# IMPROVING THEORY AND RESEARCH ON HAZARD MITIGATION: POLITICAL ECONOMY AND ORGANIZATIONAL PERSPECTIVES*

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## INTRODUCTION

Hazard mitigation is typically defined as "policies and actions taken before an event which are intended to minimize the extent of damage and injury when an event does occur" (Drabek, Mushkatel, and Kilijanek 1983, p. 12). Of the four key disaster phases or management tasks (mitigation, preparedness, response, and recovery), mitigation has been studied the least (Drabek 1986a) and is probably the least well understood.

This paper opens with a discussion of the progress that has been made to date in research and theory on mitigation. It goes on to suggest approaches that, by addressing neglected aspects of mitigation-related issues, may improve our understanding of the topic. Woven through the paper are calls for several shifts in emphasis with respect to studies on mitigation: (1) from a social system, consensus model to a conflict model on society and community; (2) from an event-based, discontinuous concept of disaster and mitigation to a view that stresses the continuity between ongoing social life and the disruption occasioned by natural and technological agents; (3) from the study of the social consequences of

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disasters to the study of aspects of the social order that increase risk and lead to disasters; and (4) from an individualistic, social psychological approach to mitigation to a perspective that takes into account macro-level social phenomena.

## CONCEPTUALIZATION, RESEARCH, AND THEORY

### The Concept of Mitigation

As with so many other terms in the lexicon of disaster and hazards research, the degree of consensus on the referent of the term is low. Commonly-studied mitigation measures include land-use planning, zoning regulations, hazard insurance, and building codes, but classifications vary widely. Godschalk and Bower (1985), for example, identify several approaches to mitigation that are available to governmental units; plans; regulations, such as zoning ordinances and subdivision regulations; building codes; public health regulations; public facility programs, such as sitting and design requirements and capital improvement plans; land acquisition policies; and preferential taxation. Many writers (see, for example, Rossi, Wright, and Weber-Burdin 1982) make a distinction between structural mitigation projects, such as dams and seawalls, and nonstructural measures. Researchers such as Drabek, et al. (1983) take a very broad perspective, viewing such activities as warning and prediction efforts, encouraging the adoption of hazard insurance, and post-event analyses as elements in mitigation. Kasperson, Kates, and Hohenemser (1985) use the term "risk reduction" to describe activities that most other researchers would call mitigation and apply the term "risk mitigation" to measures that modify the consequences of disastrous events after they occur, such as medical care and family assistance. Although the concept is most often used to refer to actions taken with reference to future events, both hazard management practice and some research (e.g., Rubin and Barbee 1985) associate mitigation more closely with post-impact recovery.

### Empirical Research

Mitigation activities can be studied at all levels of analysis: individual, household, organization, community, and society. However, empirical studies have tended to focus on the community level. Households have been a secondary emphasis; most such studies attempt to identify factors associated with mitigation decisions (see, for example, Turner, Nigg, and

Paz 1986). Floods and earthquakes, costly hazards that have been the focus of Federal programs and research initiatives, have received the most emphasis in the literature.

In the past ten years, much new research has been done on technological hazards, but very little of it focuses on the mitigation of acute (as opposed to chronic) technological agents.[1] The mitigation of technological hazards involves the same kinds of strategies as those that are applied to natural hazards, e.g., regulations on the sitting of facilities and construction codes and standards.[2] It is likely that more can be learned about mitigation by considering the entire range of disaster agents than by making distinctions among types of agents.

The literature on mitigation can be divided (somewhat arbitrarily) into three major areas:

1. *Studies on public perception of mitigation measures.* Examples include the work of Rossi, Wright, and Weber-Burdin (1982) and of Mittler (1989) on political influentials' attitudes towards hazard mitigations; research by Turner, Nigg, and Paz (1986) on the views and practices of individuals with respect to mitigation; and the research by Kunreuther and his associates (1978) on hazard insurance.

2. *Research on agenda-setting, adoption, and the implementation of hazard mitigation measures.* Representative studies in this area include Alesch and Petak's (1986) study of earthquake hazard reduction ordinances; the study by Hutton, Mileti, Lord, and Sorensen (1979) on flood plain land-use regulations; Frey's (1983) work on the adoption of National Flood Insurance programs by communities; and studies by Wyner and Mann (1983) and Wyner (1984) on the implementation of seismic safety policy in California; and by Drabek et al. (1983) on earthquake hazard mitigation in Washington and Missouri.

3. *Studies assessing the impact of hazard mitigation measures.* Examples include research by Palm (1981) on the impact of Special Studies Zone legislation in California; Burby and French (1980) on the impact of the National Flood Insurance Program; and Burby, Bollens, Holway, Kaiser, Mullan, and Sheaffer (1988) on the effect of flood plain land-use management strategies.

## Theoretical Perspectives and Empirical Findings

Even more so than the field as a whole, at present the study of mitigation lacks a theoretical focus. (Bogard 1988), although as I shall discuss later, several explanatory frameworks have been suggested. The area has not been among the more theoretically sophisticated in the field, for several reasons. Mitigation is a relatively new topic for research, and the studies that have been conducted have tended to be single- or multiple-case studies focusing either on specific types of mitigations (e.g., Kunreuter, 1978, on insurance) or on approaches to mitigating specific disaster agents (e.g., National Science Foundation 1980, on floods). This discourages broad theorizing.

To a greater degree than the three other categories of responses to hazards and disasters, mitigation is perceived as having a strong political component, because politics frequently enter in, particularly at the local level, when mitigation options are proposed. Consequently, research on hazard mitigation increasingly has become the bailiwick of "policy studies," a group of disciplines that has itself only recently begun systematic theory development. Without minimizing the very important insights they offer, it is only fair to say that the vast bulk of the writings in policy studies rely at best on conceptual frameworks and empirical generalizations, not on middle range or general theories.

Additionally, and perhaps obviously, the development of a theoretical approach (or set of approaches) to hazard mitigation lags behind because the broader field of disaster and hazards research is still in the process of grappling with basic theoretical and conceptual issues (Quarantelli 1985; Drabek 1986b). If we had what Kreps (1986) refers to as a "paradigm of disaster and hazards research," studies on mitigation would likely find their own niche. Finally, as I will discuss in more detail later, our ability to address the topic of mitigation creatively may have been hampered by our willingness to assume too much about the hazard mitigation process and our reluctance to look critically at the social dynamics that create hazards and narrow the opportunities to mitigate them.

## The Open Systems Approach

The general approach underlying most work on mitigation is an open-system or equilibrium perspective "that stresses the reactive character of social mitigation in bringing hazardous situations back to

'normal'" (Bogard 1988, p. 148). The most explicit and detailed examples of this approach can be found in the work of Gilbert White (White 1974; White and Haas 1975) and others (e.g., Mileti, Drabek, and Haas 1975) who see societies and communities primarily as human systems that develop ways of responding to disruption.

Using this general framework, Dennis Mileti (1980) developed a typology of adjustments, many of which are mitigation strategies, but some of which involve preparedness and response.[3] On the basis of an extensive review of the literature, he went on to construct a general multivariate model to explain how these risk-mitigating adjustments are selected. The model incorporates three categories of variables: (1) factors related to the perception of risk (e.g., ideas about disaster causation, experience with the hazard); (2) characteristics of the social structure of the affected unit (e.g., capacity to implement policy, as determined by social structural factors); (3) the incentives and disincentives that operate between different levels in the social structure (e.g., economic and regulatory power). This conceptual framework, the most comprehensive and systematic developed to date, has not been tested (and may be so complex as to be untestable).

**Other Representatives Studies**

Unlike Mileti, most researchers have worked at a much lower level of abstraction, focusing on narrower topics. Attempting to explain policy adoption, Olson and Nilson (1982) suggest that Lowi's (1972) notion that different types of policies lead to different political styles, each with its own problems, is applicable to the problem of hazard mitigation. In their view, the key to understanding why some mitigation measures are difficult to institute and implement lies in understanding the types of political conflicts to which they give rise. Their perspective, thus, attempts to relate the study of hazard mitigation measures to a more general analytic framework on public policy. However, this approach also lacks empirical support and has been criticized as presenting an inaccurate conceptualization of policy (see Drabek, Mushkatel, and Kilijanek 1983, Pp. 49-51 for a discussion).

Some studies have attempted to apply frameworks developed to explain political agenda-setting to the hazard mitigation process. Mittler (1988) used Kingdon's (1984) formulation to explain the adoption of state-level hurricane and flood mitigation measures. Kingdon's ap-

proach emphasizes the technical feasibility of the measures that are advocated, the political acceptability of those measures, and the ability to foresee and avoid possible constraints as factors encouraging policy adoption.

Alesch and Petak (1986) employ the "garbage can" model of organizational decision-making developed by Cohen, March, and Olsen (1972) and March and Olsen (1976) to explain the adoption of earthquake hazard mitigation programs at the local level. This perspective sees decisions as the result of the confluence of four activity "streams;" problems, solutions, participants, and opportunities for choice. Generalizing from case studies, the authors show how advocate groups (participants) such as political figures and structural engineers, knowledge of the technological, legal, cost, and strategic aspects of mitigation (solutions) succeeded in getting the hazardous building problem on the political agenda. The occurrence of earthquakes provided significant opportunities for choice, resulting in legislation. In a study that concerns technological hazards, Clarke (1989) uses the garbage can perspective to describe and explain the mitigative actions taken by responding organizations following an episode of PCB contamination.

In a very different type of analysis, Frey (1983) takes the position that the initial adoption by local communities of Federal policies, of which the National Flood Insurance Program is an example, can be explained by the more general concept of structural congruence. Frey's reasoning is that policies have distinctive sets of attributes that can be better handled or coped with by governmental units that have complementary characteristics. Communities that adopted the NFIP did so because their structural characteristics (a high degree of structural differentiation or diversity, a less "fluid," more closed social structure, and high Federal government involvement) provided a context that was receptive to that program, which was operationally complex, nonredistributive, and Federally initiated. Frey's perspective, which emphasizes structure, contrasts with the agenda-setting and garbage can approaches, which tend to focus more on the processes through which mitigations are adopted or defeated.

Some perspectives stress the importance of various kinds of resources, such as leadership skills and control of information, in supporting mitigation. Rubin and Barbee (1985), who conducted comparative case studies to identify factors that encourage adoption of mitigation policies

at the local level, place considerable emphasis on resources such as leadership skills, political astuteness, and specialized knowledge about the problems associated with the hazard in question. Wyner (1984), studying the implementation of seismic safety policy in California, also stresses the significance of commitment by key governmental personnel.

Other researchers argue that the key to understanding hazard mitigation processes and outcomes lies in the nature of intergovernmental relations in U.S. society. Mushkatel and Weschler (1985), for example, believe that recent trends have complicated the development and implementation of emergency management policies, including those concerned with mitigation. These changes include the return of responsibility for governmental programs to states and local communities, at the same time those local units have become constrained in their ability to obtain revenues; the structural diversity of emergency management programs nationwide; and the limited capacity of states and local jurisdictions to mount effective programs.

**General Observations On Mitigation**

Regardless of the perspective taken, there are three themes that pervade the literature on disaster mitigation. First, perceived risk and level of mitigation effort are at best loosely coupled. This lack of correspondence is explained in various ways. At the individual level, failure to mitigate is seen as arising from such factors as lack of economic capability, inadequate knowledge and understanding of the available options, and perceptual biases that lead the individual to discount the hazard. At the community level, the difficulties inherent in promoting hazard mitigation programs, even in cases where the risk is obvious, tend to be seen as results of the low salience of disaster-related policies and the activities of opponents of mitigation.[4] The mitigation programs that succeed are those that are well-timed (see discussions below on critical events) and that have the backing of "champions" or "policy entrepreneurs" who mobilize support, help overcome opposition, and keep the idea of mitigation alive over time. Elected and appointed officials, scientists, and members of professional groups (e.g., engineering groups, associations of building officials) are among those who advocate for hazard reduction.

A second theme is that the very nature of the problems they are attempting to address makes mitigation programs difficult to promote.

Mitigation measures are hard to sell because they tend to be very technical. Solutions can require specialized expertise; some issues related to implementation cannot be addressed adequately from a cost standpoint; and explaining problems and solutions to legislators and the general public is often difficult. Seismic safety policies are "intractable" (Wyner 1984), in part, because they present technical difficulties. Alesch and Petak (1986) and Rubin and Barbee (1985) also argue that the implementation of hazard mitigation programs has been encouraged in those cases where economical technical solutions have been advanced and where local officials have an adequate grasp of technical issues.

The third major theme involves the positive role played by critical events in the adoption and implementation of hazard mitigation programs. At the community level, researchers find that a disaster or some other event that highlights the hazard often serves as a stimulus that places hazard mitigation on the political agenda and helps get programs established. Without a disaster to provide a "window of opportunity," hazard mitigation is likely to be neglected.[5]

## WEAKNESSES IN THE LITERATURE

At present the field is characterized by broad open-systems theorizing, the use of middle-range theories and conceptual frameworks derived primarily from the sociology of organizations and from policy studies, and sets of generalizations based on diverse empirical studies. Explanatory frameworks have been developed post hoc, and there has been a tendency to study "mitigations"--that is, individual measures or programs--rather than the general topic of "mitigation." Both the theoretical and the empirical dimensions of research on hazard and disaster mitigation need to be strengthened.

We might be able to improve scholarship in the mitigation area considerably by taking two steps. First, we need to look beyond and question many of our taken-for-granted assumptions about mitigation. Much of the generalizing that is done about hazard mitigation and, more to the point, the failure to mitigate, substitutes truisms for a real understanding and explanation of the phenomena of interest. To reiterate some earlier examples, the literature argues that hazard mitigation (like emergency preparedness, but more so) "lack salience;" that one of the problems with getting mitigation programs accepted is that they frequently depend on the resolution of complex technical issues; that

problems related to hazard mitigation are intractable; and that hazard mitigation falters because it is too difficult to mobilize political support. However, such statements, while accurate at one level, offer descriptions, not explanations, and indeed beg the question. What determines the salience of an issue, and how important is salience in determining what programs move forward? The fact that technical solutions in some areas of endeavor (like splitting the atom, putting human beings in space, or exploring superconductivity) are pursued energetically, while others are neglected, should lead us to ask why. Policies such as the Star Wars program receive enormous political and economic support despite the fact that they involve massive (some say insurmountable) technical difficulties. In what sense is hazard mitigation any more intractable than any number of other problems societies and communities attempt to address? Very complicated problems such as racial discrimination and poverty have been the focus of considerable programmatic effort, so why not hazards?

Some researchers would answer that hazard-related issues face an uphill fight to get on the political agenda because they involve "low probability/high consequence" events. However, as Perrow (1984) illustrates in his discussion of nuclear power, assessments of the probability of disastrous events are themselves social constructions; we frequently know less than we claim about those probabilities. Probability of occurrence is also dependent on the unit of analysis adopted (Rossi, et al. 1983). An earthquake is a low probability event from Santa Barbara's standpoint, but not from California's. Hazard assessments are not objective, but rather are shaped by social forces. The study of mitigation must involve learning more about the social construction of hazard estimates as well as about the factors that affect the salience of hazard-related programs.

Second, social scientists must develop theoretical and conceptual frameworks that (1) help overcome the fragmentation that has resulted from focusing on individual hazards and single mitigation strategies; (2) show what hazards and disasters have in common with other social issues; and (3) avoid seeing mitigation in purely mechanistic sense--that is, as a repertoire of adjustments to specific future events.

In seeking such explanations, we are likely to profit most by using frameworks that recognize that the risks themselves, the social construction of the problems associated with natural and technological disasters,

and the solutions devised to deal with these problems (including mitigation), are all related to social structure, ongoing social processes, and institutional pressures. Both the causes and the consequences of disaster are social (Kreps 1984), and in the words of Quarantelli (1987, p. 23), we need a perspective that, rather than seeing disasters as external events that impinge upon social units, "sets disasters within the social dynamics of social life, an integral part of what usually goes on in the social structure." In the remaining sections of this paper, I will discuss two general approaches that could make a contribution in that direction: (1) political economy perspectives; and (2) studies on the role of organizations and interorganizational networks in the processes or risk-allocation and social problem definition.

## POLITICAL ECONOMY, RISK-PRODUCTION, AND HAZARD MITIGATION

Instead of conceptualizing mitigation as an adjustment to some future, externally-generated disaster event, the key to understanding mitigation may well be found in understanding how disaster-related risks are created and socially distributed in the first place.[6] Disasters are the result of social processes that expose people and property to hazardous agents, reduce or neglect protection against exposure ("mitigation"), and sometimes even create the agents themselves, as is the case with hazards related to technology. Scholars have always argued that disasters and hazards have a social dimension; disasters have never been equated purely with physical events. However, compared with the volume of work on the social **consequences** of disaster events, relatively little emphasis has been placed on the social **conditions** that set the stage for the occurrence of disaster--conditions that also have a bearing on mitigation activities.[7]

Moreover, as Buttel (1976, p. 309) has noted with respect to environmental problems in general, and as my earlier brief review suggests, researchers' views on the contribution of society to hazards and disasters have reflected overwhelmingly the "relative dominance of the order-pluralist-functionalist paradigm." This had led to a corresponding neglect of the role of economics and power in risk-production and allocation--that is, to worldwide and societal political/economic processes that, when taken into consideration, shed a great deal of light on the creation of hazards, and therefore on hazard mitigation and its failures.

Recent social science scholarship suggests several new directions for inquiry. The first topic of obvious relevance is the role of the economic structure of the world system and of society in producing hazards and making disasters more likely.[8] Comparing societies, Third World disaster losses cannot be explained solely by the fact that disaster events are more frequent in the countries in question or by the fact that such nations typically have inadequate infrastructures and emergency management systems. Rather, as Susman, O'Keefe, and Wisner argue (1983), these societies are vulnerable to environmental extremes and technological accidents because they are dependent and marginal in the capitalist world system.

Capitalist institutions contributed to chronic and acute technological hazards in Cubatao, Brazil and to the Bhopal disaster, not primarily because private industry was involved in both cases, but more significantly because the dependency of the residents of those communities on industry was typical of the processes that occur in "underdeveloped" societies.[9] The 1984 PEMEX explosion near Mexico City was such a massive disaster precisely because, like the Union Carbide plant in Bhopal, the facility acted as a magnet for displaced peasants desperate for work in an industrializing economy. Even within the underdeveloped world, some societies are more vulnerable than others. Among developing countries in Africa and Latin America for example, disaster-related fatalities are highest in those nations whose regimes espouse a "corporatist" ideology that favors Western-style industrial development over public welfare (Seitz and Davis 1984).

Pressure from economic interests and the virtually irresistible forces of growth are a taken-for-granted fact of life in capitalist societies. Cities are "growth machines" (Molotch 1976) that work very hard to attract capital so as to benefit local elites. Although forces are beginning to emerge in opposition to the notion that unbridled development is always desirable (Molotch and Logan 1984), corporate capital, real estate, and banking interests still wield enormous political power, particularly at the local level.

The intense pro-growth orientation that characterizes capitalistic societies has been identified as a factor in the burgeoning environmental problems of the U.S. (Anderson 1976; Buttel 1976; Schnaiberg 1980). Just as they play a role in degrading the environment, growth pressures also set the stage for future disasters and help to undermine mitigation.

Particularly in high-growth regions of the country such as Southern California, the political power of major economic interests is very difficult to resist. Actions taken on behalf of groups with economic power to enhance returns on their investments often result in significantly increased disaster vulnerability for some geographic areas and segments of the population.

Economic elites and pro-development interest groups are typically key actors in opposing hazard mitigation measures when they are proposed and in weakening those measures that are instituted. For example, the power of the owners of old, unreinforced masonry buildings has been a major factor impeding the adoption of programs to abate the hazards associated with those structures, which bring a very high rate of return for investors (Olson 1985; Alesch and Petak 1986). Land-use legislation to reduce seismic hazards has been opposed and watered down by pro-development interests, in order to protect short-term profits at all costs. For example, in her study evaluating the impact of California's Special Studies Zone legislation, which was designed to halt large-scale development along active fault traces, Palm concludes (1988, p. 230):

> What we have seen in Southern California is the overwhelming influence of the political economy that will always work to mitigate the impacts of any legislation that interferes with its smooth function and that might hinder capitalists from making a profit.

Related theory and research involves the role of government in capitalistic societies. Rather than seeing government as the protector of environmental health and safety, a "conflict" paradigm (Buttel 1976) recognizes that one of government's most important activities is to foster capital accumulation through the support of economic growth. Ruchelman (1988, p. 65) describes government's activity in land development as "a combination of the laissez-faire and promotional forms," noting that the consequences for hazard mitigation are frequently negative. The notion that growth is good and ought to be championed is an article of faith that few politicians in U.S. communities would dare oppose even if they wished to, despite the fact that growth increases the risk of disaster-related losses (Clary 1985; Ruchelman 1988).

The political consequences of appearing to resist development by calling attention to hazard-related problems can be disastrous for a politician, because the pro-growth interests dominate politics. Elected officials adopt views on mitigation that are consistent with those of local elites (Rossi, Wright, and Weber-Burdin 1982), which makes good sense politically but frequently works to the detriment of mitigation. Those seeking to promote hazard reduction in areas in which developers have taken an interest must contend with opponents that are well-organized and well-funded. As Ender and Kim note on the basis of their research on earthquake hazard mitigation policies following Great Alaska Earthquake (1988, p. 76):

> If a planning and zoning board allows construction in a high-hazard zone, who complains? However, if the same body attempts to enforce mitigation against local interests there is a strong and immediate response.

Opposition by development interests has also been cited as a major factor hampering the effectiveness of hazard mitigation programs once they are adopted (c.f., Burby and French 1981; Selkregg, Ender, Johnson, Kim, Gorski, Preuss, and Kelso 1984; Godschalk, Brower, and Beatley 1989).

Areas that are dependent on hazardous industries, such as West Virginia's Kanawha County, the site of the 1985 chemical release at Institute, can do very little on their own to promote hazard mitigation; political leaders and residents have little choice but to accept industry's word that it is doing all it can to reduce risk (Tierney 1987). The need for tax revenues and jobs has led many local governments, particularly those in less well-off areas of the country, to compete to attract the kind of economic activity that brings with it the potential for technological disaster. For example, although there are no definitive studies on the topic, it appears that low income and economically dependent communities and neighborhoods bear a disproportionate share of the risk associated with hazardous chemicals and wastes (General Accounting Office 1983; Couch and Kroll-Smith 1985).

As the foregoing discussion suggests, the political economy also influences which groups are most at risk from hazards. There are researchers (e.g., Rossi, Wright, Weber-Burdin and Pereira 1983) who argue that, with some exceptions, disasters affect all social classes more

or less equally. There are also cross-cultural studies (see Davis and Seitz 1982) that find no differences in disaster impacts when industrialized and naonindustrialized societies are compared. However, other research finds that people typically face greater threats to life safety and property, and they have more problems recovering from disasters (Bates 1982; Cuny 1983). Worldwide, (Susman, O'Keefe, and Wisner 1983, p. 278):

> ...the international division of labor among rich and poor countries, and market forces within the poor underdeveloped capitalist economies within the Third World, cause the poorest of the poor to live in the most dangerous places.

This pattern can be observed in the U.S., at least for some hazards. It is of course true that very affluent community residents often reside in areas that are subject to such hazards as landslides, floods, fires, and earthquakes. Indeed, many people seek out such areas because of their desirability as places to live. Some disaster agents, such as tornadoes, may strike all social classes indiscriminately. However, in general the people most likely to involuntarily face hazards and least likely to obtain compensation for disaster losses are those who lack socioeconomic resources. In California, for example, the population of the kinds of buildings that are most likely to collapse in the next large earthquake is disproportionately comprised of low-income families and elderly and disabled persons. (Tierney, Petak, and Hahn 1988). High rates of growth and migration to Southern California have led to a situation in which many new economically and socially disadvantaged residents are living in buildings such as warehouses, garages, and factory lofts, that were not originally intended to be residential structures and that present a life-safety hazard (Baer 1986; Palm 1988).

The role of disaster experience in promoting mitigation takes on a new significance when seen in a political-economy context. Disaster events do not open "windows of opportunity" merely by increasing the salience of a problem. Rather, they disrupt the operation of the political economy. An event may trigger the mobilization of groups not previously aware of or concerned with a hazard, temporarily counteracting the power of economic and political elites. Social movement organizations that formed following the Love Canal crisis (Levine 1982) and the Three Mile Island accident (Walsh 1981) are examples. An event may also make opponents of mitigation aware of the potential legal liability they face if they continue to drag their feet. For example, because of its