CHAPTER 33

The History and Future of Disaster Research

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The purpose of this chapter is to inform the reader of what is known in the field of natural hazards and disaster research. The chapter begins with an outline of the history of disaster research, which is followed by a brief synopsis of the hazards adjustment paradigm. Disaster impacts are then examined, with a focus on deaths, injuries, and dollar losses as well as psychological, short-term, and long-term impacts. Next, warning systems and public response to warnings are detailed. Preparedness activities and response to disasters are also covered, as well as the factors that influence them. The chapters of recovery and reconstruction are then detailed. The chapter concludes with a discussion of the impact of disaster research on planning and helping people and a brief statement on the likely future of disaster research.

DEFINITION OF DISASTER

Considerable change has taken place in theorizing about the characteristics of hazards and disasters over the past several decades. These changes have influenced research that has been conducted and the knowledge that has been accumulated; they have redirected policy decisions at all levels.

Until recently, most people generally agreed with the initial definition of disaster developed by Charles Fritz (1961) over 40 years ago. Using a functionalist viewpoint, he defined a disaster as:

an event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of society, undergoes severe damage and incurs such losses to its members and its physical appurtenances that the social structure is disrupted and the fulfillment or all, or some of the essential functions of the society is impaired (Fritz, 1961, p. 655)

In today's social and political climate, opinions diverge about what constitutes a disaster. In fact, entire books and journal issues have been dedicated to further exploring the concept of disaster (cf. "What is a disaster?" International Journal of Mass Emergencies and Disasters, 1995; Quarantelli, 1998). Current theorizing is based on diverse orientations, for example, social constructionism, postmodernism, and conflict-based and political economy theories. Kreps (1995) takes the stance that Fritz's position should be retained with the modification that disasters are social constructions; essentially, disasters do not exist in and of themselves but are the products of how people agree to define them. Hewitt (1995) criticizes mainstream approaches for focusing on the physical characteristics of disasters because that tends to locate the source of the disaster outside of society rather than within it. Porfiriев (1995) defines disaster as a breaking of the routines of social life in such a way that extraordinary measures are needed for survival. Another description characterizes natural disasters as infrequent, unexpected, and traumatic events that are threatening to societal well-being and overwhelming to the coping resources of individuals and communities (Ursano, McCaughhey, & Fullerton, 1994).
Even though opinions differ, a common element that can be detected in almost all definitions is that disasters and the losses that result from them are the consequence of the interaction between the natural, social, and constructed environments and are initiated by some extreme event in the natural world. Moreover, one thing is strikingly clear: the world is becoming increasingly vulnerable to natural disasters. As the human population increases and as more people migrate to hazard-prone areas such as the coastlines, the human and economic costs of natural disasters are increasing in much catastrophic proportions. In many natural disasters claimed the lives of over 80,000 people each year from 1973 to 1997, and more than 50 million people were impacted in a significant way (International Federation of Red Cross and Red Crescent Societies, 1999). There has also been a dramatic increase in economic losses from natural catastrophes over the past 50 years (see Figure 33.1). In the United States alone, an estimated $500 billion in losses resulted from natural disasters during the 1975 to 1994 period (Mileti, 1999).

The History of Disaster Research

Many of the disciplines that address hazards and disasters today had their origins in the school of thought known as human ecology, which was developing subdiscipline in the social sciences at the University of Chicago at the turn of the last century. The human ecological perspective was philosophically explored by John Dewey, who wrote that the fact that humanity exists in a natural world that is innately hazardous results in human insecurity. Individuals and societies are thus compelled to seek security through the comfort of perceived absolute truths, such as religion, science, and philosophy (Dewey, 1929/1984). More importantly, environmental perils such as floods and earthquakes do not exist independently of society, because these perils are defined, reshaped, and redirected by human actions. Dewey's perspective was that "environmental problems stimulate inquiry and action, which transform the environment, engendering further problems, inquiries, actions, and consequences in a potentially endless chain" (Dewey, 1938, p. 28).

Dewey's ideas have been attributed with the profound distinction of having shaped a generation of social scientists who in turn shaped the young mind of geographer Gilbert F. White while he was a student at the University of Chicago over 50 years ago. White is known today as the father of natural hazards research and management (see Wescoat, 1992). White himself (1973) traces the origins of his ideas along a different path. Like Dewey, he has consistently maintained that hazards and disasters are the result of the interaction of natural and social forces and that hazards and their impacts can be reduced through individual and social adjustment (White, 1945; White et al., 1958; White, Platt, & O'Riordan, 1997).

An alternative current developed in the discipline of sociology, independent of the human ecological heritage, during the early twentieth century. "Disaster research" began with Prince's (1920) dissertation on a technological disaster and was followed by investigations of natural disasters and inquiry into the conditions of panic. Disaster research received attention during the 1950s because of national anxiety over the Cold War. With federal funding, the National Research Council embarked on a series of investigations of disasters to learn lessons transferable to civil defense in the event of nuclear war with the Soviet Union. The specialty area, originally labeled social disorganization, was based on expectations about what the research would discover. The findings from that research program have been synthesized in the social psychology of collective behavior and theories of social organization. (For a summary of the history of the field, see Quarantelli, 1995; for an assessment of the impacts of disaster research on social policy, see Dynes & Drabek, 1994; for a discussion of methods, see Stallings, 1997).
Both theories are extraordinarily different from those of the human ecologists. The collective behaviorists offered explanations for human adjustment and behavior in the minutes, hours, and days after a disaster’s impact. Scholars of social organization offered similar conclusions about the behavior of organizations. The “social disorganization” label for the research area was dropped as disasters were observed to strengthen rather than paralyze the communities that they affected. For example, after studying a tornado that hit Topeka, Kansas, in 1966, Drabek and Key (1984) could find no long-term negative impacts (pp. 365, 366), leading the researchers to develop the concept of the therapeutic community.

By the 1970s, natural hazards research in geography (with its human ecological heritage and emphasis on loss reduction) and disaster research in sociology (with its collective behavior perspective and emphasis on disaster response and emergency preparedness) were both entrenched in their respective disciplines. Beginning in 1972, these approaches were mixed with the perspectives of climatology, economics, engineering, geology, law, meteorology, planning, psychology, public policy, seismology, and others. Geographer Gilbert White and sociologist Eugene Haas (1975), assisted by many others, began the nation’s first assessment of research on natural hazards—an effort to take stock of the knowledge regarding hazards and to suggest directions for national policy and data inventory research needs. That project altered the walls that had separated many of the disciplines involved with hazards and paved the way for the interdisciplinary approaches to hazards research and management that the nation employs today.

Research into the psychological aspects of disasters, as in other disciplines, emerged independently. Early work characterized impacts on individuals that included people being “dazed” and experiencing “hyperactivity.” In the 1950s, a model called “the disaster syndrome” was proposed by Wallace (1956) which was constructed as a psychologically determined defensive reaction in which people are: (1) dazed and immobile, followed by (2) extreme suggestibility and altruism, (3) euphoric identification with the damaged community, and, eventually, (4) return to predisaster ambivalent attitudes. More contemporary psychological models (cf. Green, Grace, & Gleser, 1985) begin with exposure to the traumatic event. This includes the experience a person brings to the event and specific aspects of the event experience. Exposure leads to “immediate appraisal” of the event and “initial emotional reactions,” followed by attempts to process the information and put it into perspective given one’s present world view. Most models now take both personal and socioenvironmental characteristics into account. Contemporary views were greatly influenced by the call for psychological research resulting from the accident at the Three Mile Island nuclear power generating station in the late 1970s (cf. Broman, Parkinson, & Dunn, 1990). Psychological research now utilizes diverse approaches including adult and child studies regarding topics that include rates of disorder, longevity of impact, risk factors, and post-traumatic stress disorder (PTSD), and incorporates other variables such as severity of exposure, gender, age, pre-existing conditions, and family factors (cf. Green, 1996, for a summary of research findings).

In the early 1990s, a second national assessment of hazards and disasters was begun at the University of Colorado’s Natural Hazards Center as part of the national activities of the Decade for Natural Disaster Reduction (Huff, 1999). The project summarized knowledge in all fields and engineering (psychology was the only discipline in the nation not to participate), evaluated U.S. approaches and programs over the last quarter century to judge what has worked and what has not, and made recommendations regarding a shift in approach and perspective. Over 130 of our nation’s leading scientists and engineers participated in the project, which was overseen largely by members of the White House’s Subcommittee on Natural Hazards in the Committee on the Environment in the Office of Science and Technology Policy. One result of this effort was to create a holistic model for future programs and research on hazards and disasters that links hazards mitigation, planning response, recovery, and reconstruction to sustainable development. The holistic and interdisciplinary approach recommended in the second assessment has attracted global attention, and it now serves as the basis for several national and international interdisciplinary programs. It is most likely that future research and policy approaches for hazards and disasters will be less limited by the boundaries of traditional disciplines and more influenced by the need to approach problems with teams representing the range of skills and knowledge areas needed to impact a solution to the problem.
THE HAZARDS ADJUSTMENT PARADIGM

Research on hazards conducted over the past 30 years has been based on the notion that individuals and groups choose how to cope with or adjust to hazards in their natural and constructed environment. This paradigm used the bounded rationality model of decision making, which says that individuals make decisions based on limited knowledge and within constraints set by the social system in which they live. This allows for acceptable, although often not optimal, adjustments and outcomes. This decision-making model, paired with the adjustment concept, generated the following five-step strategy for coping with hazards: (1) assess hazard vulnerability, (2) examine possible adjustments, (3) determine the human perception and estimation of the hazard, (4) analyze the decision making process, and (5) identify the best adjustments, given social constraints, and evaluate their effectiveness.

Public and private policies that have been developed based on this paradigm have generated a management strategy with the goal of reducing hazard-related losses, such as lives, injuries, dollars, and social and economic disruption. This strategy is organized conceptually around a four-stage cycle of preparedness, response, recovery, and mitigation, which is described in what follows. Current policy implementation relies on "lead recruitment" activities in all four stages, fostered at the societal level but carried out locally or individually.

PREPAREDNESS

Preparedness involves developing an emergency response and management capability before a disaster strikes, in an effort to promote effective response as needed. This requires a vulnerability and risk analysis to identify potential problems that an extreme meteorological or geological event could impose. Furthermore, preparedness involves hazard detection and warning systems, identification of evacuation routes and shelters, maintenance of emergency supplies and communication systems, procedures for notifying and mobilizing key personnel, and preestablished mutual aid agreements with neighboring communities. Training and educating response personnel, citizens, and community leaders are also crucial to the preparedness process.

RESPONSE

Response refers to the actions taken immediately before, during, and following a disaster. The intent of an effective response to disaster is to save lives, minimize property damage, and to enhance the recovery process. The activities typically carried out during a response effort are hazard detection and warning, evacuation and shelter of victims, medical care, search and rescue operations, and security and protection of property. The effectiveness of the response effort is directly related to the activities carried out during the predisaster preparedness phase.

RECOVERY

Disaster recovery efforts involve short-term activities such as restoring vital support systems as well as long-term endeavors aimed at returning life to normal. The initial recovery phase involves an assessment of the damage to begin prioritizing the recovery efforts. The recovery stage involves repairing and rebuilding homes, public buildings, lifelines, and infrastructure; organizing volunteers and donations; delivering disaster relief; restoring vital community services; coordinating government activities; and expediting permitting procedures. The recovery process can take weeks or even years, depending on the magnitude of the disaster, available resources, and the effectiveness of community and governmental efforts.

MITIGATION

The fourth stage, mitigation, refers to the policies and activities aimed at reducing an area's vulnerability to damage from future disasters. These mitigative measures are typically in place before a disaster occurs. Generally, mitigation activities are characterized as structural, infrastructural, and nonstructural. Structural and infrastructural mitigation measures attempt to keep hazards away from people and buildings, to construct buildings more able to withstand disaster, and to strengthen elements of the constructed environment that are exposed to hazards. Nonstructural mitigation measures try to distribute the population and the constructed environment such that their exposure to disaster losses is limited.
A Contemporary Reconceptualization

Over the past several decades, a vast amount of theoretical, empirical, and policy work has been conducted, all in an attempt to reduce vulnerability to losses from natural and related technological disasters. While these efforts have led to many accomplishments, including stronger infrastructures, safer buildings, and better warning systems, just to name a few, there is still a need for improvement. Many policy makers are troubled by the fact that more progress does not appear to have been made in reducing losses from hazards: The staggering monetary losses from disasters continue to increase at alarming rates; some mitigation measures may only be postponing losses onto future generations; and short-term thinking has resulted in environmental degradation and ecological imbalance, which not only is detrimental to society but also contributes to the severity of the next disaster. Given this, the contemporary hazards adjustment paradigm needs to further evolve to begin to deal with the complex factors that contribute to natural disasters in today's world and especially tomorrow's.

Disaster Impacts

Some impacts of disaster can be readily quantified, such as dollars lost or the number of injured or injured animals. Other more indirect and less easily quantified impacts of disaster are more difficult to measure, such as increased stress levels or a loss of community cohesiveness. The following sections describe disaster impacts in terms of deaths, injuries, and dollar losses; psychological impacts; and economic impacts.

Deaths, Injuries, and Dollar Losses

It is estimated that natural hazards killed over 24,000 people (about 24 per week) and injured at least four times more people in the United States and its territories between January 1, 1975, and December 31, 1994 (Mileti, 1999). Almost 2 million households per year (24.5 per 1,000) experienced injuries or damage from natural hazards including floods, storms, tornados, hurricanes, earthquakes, and fire (Rossi, Wright, Weber-Burdin, & Pereira, 1983). Furthermore, about one-seventh of the population reports feeling threatened by natural hazards (Norris, 1992). In the 1975 to 1994 period, dollar losses to property and crops from natural hazards and disasters were between $230 billion and $1 trillion (Mileti, 1999). A conservative estimate of the actual average dollar losses from natural hazards and disasters in the nation from 1974 to 1994 is $500 billion (Mileti, 1999).

Psychological Impacts

It is now widely recognized that disasters can cause emotional distress and trauma. This distress often results in both short- and long-term effects. Most of the psychological research following a disaster has been on the short-term impacts. For example, Bland, O’Leary, Farinaro, Jossa, and Trevisan (1996, p. 18) found that in the short-term, disasters are associated with an increased prevalence of severe psychiatric symptomatology, PTSD, anxiety, depression, somatic complaints, and nightmares. While the long-term effects have been studied less extensively, reports do suggest that there may be a lengthy period, or delayed onset, of some symptoms symptoms can come and go, and some psychiatric symptomatology may remain for as long as 14 years (Bland et al., 1996, p. 18). Although there is little supporting psychological research, most disaster intervention programs have identified certain population subgroups to be at greater risk of emotional distress than others. Most often identified as special risk groups are children, the elderly, the poor, those with a previous history of emotional disability, and those with a marginalized predisaster existence.

Research on gender shows mixed results. Some researchers have found that females exhibit more short-term mental health problems following a disaster, including stress, depression, PTSD symptoms, and anxiety (Fothergill, 1996). Other studies state that men experience greater decreases in mental and physical well-being and have increased rates of depression and alcohol abuse after a disaster (Fothergill, 1996). Some studies have concluded that women may be able to cope in disasters because of their "flexibility" and "adaptability" skills and because the traditional role division in nuclear families better prepares women for disaster (Clason, 1983). An early but still common claim is that both males and females suffer from emotional distress, but females report and express types of psychological upset more than males (Moore & Friedsam, 1959).
Research on race and ethnicity and the psychological impacts of disaster is limited. The work that has been conducted has found important associations. Aptekar (1990) reports that social class and race contribute to differing psychological reactions to the disasters. In a study regarding stress and disaster relocation, J. L. Garrison (1985) reported a correlation between minority status and increased stress levels. In another study of fear associated with earthquakes, it was found that Hispanics, women, and the poor reported the highest levels of fear from the risk of disaster. Shoaf (1998) reported that blacks and Latinos suffered the most emotional injuries in a survey done after the Northridge earthquake. In a follow-up study of the Buffalo Creek dam collapse disaster, 14 years after the event, Green et al. (1990) found that more blacks had delayed PTSD symptoms than whites.

Socioeconomic status may impact emotional vulnerability, yet very little research has been conducted on this topic. The studies that have been done overwhelmingly show that higher-income victims suffer less psychological damage than lower-income victims. Importantly, the psychological impacts could be caused by the poverty, the disaster, or a combination of the two. Yet, no matter if the poverty causes the psychological conditions, the disaster exacerbates the situation. The financial devastation of a disaster creates mental stress (J. L. Garrison, 1985). Higher-income catastrophes are generally viewed as “just a part of the burden,” and lower-income catastrophes are more likely to be financially devastated by the disaster and subsequent relocation than are wealthy middle-class people, thus increasing the likelihood of mental stress. Bolin (1993) found that higher-income victims reported fewer stress symptoms than lower-income victims. Aptekar (1990) states that the working class were embittered by the losses they sustained. Furthermore, if these residents knew they were not going to be compensated for their losses, they are said to have been less likely to resolve psychological issues. Another study found that poorer people and those with larger families are more likely to report emotional problems following a disaster (Bolin & Bolton, 1986). Rossi et al. (1983) agree, finding that those respondents with higher incomes reported fewer feelings of depression after the disaster.

Age also influences impacts, with the young and elderly being the most vulnerable (Bolin & Klenow, 1988). For example, after Hurricane Hugo, children were more impacted than adults, with girls more emotionally affected, while boys experienced some behavioral difficulties, such as attention problems (Shannon, Lonigan, Finch, & Taylor, 1994). Essentially, girls seemed to suffer more from PTSD, while boys acted out more and had increased sleep disturbances. Other studies of Hugo indicated that adolescent females communicated somewhat higher PTSD symptoms than adolescent males (C. Z. Garrison, Weinrich, Hardin, Weinrich, & Wang, 1993).

Economic Impacts

In general, most disasters affect relatively small proportions of communities, and consequently, those communities as a whole tend to bounce back quickly with available forms of assistance (Friese, Caporaso, Goldstein, Lineberry, & McCleary, 1979). There is additional evidence that suggests that, though disasters may be manageable in most events, about 1 in 10 events results in losses that are truly catastrophic (Burby et al., 1991). However, the issue regarding economic impacts is more complicated. For example, the question regarding economic impacts is to be if certain type and magnitude of disaster is anticipated and planned for in a community: If so, the disaster, when it occurs, could have no long-term economic impacts, but if not, larger local economic impacts can be expected (Yezerski & Rubin, 1987). Additionally, economic impacts can vary widely across different subpopulations in a local community, and some are affected proportionately more than others; small businesses, for example, are particularly vulnerable.

Warnings

Warning systems detect impending disaster, give that information to people, and help people to take protective actions prior to a disaster. This definition is simple, but warning systems are complex because they link many specializations and organizations, such as science, engineering, technology, government, news media, and the public. The most effective warning systems integrate the subsystems of “detection of extreme events,” which use knowledge from the natural and physical sciences and engineering; “management of hazards information,” which applies what is known in disciplines like public administration, planning, and political science; and “public response,” which is informed by disciplines like psychology and sociology.
The Character of Public Response

Public response to warnings of disaster involves the interruption of the routine of daily ongoing life. Responses vary by hazard type and involve such things as community evacuation during a hazardous chemical spill, sheltering in-place in case of a rapidly developing nuclear power plant accident, or bolting water heaters to help mitigate the impact of a predicted earthquake. Additionally, during the warning period, people invariably actively seek out further information on their own and in response to getting a warning in order to verify and confirm what they heard. This information search is typically referred to as “warning confirmation” (Drabek & Stephenson, 1971; Mileti & Sorensen, 1990; Quarantelli, 1984). The result can be variation in risk perception about what to do about the warning (Bellamy & Harrison, 1988; Flynn & Chalmers, 1980; Nigg, 1987; Perry, Lindell, & Greene, 1981).

The Warning Response Process

A fairly thorough understanding of public warning response has been developed by social scientists. It is generally understood that public warning response is a process with several stages: (1) hearing the warning, (2) believing the warning is credible, (3) confirming that the threat is genuine and that there are heeding it, (4) personalizing the risk to oneself, (5) determining protective actions is needed and if it is feasible, and (6) deciding what action to take and then taking it (Burby & Perry, 1992; Mileti & Sorensen, 1990). Many research studies exist on the factors that influence the process of public response to disaster warnings. Findings point to two general categories of factors that influence response: the form of the warning information itself and variation in the personal characteristics of the people who receive it. Moreover, some factors are more important in shaping people’s response to warnings than others.

Information Factors

Warning information can play a more important role in influencing public response than the characteristics of the people warned if the information is well-crafted; however, the converse is likely the case when warnings are not well designed. Table 33.1 includes a list of the key warning variables that impact public response.

| Table 33.1 |
| Key Warning Variables That Impact Public Response |
| 1. Credibility of source |
| 2. Consistency |
| 3. Accuracy |
| 4. Clarity |
| 5. Perceived confidence and certainty |
| 6. Clear guidance |
| 7. Frequency |

The channels and mechanisms through which warnings are disseminated also have an impact on public response. Warnings communicated over multiple channels—such as printed and electronic media or personally delivered—enhance people’s understanding, belief, and response (Mikami & Ikeda, 1985; Mileti & Beck, 1975; Rogers, 1963).

Public and Personal Factors

The perceptions that people form in response to warnings and the actions to the warnings also covary with the diverse personal and social characteristics. Table 33.2 lists the important factors that influence response to warnings. It is important to note that the weight of these variables in impacting behavior decreases as the quality of warning information, as described earlier, increases.

In summary, the communication of risk information to the public in warnings is a dynamic process. Seeking additional information and engaging in protective actions is a direct result of the understanding, belief, and personalization of risk that a person comes to possess in the context of receiving a warning. Risk perception is a product of people interacting with risk information and each other. These interactions are directly influenced by the content...
and style of the warning message(s) communicated. Perceptions are simultaneously influenced by the context people are in when the warning is received, as well as by personal psychosocial characteristics.

**PREPAREDNESS AND RESPONSE**

The following sections detail what is known about emergency preparedness and disaster response and the factors that influence them. Preparedness is an important phase in the disaster cycle. Better prepared communities are more able to respond effectively to catastrophic events. In turn, the more effective the response is, the more lives can be saved, injuries can be reduced, and damage and disruptions can be lessened.

**Preparedness**

The purpose of emergency preparedness is to anticipate problems in disasters so that plans can be devised to address the problems effectively and so that the resources needed for an effective response are in place prior to the event. Preparedness may include activities like formulating, testing, and exercising disaster plans; providing training for disaster responders and the general public; and communicating with the public and other about assessing vulnerability and what to do about it. Preparedness activities occur at varied levels including families and households, organizations, communities, states, and at the national level. Factors that influence preparedness at each of these levels are discussed in what follows.

All other things being equal, households of higher socioeconomic status and nonminorities are better prepared than others, but those who do prepare are doing relatively little. “Prepared” households may undertake any of the following activities: purchasing insurance, making structural changes to the home, assembling first aid kits, storing food and water, rearranging furniture, establishing a household disaster plan. According to Cuny (1983), disaster preparation efforts should be primarily geared towards designing and building secure housing because most individuals are injured or killed due to unsafe housing. Unfortunately, however, many people take no action at all. Although some of the factors that affect preparedness are known, there is still no thorough understanding of the social-psychological processes involved in making the decision. In other words, researchers know who prepares, but not why (Miletí & Fitzpatrick, 1993). A good deal is known about how public education can overcome obstacles to foster significant amounts of household preparedness. Less is known about the incentives that will motivate people to increase and sustain preparedness efforts during periods of relative normalcy.

Knowledge about organizational preparedness and the factors that impact it is still lacking. More is known about preparedness among public-sector organizations than the private sector, but what is known is far from comprehensive. Preparedness among local emergency management agencies in the nation has improved significantly, but little is known about fire and police department disaster preparedness. Hospitals and health care organizations are not prepared to advise people or to treat victims of chemical hazards and disasters, and, until recently, private-sector business preparedness was virtually not investigated by researchers (see Miletí, 1994). Research that does exist indicates that private firms are less than enthusiastic about disaster preparedness, even in disaster-prone areas.

Numerous studies have shown that local support for disaster preparedness is low in most communities and that relatively few resources are allocated to disaster preparedness and response. This low priority of disasters tends to occur because disasters are locally infrequent, the benefits are not immediately apparent, responders tend to overgeneralize from experiences with routine emergencies, and nonspecialists tend to either underestimate the magnitude of disaster demands (resulting in unrealistic optimism) or grossly overestimate them (resulting in fatalism).

States possess broad authorities and play a key role in disaster preparedness and response, both supporting local jurisdictions and coordinating with the federal government on a wide range of disaster-related tasks. In light of the important roles that states play in the management of hazards and disasters, the small amount of research that is focused on state-level disaster preparedness activities is surprising. What states do undoubtedly makes a difference at the local level; however, without research that takes an in-depth look at what states and localities are actually doing, researchers can conclude little about their role in the preparedness process.
The picture is scarcely better at the national level. Much of the knowledge in hand about federal government preparedness comes from detailed case studies that either focus on the federal government at a particular point in time or assess changes in federal policies and programs that have taken place over time. It is known that national-level preparedness initiatives tend also to be shaped by dramatic events, such as the Three Mile Island nuclear accident. One key message in the research literature is that federal preparedness is influenced and constrained not only by institutional power differentials but also by the nature of the intergovernmental system itself—the nature of federalism; the complexity of agencies, responsibilities, and legislation; and the difficulty of effective interagency coordination.

RESPONSE

Disaster response activities include the following: emergency sheltering, search and rescue, care of the injured, firefighting, damage assessment, and other emergency measures. Disaster responders must also cope with response-generated demands such as the need for coordination, communications, ongoing situation assessment, and resource mobilization during the emergency period. The response period has been the most studied phase of disasters. In general, response research has a need for the development of frameworks, research designs, and the variables included in analyses range widely across studies, making generalizations difficult. Some research topics, such as emergency sheltering, social solidarity, group emergence, and organizational response have been studied extensively, while others have received little attention.

Research findings associated with the more widely studied response topics are generally consistent. For example, we know that preexisting social inequities, including differences in income and household resources, home ownership, insurance, and access to affordable housing have a significant impact on housing options in the postdisaster response phase. Furthermore, the literature on U.S. disasters consistently shows that social solidarity remains strong in even the most trying of circumstances. Disasters engender prosocial, altruistic, and adaptive responses during the emergency period immediately after a disaster’s impact. Research regarding group emergence during the response phase shows that new groups invariably form during and after disasters (Drabek & Key, 1984), usually in situations characterized by a lack of planning, ambiguity over legitimate authority, exceptionally large disaster search and rescue tasks, a legitimizing social setting, a perceived threat, a supportive social climate, and the availability of certain nonmaterial resources. Political and social inequality may also drive group emergence. Finally, disaster research concerning organizational response has most often looked at the following groups: local emergency management agencies; medical, fire, and police departments; the private sector; and the news media.

FACTORS THAT INFLUENCE PREPAREDNESS AND RESPONSE

Broad social, political, economic, cultural, and institutional contexts shape disaster preparedness and response. At the personal and household levels, ethnic and minority status, gender, language, socioeconomic status, social attachments, and relationships, economic resources, age, and physical capacity, all have an impact on the propensity of people to take preparedness actions, to evacuate, and to take further mitigation measures. In addition, people use a wide variety of decision-making processes, not all rational.

Household preparedness activities are more likely to be undertaken by those who are routinely most attentive to the news media; are more concerned about other types of social and environmental threats; have personally experienced disaster damage; are responsible for the safety of school-age children; are linked with the community through long-term residence, home ownership, or high levels of social involvement; have received some sort of disaster education; and can afford to take the steps necessary to get prepared. For organizations, governments, and people in general, mandates and legal incentives can in some instances induce preparedness, proper response, and other actions. However, there is a wide body of literature that indicates that politicians are often resistant to disaster prevention activities (cf. Burby & French, 1980; Kunreuther et al., 1978; Mader et al., 1980; Turner, Nigg, Paz, & Young, 1980). Disaster planning and prevention can be politically troublesome because, to most politically influential people in most states and local communities, natural hazards problems are not especially serious ones, absolutely and relative to other
problems (Rossi, Wright, & Weber-Burdin, 1982, p. 65). Thus, hazards preparedness efforts often take a back seat to other pressing political matters.

In sum, three clear conclusions can be made regarding preparedness and response. First, effective preparedness and response activities help save lives, reduce injuries, limit property damage, and minimize all sorts of disruptions that disasters cause, and research into preparedness and response has done much to effectively inform us how we can plan for and respond to disasters. Second, the theoretical approach to disaster preparedness and response has changed dramatically over the years. It has moved from a "functional" view of disasters to a much broader one that recognizes the tremendous influence social norms and public perceptions and expectations have on the occurrence, effects of, and recovery from disasters. Finally, a great deal has been learned about who prepares for disasters, but why they do so is still somewhat of a mystery.

**RECOVERY AND RECONSTRUCTION**

While early views of recovery almost exclusively saw it as reconstruction of physical damage, researchers have recently begun to view recovery as a process and an opportunity to address long-term material problems in local institutions and infrastructure. In this light, reconstruction can be seen as a developmental process of reducing vulnerability and enhancing economic capabilities (Anderson & Woodrow, 1989). More specifically, the contemporary perspective is that recovery is not just a physical outcome but a social process that encompasses decision making about restoration and reconstruction activities. Thus, recovery is often driven as much by the human interest to resurrect predisaster patterns of culture and human interaction as by interests in reconstructing purely the physical environment (Militi & Passerini, 1996).

Most research has examined how recovery is affected by a family’s socioeconomic status and other demographic characteristics, position in the life cycle, race or ethnicity, real property losses, employment loss, loss of wage earner(s), the family’s support, and the use of extrafamilial assistance programs. Researchers have found that linkages to extended family are strengthened immediately after disasters, and this lasts well into the recovery phase. Extended kin groups provide assistance to relatives. Socioeconomic status, race, ethnicity, and gender are interrelated in complex and different ways. Ethnic and racial minority groups are typically disproportionately poor and thus disproportionately more vulnerable to disaster and to the negative impacts of long-term recovery. Poorer families have more difficulty recovering from disasters and also have the most trouble acquiring extrafamilial aid.

Businesses have many of the same characteristics as households: They vary in size, income, and age; they are typically housed in structures that are more or less vulnerable; and they differ in the resources they demand and control. Some businesses are less vulnerable to disaster and more capable of recovering. Although businesses play vital community roles, research to date has not documented the effects of business closures on family and community recovery.

There are several components of community recovery, including residential, commercial, industrial, social, and lifelines, and there are various degrees of recovery. Some aspects of community life, such as tax revenue and community revenues, may take years to return to normal. When the fundamental look of the community has been altered, it has been argued that other aspects, such as a sense of community, may not return. Thus, researchers have discovered that communities try to rebuild in forms similar to predisaster patterns and that the resulting continuity and familiarity in postdisaster reconstruction may enhance psychological recovery.

**PLANNING FOR RECOVERY AND RECONSTRUCTION**

With each new disaster, more is learned about how to plan more effectively for recovery and reconstruction. However, this information has yet to be systematically collected or synthesized into a coherent body of knowledge. Perhaps because of this lack of synthesized knowledge, planning for recovery has been minimal in the United States. However, this is changing, largely because of attempts at the federal level to educate and train public officials to cope effectively with recovery in their jurisdictions.

The notion of predisaster planning for postevent recovery is a relatively new and powerful concept. When further researched, developed, tested, and evaluated, such knowledge may help many communities mitigate current hazards before a disaster and recover more quickly and safely afterwards. Predisaster planning is key because planning dramatically
reduces the unintended longer-term consequences of hasty disaster response actions (Mileti & Passerini, 1996). Thus, whereas recovery is characterized by wanting to rapidly return to normal, increase safety, and improve the community, planning must reflect an effort to balance certain ideal objectives with reality.

According to Arnold (1993), to be effective, recovery plans require the following information: (1) the characteristics of the hazards and the geographic areas likely to be impacted; (2) a demographic analysis of the population's size, composition, and distribution; (3) data on the local economy; (4) the resources likely to be available in the postdisaster environment; (5) knowledge of the powers, programs, and responsibilities of local, state, and federal governments; (6) existing land use patterns and building stock location and characteristics; and (7) an inventory of local infrastructure, for example, water, power, communication, and transportation lifelines (p. 7). Finally, recovery involves a process of interaction and decision making among a variety of groups and institutions including households, organizations, businesses, the broader community, and society and thus requires extraordinary flexibility and teamwork.

THE FUTURE OF DISASTER RESEARCH

Rooted in the origins of human ecology at the University of Chicago at the beginning of the last century, disaster research in today's social and behavioral sciences became emeritus in the middle of the last century. Researchers in disciplines such as sociology, geography, psychology, and others have spent decades in pursuit of knowledge that both advanced discipline-specific theories and contributed to practical applications to mitigate future losses, prepare for disaster response, and recover from the impacts of disasters experienced. In the last quarter century, interdisciplinary approaches have been increasingly used to develop more effective approaches and solutions to disaster-related problems. The future of disaster research will likely be closer to Dewey's (1938) holistic and philosophical claims, discussed earlier, than to that which is familiar to contemporary researchers.

Many disaster losses—rather than stemming from unexpected events—are the predictable result of interactions between the physical environment, which includes hazardous events; the social, demographic, and psychological characteristics of the people in communities that experience them; and the buildings, roads, bridges, and other components of the constructed environment. Growing disaster losses result partly from the fact that capital stock is expanding, but they also stem from the fact that all these systems—and their interactions—are becoming more complex with each passing year.

Three main influences are at work. First, the earth's physical systems are constantly changing—witness the current warming of the global climate. Scientists expect a warming climate to produce more dramatic meteorological events such as storms, floods, drought, and extreme temperatures. Second, recent and projected changes in the demographic composition and distribution of the nation's population mean greater exposure to many hazards. The number of people residing in earthquake prone regions and coastal counties subject to hurricanes, for example, is growing rapidly. Weakening inequality of wealth also makes many people more vulnerable to hazards and less able to recover from them. Third, the built environment, including public utilities, transportation systems, communications, and homes and office buildings, is growing in density, making the potential losses from natural forces larger.

Settlement of hazardous areas has also destroyed local ecosystems that could have provided protection from natural perils. The draining of swamps in Florida and the bulldozing of steep hillsides for homes in California, for example, have disrupted natural runoff patterns and magnified flood and landslide hazards. In fact, many mitigation efforts themselves degrade the environment, only contributing to the heightened intensity of the next disaster. For example, levees built to provide flood protection can destroy riparian habitat and increase the magnitude of downstream floods.

Another major problem has become clear over the last several decades: Some efforts to head off damages from natural hazards only postpone them. One case is communities that are built below dams or behind levees may avoid losses from flood that those structures were designed to prevent. However, such communities often have more property to lose when those structures fail, because additional development occurred that counted on protection. Thus, it is important to recognize that it is often difficult to anticipate the long-term impacts for future generations of decisions that are made today. Attempting to plan for disaster in order to lessen the impact is
psychologically and politically difficult, as are all long-range efforts, because the effects and benefits are not immediately apparent.

In conclusion, the future of disaster research will likely be linked to broad issues like these and focus on the link between sustainable development and natural hazards. Although discipline-specific research will undoubtedly continue, as will work into disaster impacts and recovery, a likely future research direction will focus on how to mitigate losses from future disasters in ways that enhance sustainable development. From the viewpoint of disasters, sustainability means that a locality can tolerate—and overcome—damage, diminished productivity, and reduced quality of life from an extreme event without significant outside assistance. To achieve sustainability, communities must take responsibility for choosing where and how development proceeds. Toward that end, each locality evaluates its environmental resources and hazards, chooses future losses that it is willing to bear, and ensures that development and other community actions and policies adhere to those goals. Future disaster research in the social and behavioral sciences will likely shift from their current emphases to ones that explore the human dimensions of how to mitigate impending disaster losses in a sustainable way. Furthermore, future research in the varied disciplines that study hazards and disasters will likely target research on climate-related sustainability dependent variables.

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