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Recommended Citation

Green, John, Duane Gill, and Anna Kleiner. 2006. "From Vulnerability to Resiliency: Assessing Impacts and Responses to Disaster." *Journal of Rural Social Sciences*, 21(2): Article 6. Available At: https://egrove.olemiss.edu/jrss/vol21/iss2/6

FROM VULNERABILITY TO RESILIENCY: ASSESSING IMPACTS AND RESPONSES TO DISASTER[*]

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ABSTRACT

Hurricane Katrina devastated the social, economic, and physical infrastructure of communities along the Gulf Coast, and many organizations responded in a massive effort to meet their needs. Building from a livelihoods theoretical framework emphasizing the vulnerability-resiliency continuum, this research note focuses on informing services provided during post-disaster relief, recovery, and redevelopment. Based on a case study conducted in East Biloxi, Mississippi, we describe a project that included a needs assessment survey and qualitative interviews. Research findings address the expressed needs of community members following the disaster, types of relief and recovery assistance provided to them, and the kinds of social relationships observed between service providers and survivors. We conclude with a discussion of what communities might do to reduce vulnerability and improve resiliency as they redevelop their social infrastructure.

Introduction

As coastal communities struggle to recover from the devastating effects of Hurricane Katrina, it is important for scholars and practitioners to learn from and inform their efforts. Katrina damaged the social and physical infrastructures of many communities. People are working to rebuild homes and businesses, roads and bridges, and public utilities, but they must also work to rekindle social organizations and networks, learning from what went right and what went wrong during the disaster and its aftermath. A long-range goal of redevelopment should be reducing vulnerability and promoting disaster resiliency.

Building from a livelihoods theoretical framework emphasizing the vulnerability-resiliency continuum, our research is intended to help organizations involved in post-disaster relief, recovery, and redevelopment to understand better and improve their work. Using East Biloxi, Mississippi as a case study, we describe a community-based research project that provided data and analysis relevant to immediate services, advocacy initiatives, and planning. We examine the following questions: 1) What were the expressed needs of community members following the disaster? 2) What types of relief and recovery assistance were provided? 3) What kinds of social relationships were observed between service providers and survivors? and 4) How can communities reduce vulnerability and improve resiliency as they redevelop their social infrastructure? Besides addressing these important issues for understanding disasters overall and policies to address them, this research note also sheds light on the lived experiences of people affected by the hurricane in a specific community context, by that augmenting insights from broader regional studies (e.g., Elliot and Pais 2006, Saenz and Peacock 2006).

Livelihoods, Vulnerability and Resiliency

The concept "livelihood" refers to the system of actions and outcomes taken by individuals, households and their communities to achieve a particular standard of living. Livelihood strategies involve social, cultural, political and economic relations within communities and broader institutions, requiring ongoing negotiation to meet material and experiential needs (Bebbington 1999, DeHaan 2000, Ellis 1998). Of special interest to this line of research are the ways in which access to and exclusion from socioeconomic resources provide the capabilities for people to handle short-term shocks and longer-term stresses (Bebbington 1999, DeHaan 2000).

Disasters–be they natural, technological, economic and/or humanitarian–certainly present both short-term shocks and longer-term stresses to livelihood systems. The extent to which individuals and groups are susceptible to the shocks and stresses of disaster because of their socioeconomic position, race/ethnicity, age, gender or geographic location can be labeled as "vulnerability" (see: Bolin and Stanford 1998; Cannon 1994; Cutter, Emrich, Mitchell, Boruff, Gall, Schmidtlein, Burton and Melton 2006; Morrow 1999). People and their communities are considered "resilient" when they have access to the material, financial, social and psychological resources necessary to prevent or respond effectively to a crisis. As Cutter et al. (2006:11) note, "hazard–resistant" communities are able to mitigate disaster impacts. Considering this, attention should be focused on the relative vulnerability of groups before a disaster to assess

potential impacts, and attention should also be directed toward the aftermath of the event when relief, recovery and redevelopment are of concern.

Community-Based Research Framework and Methods

This project used a community-based research (CBR) framework drawn from participatory and action research models (Reason and Bradbury 2001, Selener 1997, Stoecker 2005, Stringer 1999). CBR involves partnering among professional researchers, community members, informal groups and formal organizations to engage in systematic research to inform problem solving. Through a research process collaboratively initiated and implemented at the grassroots level, it is envisioned that collective capacity will increase to address issues in need of attention, including those in the wake of disaster.

Our case study is based on research evolving from pre-existing social networks functioning in the aftermath of Hurricane Katrina. Two of us had previously worked on community-based food security research projects with a statewide organization and an international agency that were assisting a grassroots group in East Biloxi, Mississippi seeking to coordinate relief and recovery services after the hurricane. We were asked to provide technical assistance in documentation and assessment. We visited the area and met with representatives from local government and several nonprofit organizations. These partners determined that a needs assessment survey should be developed as a tool for identifying and responding to individual requests for relief services, for coordinating services between organizations, and for advocating for community concerns to funding organizations and public agencies. The survey instrument was drafted by volunteers working with a local relief center. Several individuals from the community and outside organizations provided input. Based on interest and potential use of the data, this informal group became the "research team" for the project.

With the extensive damage to homes and the concentrated level of activity at food distribution and other service sites, data collection in residential neighborhoods was of little use. As a result, the research team decided to conduct surveys where people were congregating to obtain assistance. Beyond three days of extensive data collection at these assistance sites operated by nongovernmental organizations, research team partners continued to conduct surveys as people in need of services were identified at these sites, at community meetings, and as walk-ins. An attempt was made to have a completed questionnaire for everyone requesting services through the relief center and its partner groups. Completed

questionnaires were first scanned by community members and relief workers to identify immediate needs and prepare work orders. Copies of the survey were sent to the university researchers who entered and analyzed the data. Working with the help of faculty and students, we entered data and provided periodic updates and analysis to community partners. A total of 1,204 surveys were entered into the database with 879 respondents from the eastern neighborhoods of Biloxi in the 39530 zip code. As conditions stabilized, the relief center assumed responsibility for maintaining the database and ongoing case management.

During survey work, observation and informal qualitative interviews were also conducted. Later, an open-ended interview guide was designed and used to collect data from service providers from nonprofit, faith-based and government agencies working in and around the community.[1] From a total of 157 interviews conducted in the Gulf South, data from 34 of the interviewees working in and around East Biloxi were used to inform this research note.

Findings

What Were the Expressed Needs of Community Members Following the Disaster?

People across the Gulf Coast were negatively affected by Hurricane Katrina. Still, some segments of the population were more vulnerable than others. Census data reveal that residents of East Biloxi neighborhoods faced socioeconomic challenges before the disaster (Table 1). Compared with the City of Biloxi, East Biloxi residents had relatively lower levels of educational attainment. While nearly 73% of adults 25 years or older had completed high school, the figure was nearly 82% for the city as a whole. There were also lower median household income ($26,187 vs. $34,106) and higher individual poverty rates (22.6% vs. 14.6%) in East Biloxi. Residents of the area were more likely to rent their homes (56.0% vs. 51.1%), and the median value of owner-occupied units was lower than that for the city ($65,300 vs. $92,600).

Needs assessment survey respondents had a median age of 51 years, and 18% of them were 65 years of age or older (Table 2). Slightly less than three-quarters of respondents 25 years of age or higher had graduated from high school. Household income levels were low with 80% reporting less than $30,000 in the previous year.

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[1] With this assessment, the partnership expanded to include faculty and graduate students from Delta State University, Southeastern Louisiana University, and the University of Michigan, with the latter under the leadership of JoLynn P. Montgomery and Irene S. Bayer.

Interviews showed that the jobs held by respondents before Hurricane Katrina included fishing/shrimping, construction, casino services, cooking, and general labor.

TABLE 1: SOCIOECONOMIC CHARACTERISTICS OF EAST BILOXI, MISSISSIPPI, AND BILOXI, MISSISSIPPI

CHARACTERISTICS	EAST BILOXI*	BILOXI
Population.	17,214	50,644
Age		
Median.	30.3	32.5
Percent of Population 65 Years and Over.	14.2%	12.0%
Race/Ethnicity		
White.	58.3%	71.1%
Black/African American.	27.8%	19.0%
Asian.	9.2%	5.1%
Other (American Indian, Pacific Islander).	2.4%	1.4%
Two or More Races Reported.	2.3%	2.4%
Hispanic or Latino (Any Race).	3.8%	3.6%
High School Graduate (Adults ≥ 25 Years).	72.8%	81.9%
Economic Status		
Per Capita Income (1999).	$15,791	$17,809
Median Household Income (1999).	$26,187	$34,106
Individuals Below Poverty Line.	22.6%	14.6%
Housing Status		
Rental Occupied Housing.	56.0%	51.1%
Owner Occupied Housing.	44.0%	48.9%
Median Value of Owner Occupied Housing.	$65,300	$92,600

Source: U.S. Census Bureau, American FactFinder. Table constructed by authors.
*The 39530 Zip Code was used to approximate the geography of "East Biloxi."

Residents identified several needs in the wake of the hurricane including clean water, food, clothing, housing, and health care. Survey respondents reported extensive damage to their homes (Table 3). Nearly one-quarter said their home was either no longer standing or off its foundation. Over three-quarters reported damage as severe. Many people involved in this study were living in damaged houses, area shelters, tents and trailers at the time of data collection. Housing damage was especially problematic for those without insurance; most respondents did not have homeowners/renters insurance, and the percent of flood insurance coverage was even lower (84% reported no coverage). Even those who did have

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some type of insurance faced challenges as a debate between homeowners, insurance companies, and the government concerned what types of damage should be covered.

TABLE 2:   CHARACTERISTICS OF NEEDS ASSESSMENT SURVEY RESPONDENTS IN
           EAST BILOXI, MISSISSIPPI

CHARACTERISTICS	EAST BILOXI
Total Sample..	879
Gender (n = 786)	
Female..	53.8%
Male...	46.2%
Age (n = 879)	
Median...	51.0
Percent of Population 65 Years and Over.	18.0%
Education (n = 795)	
High School Graduate (Adults $\geq$ 25 Years).......................	73.5%
Economic Status: Household Income (n = 805)	
< $10,000..	34.3%
$10,000 – $19,999.	30.4%
$20,000 – $29,999.	15.3%
$30,000 – $39,999.	11.4%
$40,000 – $49,999.	5.1%
> $50,000...	3.5%
Housing Status (n = 873)	
Rental Occupied Housing...	37.4%
Owner Occupied Housing.	62.6%

Source: Needs Assessment Survey, conducted September – November, 2005.

More than two-fifths of respondents reported not having any form of health insurance coverage. The self-rated health of community residents was low with more than half of respondents ranking their health as poor or fair. Often, respondents indicated some type of existing health issue within their household, including respiratory problems and skin irritations associated with the aftermath of the hurricane. Additionally, there were challenges associated with pre-storm health conditions worsened by the post-storm situation such as high blood pressure, hypertension, need for diabetic and dialysis treatments, and physical disabilities. Also identified was the need for counseling services.

What Types of Relief and Recovery Assistance were Provided?
Many organizations were involved in providing relief and recovery assistance following the hurricane. These included government agencies, traditional aid

agencies such as the Red Cross and Salvation Army, and a variety of other nongovernmental agencies, community-based organizations, and faith-based groups.

TABLE 3: HOUSING AND HEALTH CHARACTERISTICS OF NEEDS ASSESSMENT SURVEY RESPONDENTS IN EAST BILOXI, MISSISSIPPI

CHARACTERISTICS	EAST BILOXI
No Homeowner/Rental Insurance (n = 858).	52.4%
No Flood Insurance (n = 864).	83.8%
Home Not Still Standing or on Foundation (n = 872).	24.7%
Level of Damage to Home (n = 849)	
None.	1.1%
Minor.	3.2%
Moderate.	17.9%
Severe.	77.8%
Health Insurance Status (n = 846)	
None.	45.0%
Government Program.	24.3%
Private Insurance/Job Benefits.	27.7%
Other.	3.0%
Self-Reported General Health Status (n = 846)	
Poor.	12.9%
Fair.	41.0%
Good.	40.2%
Excellent.	5.9%

Source: Needs Assessment Survey, conducted September – November, 2005.

By mission, the Federal Emergency Management Agency (FEMA), Red Cross and Salvation Army are supposed to be among the first responders in cases of disaster. Each of these organizations had a presence in Biloxi, although some of their activities were less apparent in East Biloxi during the first two months following the disaster. The Salvation Army had a clear presence in East Biloxi through its relief distribution center on the grounds of an old sports stadium where water, food, clothing, money/gift cards, and limited medical assistance were provided. It also served as one place where volunteers, primarily those associated with churches, stayed in tents and campers. Survey respondents indicated having registered for assistance with FEMA (86.3%) and the Red Cross (80.6%), as well as with the Salvation Army, though at a lower percentage (41.5%).

There was an eclectic group of outside nongovernmental organizations that also provided assistance, often partnering with local and outside churches and

community-based groups, such as Hands On USA, United Life Ministries, Oxfam America, and Islamic Relief and Development. These groups provided emergency funding, food and water, supplies (e.g., personal care items, household goods, clothes, toys), technical assistance, and physical labor for tree cutting, debris removal and housing demolition/renovation. Much of this work was coordinated with assistance from the East Biloxi Coordination and Relief Center, later renamed the Biloxi Relief, Recovery, and Revitalization Center. Both observation and interviews with volunteers and relief workers revealed that churches, faith-based groups, and other nonprofit organizations provided services consistently and openly. However, service providers indicated that it took time and resources to get relief "on the ground" and to coordinate their work.

What Kinds of Social Relationships Were Observed Between Service Providers and Survivors?

Observation and qualitative interviews demonstrated variance in the interpersonal and individual-institutional relationships involved in relief and recovery services. To illustrate this, we draw on two examples of how relief and recovery assistance were provided. The first site was structured on a "maintaining social order" model and the second focused on a more "humanistic service" basis.

One facility was primarily managed under the auspices of a large-scale relief agency. It offered numerous services, although accessing some provisions was an arduous task. Often people would come and stand in line, many with their children, only to learn that they would receive a ticket for later assistance because goods were scarce. Significant attention was directed toward identifying who truly "deserved" assistance and who did not. With an emphasis on maintaining social order, time and energy were focused on warding off potential looters, especially after the curfew was lifted.

Alternatively, a site was providing some, although not all, of the same services. It, however, was structured much differently. People were asked to complete an intake form regarding their situation. In the end, few of them were turned away without any services or supplies. When it came to food and other perishables, they were asked to take only what was absolutely necessary for three days, after which time they could return for additional assistance as more supplies arrived.

Clearly, both sites provided critical services in a complex and stress-ridden situation. The first scenario involved services being provided authoritatively in anticipation of social disorder. The latter focused more on providing services

because of moral responsibility with an eye toward service recipients retaining a sense of dignity.

In good times, positive community action toward common goals relies on personal and institutional trust. In times of crisis and attempts to recover in its aftermath, successful provisioning of services may increase trust and heighten a sense of collective efficacy. In cases where there is perceived mishandling of the situation at best or institutional failure at worst, it is likely that levels of trust will be diminished, and there will be further loss of faith in the "system." Combined with contentious relationships with insurance providers, this has a potential to contribute to the negative psycho-social impacts of a disaster and may contribute to the creation of "corrosiveness" in social relations following the disaster, a response typically associated with disasters of a more technological nature (see: Erikson 1994; Freudenburg 1997; Picou, Marshall, and Gill 2004). Hurricane Katrina left many people homeless and traumatized. Survivors continue to need support, and there should be vigilance in the manner in which service is provided.

Recommendations for Building Resiliency

The livelihoods framework directs attention toward the relative vulnerability or resiliency of individuals, groups and their communities in the face of short-term shocks and longer-term stresses. Exploring both situations in East Biloxi before and shortly after Hurricane Katrina, this study provides insights on the needs expressed, services provided, and how these were organized. Data were used to inform actual service delivery and to advocate for the needs of vulnerable community members. Drawing from this case study and literature from research on disasters and greater community involvement in planning and response (e.g., Bolin and Stanford 1998; Morrow 1999; Morrow and Enarson 1996), we offer the following recommendations.

1. Vulnerability must be addressed in planning for disaster preparedness, relief, recovery, and redevelopment. Geographic areas and socioeconomic groups that may be particularly susceptible to the negative impacts of a disaster should be afforded direct attention rather than being treated as an afterthought. Consideration of people's livelihoods is critical, and both their housing and health needs demand attention beyond water, food, clothing, and emergency shelter.

2. Responses to disasters should be organized and managed to deliver goods and services to survivors efficiently and with the least burden on them as possible. Furthermore, services need to be provided in a way that allows

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people to maintain a sense of dignity and self worth. The goal of providing disaster relief is to meet people's needs. Through this, trust should be built rather than diminished.

3. Local organizations, including nonprofit and faith-based groups, have an important role to play in planning for and responding to disasters. To realize their potential, however, they must have access to internal and external networks and resources. This requires assistance from nongovernmental organizations and governmental agencies. Having funders and other resource providers establish and maintain relationships with local groups before disaster strikes would provide for timelier responses "on the ground."

4. Finally, as this case study demonstrates, the community-based research framework may be used to inform planning and responses to disaster. In collaboration with university researchers, community-based organizations working to address the needs of disaster victims in East Biloxi developed the necessary tools to conduct needs assessments, asset-mapping, and evaluations of response and recovery effectiveness. This process directly involved community residents, relief and recovery workers, and diverse organizations in the generation of timely data and analysis critical for providing direct disaster services. Furthermore, the community-based research approach was beneficial for nonprofit organizations advocating for the needs of the most vulnerable, acquiring funding to continue this work, and facilitating organizational planning for future crisis events.

Albeit far from a panacea, learning from this case study can assist communities as they develop from a state of vulnerability to one of greater resiliency.

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