

obvious relevance for California, the 1985 Mexico City earthquake helped mobilize support and neutralize opposition for both statewide and municipal earthquake hazard mitigation measures in California. At the state level, Senate Bill 547, requiring local jurisdictions to prepare inventories of a particular class of hazardous buildings and to adopt at least a minimal mitigation program, was finally passed in the legislature, although it had been defeated on several previous occasions. In Los Angeles, the timetable for requiring landlords' compliance with the local hazardous building ordinance (which was originally quite permissive, to lessen the economic impact of the ordinance on building owners) was shortened. The occurrence of a disaster may also prompt modest moves in the direction of mitigation as a way of heading off other interventions that powerful interests fear. Finally, disaster experience may trigger discussions and controversies within the elite.

This is not an argument that capitalist economic forces are the sole explanatory factor in risk-production and hazard mitigation. Some writers, such as Winner (1977; 1986) focus more on the role of industrialization and high technology than on the role of the economy in producing environmental crises. Other factors must be taken into consideration in explaining how social structure affects hazard mitigation. This is obviously an area in which more cross-cultural, comparative, and historical studies are needed.

It would also be incorrect to argue that capitalist institutions always act to create risk and undermine mitigation. McCaffrey (1982) has shown that regulation can be consistent with the interests of some economic power-holders, and the same can be said for hazard mitigation. For example, mitigation activities generate profits from some of the parties involved. Hazardous material and hazardous waste clean-up, an enormous industry in the U.S., is a case in point. Earthquake hazard mitigation generates income for structural engineers, geologists, soils engineers, and contractors that specialize in seismic retrofitting procedures. Technologies such as base isolation promise to be quite profitable. The private sector is also paying increasing attention to hazard mitigation as a way of protecting profits by avoiding disaster losses (including potential liability) and staying competitive in the post-disaster environment. In some cases, hazard mitigation is consistent with the promotion of economic growth and consequently is given more support. In the city of Santa Rosa, California, following two earthquakes in October, 1969, the seismic retrofitting of commercial buildings be-

came an element in an urban redevelopment strategy that had the support of the local power structure (Mader, Spangle, and Blair 1980). Santa Ana, California is another community in which hazardous building and redevelopment programs were linked. Alesch and Petak (1986) argue that the seismic safety ordinance would never have been enacted if that were not the case.

It is also useful to contrast Los Angeles with San Francisco and other Earthquake-prone cities in this regard. In Los Angeles (which, not incidentally, experienced a damaging earthquake in 1971, the San Fernando Valley earthquake), some branches of the local elite support the city's hazardous building ordinance, or at least do not actively oppose it. These groups include large-scale developers and the owners of new high-rise buildings. New buildings are, of course, more earthquake-resistant than many older buildings, so these groups lose nothing by supporting the retrofitting or removal of unreinforced masonry buildings. (Indeed, demolition frees up land for new development, which some see as a positive thing.) The owners of the unreinforced masonry buildings, historic preservationists, and slow growth advocates are among the groups that oppose the Los Angeles ordinance. None of these groups has as much clout as the big developers. Los Angeles might thus be considered an example of successful seismic hazard mitigation--a community in which hazard reduction and urban development coexist to some degree. However, Los Angeles is atypical, and even there it took ten years to get the seismic ordinance passes. In contrast, in San Francisco, mitigating hazards associated with old buildings is an extremely unpopular issue that has little support from any branch of the local elite. The same general pattern can be seen in other large cities in earthquake-prone areas. Moreover, outside California, with the possible exception of Seattle, even the structural engineering community, which would appear to be a natural constituency for mitigation programs, has little interest in unsafe buildings as a political issue.

Critics may argue that my position ignores the fact that disasters have occurred throughout history and strike societies irrespective of their mode of economic organization. However, while people have always been killed and injured and communities have always suffered devastation because of natural calamities, both the scale and the underlying causes of disaster losses are different in the modern world. The inexorable drive for growth and expansion that characterizes modern capitalist economies has introduced the potential for truly catastrophic

technological crises. It has also greatly increased the potential for losses and societal disruption resulting from natural disaster agents. Such effects are most obvious and their consequences are most severe in the Third World, but the general principle is equally applicable to developed societies. And the fact that major disasters occur in nominally socialist countries like the Soviet Union and China does not make a political economy perspective any less valid.

ORGANIZATIONS, RISK, AND MITIGATION

A second way social scientists can improve hazard mitigation research is by concentrating more on the role of organizations and networks in choosing among risks and in formulating hazard management policies. Unlike studies in the disaster response area, which historically have concentrated a good deal on organizations, mitigation research has tended to focus either on communities or, more frequently, on how individuals (either community residents or members of various elites) view different mitigation strategies. One consequence of the latter emphasis is the seeming endorsement of the idea that support for and adoption of mitigation strategies are a matter of individual choice. However, as Clarke (1985; 1988; 1989) demonstrates convincingly, many decisions about risk--which naturally entail decisions about mitigation--are made by organizations. Risks that are imposed on others (which is more accurate than saying they are "assumed") are often, in the final analysis, those that are defined as acceptable by organizations based on organizational priorities. For example, some of my academic colleagues in California go to work daily in structures that are widely acknowledged to present a life-safety hazard in earthquakes, thus, facing an involuntary risk, because their institutions have made a decision not to mitigate that hazard. As Drabek (1986a) suggests, whether households in areas of high seismic risk will purchase earthquake insurance in the future or go uninsured will likely hinge more on decisions made in the insurance industry and in government than on decisions made in those households.

Actions taken by organizations in areas not directly related to hazards can obviously have implication for increasing or mitigating risks. For example, garment manufacturers operating illegal sweatshops in downtown Los Angeles are in business to make money. It is not likely that they take into account the life-safety hazard their code violating enterprises pose to their largely immigrant, exploited work force in the

event of an earthquake or fire, and most of those workers probably never give a thought to the risk they have been forced to assume in order to make a living. Vulnerability to the earthquake hazard is in part an outcome of the economic constraints under which those businesses and workers operate.

Focusing on individual opinions and preferences and neglecting the organizational dimension presents a very one-sided perspective on mitigation-related issues. As a corrective, we need to focus increasingly on "how hierarchies allocate resources toward and away from risks" (Clarke 1988, p. 25). Whether seen as conduits through which the political economy operates, or as autonomous actors (which is how Clarke see them), organizations are a crucial area of emphasis for studies of hazard mitigation.

It is very easy to recognize the key role played by organizations in some disasters. We are immediately led to inquire into the dynamics of decision-making by a Union Carbide or a Hooker Chemical Company that contributed to subsequent catastrophes, because the impact of organizational decisions is so obvious. However, the role of organizations in producing and allocating risks associated with many other hazards can be much more subtle and can go unacknowledged. As the discussions above suggest, some of the other kinds of organizations and networks that I believe warrant particular attention include banking, savings and loan, and other financial institutions; the insurance and reinsurance industries; construction, development, and real estate groups; professional associations; public regulatory, enforcement, and emergency management agencies; advocacy and social movement organizations; and private firms specializing in risk-reduction technologies.

Studying organizations and interorganizational networks has increased our understanding of policy development (Knoke and Laumann 1982; Laumann, Knoke, and Kim 1985). Candidates from social problem designation must compete to get on the public agenda, and so must different approaches to framing and solving those problems. Choices are hammered out in "public arenas," which consist of organizational actors and which are typically dominated by economic and political interests (Hilgartner and Bosk 1988). Emphasizing the organizational dimension in studies of hazard mitigation policy might improve research on how mitigation options are devised, adopted, and implemented. Hazards are

one type of social problem "candidate;" they are subject to the ebb and flow of public and elite interest, and many alternative strategies, including various mitigation approaches, are available to deal with them. Choices among hazard management policies can be seen as the outcome of competition and negotiation among those organizations in the public arena that have vested interests in different policy outcomes. Understanding the composition and dynamics of the hazard management arena might help us understand why it is that mitigation is downplayed or highlighted as a strategy, or why, among various mitigation strategies that could be undertaken, certain approaches receive most of the attention and support.

CONCLUSIONS

The central idea of this paper is that the study of disaster and hazard mitigation needs to move beyond the single and comparative case studies, the focus on individual hazards and mitigation strategies, and the *ad hoc* theorizing that have tended to characterize past work. More comprehensive perspectives are needed, and I have tried to suggest directions in which future work ought to proceed. In a recent paper, Thomas Drabek (1986b) contrasts two approaches to disasters, which he terms the "event-focused" and the "social problems" perspectives. He argues that by adopting the latter approach, researchers are beginning to place disaster events in a wider social context, "a context of ongoing social processes whereby some individuals enter into locations of greater risk--at times knowingly and voluntarily, and at times unwittingly" (1986b, p. 38).

Political economy perspectives seem particularly well-suited for bringing to light those linkages between broader social processes and disasters that are alluded to by Drabek. Although disaster and hazards research, like most social science in the U.S., has eschewed explanatory frameworks based on conflict models of society, such models may have considerable explanatory power not only for the study of mitigation but also for a broad range of disaster-related topics.

Research on hazard mitigation has also tended to take either individuals or entire communities as units of analysis. The public opinion/public choice paradigm that has driven much of the empirical research on hazard mitigation has led researchers to neglect the key role organizations play in placing people and property at risk. We can

improve our understanding of mitigation processes and outcomes by focusing more on studying how groups and organizations allocate risks, contribute to the framing of hazard-related issues, and influence the formulation of mitigation policies.

Future research on these topics should be comparative, in several senses. We need much more cross-national, cross-cultural, and historical research, which will increase the number of cases available for study and provide needed variation on such key dimensions as type of economy, form of government organization, and magnitude of disaster impacts. We also need to focus, not only on disasters--that is, on events involving risk-production without mitigation--but also in cases in which efforts to reduce hazards appear to have succeeded despite constraints. The range of agents, impact ratios, mitigations, and types of societies studied to date has been too narrow to yield solid findings.

Examining hazard mitigation from the perspectives discussed here has several advantages. It links research on hazards and disasters to more general studies of social structure and processes, focusing on classical sociological topics such as the distribution of power and wealth and the mediating role played by organizations in society. It demonstrates what disasters have in common with other phenomena, such as environmental and health problems, that tend to be treated as distinct. It also requires us to question many common assumptions about disasters, including those concerning the concept of disaster itself, the usefulness of distinction between natural and technological disasters, and the reasons why hazard-related issues tend to have such a low societal priority. In short, it can lead to the kind of thoughtful reexamination of the field that results in improvements in scholarship.

NOTES

1. The edited volume on hazardous technologies by Kates, Hohenemser, and Kasperson (1985) focuses mainly on specifying the dimensions of such hazards, not on their mitigation. Perrow's *Normal Accidents* (1984) and Shrivastava's *Bhopal: Anatomy of a Crisis* (1987), both of which deal with acute technological incidents, discuss mitigation, but that is not their main focus. Some recent work on Bhopal, such as Bowander, Kasperson, and Kasperson (1985), has begun to address the topic more directly.

2. There is perhaps one sense in which the mitigation options are more varied for technological hazards than for natural disaster agents, since a decision can be made to cease using a particular technology, thus reducing to zero the risk of failures involving that technology.
3. According to Mileti's typology, adjustments involve decisions to: (1) choose or change locations (e.g., abandonment of a site, land-use planning); (2) reduce losses (building codes); or (3) redistribute losses (insurance). Adjustments may be purposeful--that is, intended to reduce the hazard; incidental byproducts of decisions not related to hazards; or completely unwitting and unforeseen consequences of general trends, such as changes in human settlement or population demographics.
4. Interestingly, however, Mittler (1989), reanalyzing the data reported on in Rossi, Wright, and Weber-burdin (1982), found that both the salience of hazards and the perceived seriousness of nonhazard problems are unrelated to support for nonstructural hazard mitigation measures by political influentials.
5. Based on their study of the formulation of hazardous building ordinances in California, for example, Alesch and Petak state the following principles:

Windows of opportunity are essential for hazard mitigation policy to be enacted. Windows can be pried open with enormous, continuing effort, but they open automatically in the event of a low-probability/high-consequence event that demands community attention because of geographic proximity or other reasons...a credible forecast or foreshadowing of the event will frequently open the window at least a crack... Most hazard mitigation policies are enacted in the period immediately following a low-probability/high consequence event (1986, Pp. 225-226).

6. My position on "disasters as events" has been shaped by Hewitt's (1983) argument that disaster impacts should be seen as intrinsic features of the societies in which they occur and as characteristic of, not separate from, ongoing social life. In his discussion of the work of some social geographers, Drabek observes that (1986b, p. 9)

...most sociologists have given minimal attention to both issues of hazard mitigation and problem definition. We have failed to ask...what institutional processes operate to place some at greater risk than others.

Such topics deserve a much more central position in the field than they have received so far.

7. E.L. Quarantelli frequently points out that it is important to distinguish the conditions (and sometimes the contexts as well) that give rise to an event or occurrence; the characteristics of the phenomenon; and its consequences.
8. Since the purpose of this paper is heuristic, I am keeping the discussion of political economy approaches broad and general, glossing over what are really two distinct perspectives. The first, a "world systems" perspective, sees hazards as produced in part by the operation of the capitalist world system and mitigation options as circumscribed by worldwide processes. The second, a "class" perspective, argues that, within societies and communities, hazards and hazard mitigation policies must be seen in the context of relations within and between classes. To gain a clear understanding of a particular hazard situation, both perspectives are needed.
9. Shrivastava (1987), who refers to the community of Bhopal as "textbook example" of the impact of Western development on Third World, provides a detailed description of the economic, political, and ecological sources of the 1984 tragedy. These conditions include: rapid industrialization accompanied by an absence of rural development, which caused poor, unemployed, uneducated peasants to migrate to the city; a population increase in the previous twenty years that was three times the national rate; the growth of squatter settlements near the plant—partly a consequence of government's efforts to concentrate on building expensive dwellings, rather than low-cost housing for poor people; and government's inability to regulate growth and control land use. Shrivastava points out that Bhopal was not an exceptional community, except that its resources and industrial infrastructure were in many ways **better** than those of other communities in the state of Madhy Pradesh.