctoral studies in the Department of Educational Leadership and Cultural Foundations, she taught in the Women and Gender Studies Program part-time and the Science Department at the American Hebrew Academy full-time. Her current research focuses on the biopolitics of disposability embedded in postdisaster or crisis environments as it defines disaster response and recovery. She is a secondary science educator interested in ways to restructure environmental education to accommodate an environmental justice orientation that teaches against the biopolitics of disposability while also providing people with tools and knowledge that safeguards them from disasters or crises.