Hazards and Disasters

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Introduction

Despite advances in science and engineering and a growing understanding of the societal factors that cause disasters, disaster losses remain high. A recent World Bank report (2010) indicates that disasters resulted in 3.3 million deaths and $2,300 billion US dollars in damage between 1970 and 2008. Additionally, researchers continue to assess how climate change will affect the frequency, intensity, and effects of extreme events such as floods, tropical cyclones, wildfires, and heat waves. What is currently clear is that climate-related sea level rise will amplify the effects of hazards such as hurricane-related storm surges and coastal flooding.

Disasters caused by intentional attacks of terrorism are not new but have received increasing attention in the wake of the 2001 terrorist attacks in the USA and attacks in cities around the world, including Madrid, London, Mumbai, and Oslo. Industrial and information technologies add further to the potential for catastrophic failures—a potential that is amplified when so-called “naturally occurring” disasters trigger technological disasters, as happened in the devastating Japan earthquake and tsunami of March 2011. That event also showed how in an era of globalization, a single disaster can have ramifications not only for the world’s third-largest economy, but also for global economic activity. Indeed, with increasing globalization, it appears that the world has also entered an epoch of global disasters (Alexander 2006). Current trends in worldwide vulnerability, coupled and in interaction with environmental changes, indicate that disasters will cause even greater damage and losses in the future.

The study of hazards, disasters, and risk encompasses topics that can be roughly categorized as focusing on pre-event or “normal”, non-disaster times; disaster impacts and the immediate post-impact response period; and the post-event period, which includes short- and longer-term disaster recovery. Commonly-studied topics in the pre-event context include hazard analysis; disaster loss estimation and vulnerability assessment; risk perception; societal factors affecting the adoption of mitigation measures, or actions undertaken in advance that are intended to reduce disaster damage, such as land-use regulations, building codes, and protective works; and disaster preparedness measures undertaken by societies, communities, households, and organizations. Research on the impact and immediate post-impact period centers on such topics as disaster-induced mortality and morbidity; psychosocial impacts; population displacement; direct physical and economic damage; and disaster responses at various levels of analysis (society, community, organization, household). Post-event studies focus on processes such as reconstruction and recovery planning and financing; differential longer-term effects of disasters on societies, communities, and groups; post-event psychological and psychosocial recovery; and community, household, business, and economic recovery. Cross-cutting themes spanning the hazard-disaster cycle include risk and disaster governance; societal inequities and disparities that are linked to such factors as social class, race, gender, and ethnicity; and disaster resilience. Summaries of sociological research on disasters over time, including many comparative studies, can be found in Mileti, Drabek, and Haas (1975); Quarantelli and Dynes (1977); Drabek, (1986); Tierney, Lindell and Perry (2001); National Research Council (2006); and Rodriguez, Quarantelli and Dynes (2006). In this essay, I first discuss theoretical perspectives in the field of disaster research, and then provide an overview of representative comparative studies on hazards and disasters. I conclude by discussing future directions for comparative hazard and disaster research.

Disaster Theory and Comparative Research

Social science research on hazards and disasters is strongly multi-disciplinary, and this is especially true of cross-national and comparative research. This multi-disciplinarity is evident in the membership of the International Sociological Association’s Research Committee on Disasters (RC 39); membership in other research networks, such as Latin America’s Red de Estudios Sociales en Prevencion de Desastres in America Latina (LA RED); publications in hazard- and disaster-related social science journals; and textbooks on disaster research. Research projects are often carried out by multi-disciplinary teams that include physical scientists and engineers as well as social scientists.
Disciplines other than sociology have thus played a strong role in building the knowledge base on the sociological dimensions of hazards and disasters.

Some studies on hazards and disasters, including comparative ones, are essentially descriptive and not theory-driven. Others incorporate theory, but only implicitly. Most theorizing on hazards and disasters consists of theories of the middle range, or explanations of social phenomena at one or more scales. Examples include theories on risk perception and hazard awareness (Slovic 1987; Krimsky and Golding 1992; Pidgeon, Kasperson, and Slovic 2003; Fischhoff 2006) and on evacuation behavior and other types of self-protective decision making under uncertainty (Mileti and Sorensen 1987; Lindell and Perry 1992; Sorensen 2000). Despite the prominence of middle-range theory, it is possible to identify several general paradigms or theoretical frameworks that have influenced the field over time. I discuss these perspectives in the sections that follow as if they were distinct, even though there are overlaps and commonalities among them.

In the USA, foundational sociological studies were strongly influenced by structural-functionalism and social systems theory. This influence is evident in research pioneer Charles Fritz’s definition of a disaster as (1961, 655)

\[\text{[a]n event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of some of the essential functions of the society is prevented.}\]

Classical systems-oriented research also conceptualized disasters as situations in which the demands faced by social systems exceed their capabilities, leading to system stress and the necessity for adaptation (Barton 1969; Dynes 1970a). For example, when disasters strike, organizational entities undergo changes in their structural features and in the tasks they undertake as a way of coping with increased disaster-generated challenges. System stress leads to other types of adaptive activities, such as the emergence of new social groupings comprised of people in the disaster impact area and those who converge to provide assistance, whose activities are aimed at coping with disaster-related needs (Dynes 1970b; Brouillette and Quarantelli 1971; Stallings and Quarantelli 1985; Drabek and McEntire 2003).

As the original framework that guided US research on disasters, the systems perspective framed disasters as discrete events and also tended to focus research activities on the emergency time period immediately surrounding those events—the pre-disaster warning and post-disaster response periods. It characterized communities as more or less integrated systems that were temporarily thrown off balance by the occurrence of those events and conceptualized disasters as “consensus crises” marked by high community morale in which status differences diminish in importance and deviant behavior becomes less frequent. More recent research has challenged the event-based conceptualization of disaster in favor of more process- and historically-oriented approaches and has also questioned the accuracy of characterizing response-related behaviors as harmonious and conflict free (Tierney 2007).

Other approaches retained systems imagery while dropping ideas about harmony and consensus. The socio-political ecology perspective views societies and communities not as unitary systems but rather as “systems-of-systems” that are made up of loosely-coupled and heterogeneous elements. Systems are characterized by resource and power differences among groups and by competing or conflicting interests based on those differences. According to this view, disasters do not eliminate these pre-existing conditions and may even exacerbate them. What is functional or adaptive for some groups and interests, both during non-disaster times and in the disaster context, may be less so, or even harmful, for others. For example, research conducted following Hurricane Andrew by Peacock and his collaborators (Peacock, Morrow, and Gladwin 1997) emphasized the ways in which differences in hurricane damages, losses, experiences, and recovery outcomes were shaped by pre-disaster household, group, and community positions in the social and political structure of the affected area. In this work, the classical image of the disaster-stricken community as cohesive because its members share a common fate is replaced by a view of the community as potentially fragmented because its members’ fates are heavily influenced by pre-disaster inequalities associated with race, ethnicity, class, citizenship, gender, and political power.

Other research draws upon insights from development studies, vulnerability science, and political economy and world-systems theories. Regarding