
Recovery after Disaster: Achieving Sustainable Development, Mitigation and Equity

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This paper reviews key findings and raises issues that are not fully addressed by the predominant disaster recovery literature. Achievement of equity, mitigation and sustainable development, particularly through local participation in redevelopment planning and institutional cooperation, is the central issue of the review. Previous research and past assumptions about the process by which communities rebuild after a disaster are reviewed. A conceptual model for understanding local disaster recovery efforts is then presented. The conceptual and practical significance of this model is then demonstrated by presenting case studies of local recovery experiences. Finally, conclusions on the current understanding of disaster redevelopment planning, as well as implications for public policy and future research are offered.

The aftermath of a natural disaster poses a monumental challenge to local officials. Homeless citizens need replacement housing. Water, sewer and other public services must be restored to maintain public health and to support other recovery activities. Local businesses need to be reestablished to restore the local economy.

The recovery period offers an opportunity to strengthen local organizational capacity to facilitate economic, social, and physical development long after the disaster. Tentative evidence suggests that what we term a developmental approach for recovery can have multiple benefits including reducing the costs and increasing the effectiveness of recovery aid policies. External aid can be used to build and support local organizations to be more effective in undertaking self-directed sustainable development initiatives. The community

can assume the role of active participants, rather than helpless victims. Local people can define goals, control resources, and direct redevelopment initiatives with long term economic and social benefits.

Another opportunity is to alter physical development patterns to reduce future hazard vulnerability. Support for hazard mitigation is typically strongest immediately following a disaster (Rubin et al., 1985). With appropriate construction, repair, and land use standards, a rebuilt community can be at lower risk to future disasters, compared to pre-disaster conditions. Moreover, long standing community problems can be resolved through reconstruction. For example, increasing the affordable housing stock for the poor, improving traffic circulation, expanding open space for parks and recreation, modernizing public facilities, and stimulating the local economy

can be achieved through disaster recovery.

Communities need to initiate collective actions soon after the impact in order to facilitate the timely and equitable distribution of aid and to prevent the loss of significant opportunities. A key set of actions involves local redevelopment planning, which includes local efforts to influence the pace, location, type, density, design, and cost of redevelopment. If a community can successfully carry out a redevelopment planning program, then it has derived a key solution to the problem of achieving equity in aid distribution, mitigation, and development, while assuring participation by those individuals and institutions most affected by redevelopment initiatives.

Ironically, the prevailing approach of aid and recovery programs has been oriented toward short term relief, with little linkage to long term development, local roles and capacities, and diverse social, economic, and cultural conditions (Anderson and Woodrow, 1989; Kartez 1991). It presumes that communities and citizens are helpless without aid; they are seen as having limited capacity to cope with losses and to participate effectively in redevelopment initiatives. In the context of rising losses and expanding international (Office of Foreign Disaster Assistance, 1990) and domestic (Burby et al., 1991) relief budgets, this approach has clearly failed. What is needed is a greater understanding of community needs and capacities. Furthermore, we need to know how such understanding can be put into practice by relevant institutions before the disaster strikes.

This paper reviews key findings and raises issues that are not fully addressed by the predominant disaster recovery literature. Achievement of equity, mitigation and sustainable development, particularly through local participation in redevelopment planning and institutional cooperation, is the central issue of our review. The paper consists of three parts. First, we review previous research and past assump-

tions about the process by which communities rebuild after a disaster. Second, we present a conceptual model for understanding local disaster recovery efforts. We then demonstrate the conceptual and practical significance of this model by presenting case studies of local recovery experiences. Finally, we offer conclusions on the current understanding of disaster redevelopment planning, as well as implications for public policy and future research.

RECOVERY PLANNING PROCESS

Previous Research

Unfortunately, the recovery phase is the least investigated and most poorly understood of the four phases of a disaster — mitigation, preparedness, response and recovery (Drabek, 1986; Rubin, 1991). A few studies have examined individual and household coping behavior (Bates, 1982; Bolin, 1982; Bolin and Bolton, 1986; Drabek and Key, 1984; Perea, 1990). Some attention has been given to questioning the national economic justifications for federal aid funds (Burby et al., 1991; Chang, 1983; Friesma et al., 1979; Kunreuther, 1973) and to issues of intergovernmental cooperation and implementation of federal disaster assistance programs (Kartez, 1991; May and Williams, 1986).

There has also been little research regarding the ability of communities to influence post-disaster redevelopment processes through the use of various planning measures. This is particularly unfortunate, because local governments have increasingly been gaining experience in redevelopment planning. In the United States, Florida and North Carolina now mandate that their local jurisdictions prepare reconstruction plans as part of local comprehensive or general plans. California authorizes, but does not require, local preparation of redevelopment plans. In addition, communities

in other states have increasingly undertaken redevelopment planning initiatives on their own (see, for example, Berke and Beatley, 1992, ch. 6; Brower et al., 1987; Urban and Regional Research, 1986). Similarly, national governments throughout the world have begun to require that their regional and local jurisdictions prepare disaster reconstruction plans (Anderson and Woodrow, 1989).

During the past two decades, however, some studies have begun to examine disaster recovery at the community level (eg., Haas et al., 1977; Mader, 1980; Rubin et al., 1985, 1989). This work has highlighted the major impediments to community post-disaster reconstruction. These include such problems as staff that are unprepared to deal with aid recipients, aid that does not meet the needs of the inner city poor, outside donor programs (governmental and nongovernmental) that exclude local involvement, and poorly coordinated and conflicting demands from federal and state agency assisted programs. In sum, while this literature is still limited, it has advanced enough to provide a conceptual foundation for understanding the redevelopment process, and to delineate the factors that can constrain or facilitate this process. Assumptions are changing about that process.

Assumptions About the Redevelopment Process

Various studies have attempted to understand the process by which communities recover from disasters. Most notably, Haas et al. (1977) examined the redevelopment process in four case cities in the U.S. and Latin America. They concluded that 'Disaster recovery is ordered, knowable, and predictable' (p. xxvi). This study is premised on a descriptive conceptual model that approximates a 'value added' approach, which specifies that a recovering community must undertake four stages of

activities: (1) take emergency responses involving debris removal, provision of temporary housing, and search and rescue; (2) restore public services (electricity, water, and telephone); (3) replace or reconstruct capital stock to pre-disaster levels; and (4) initiate betterment and developmental reconstruction involving economic growth and development of the locale.

The study by Haas et al. was the first major work on long-term recovery and made a significant contribution from a limited sample of disaster events. More recent criticism has developed, however, from an ever-widening body of studies that reveal the conceptual and empirical shortcomings of the value added approach. Such an approach views a community going through a series of fixed stages. Each stage is a necessary development that adds value to the final product which is a recovered community. Conceptually, the approach is similar to a variety of value added frameworks that have been proposed in such fields as hazard mitigation policy making (e.g. Slovic et al., 1974), and collective behavior and social movements (e.g., Smelser, 1962). In the case of the former field, for example, mitigation policy would be formed by defining goals, setting objectives, collecting information on possible alternatives, and selecting the alternative that maximizes public goals at minimum cost.

There are inherent difficulties with value added approaches. The problem is that they are linear and orderly representations of uncertain decision making processes. Community decision making is not strictly a technical exercise where each stage occurs in 'proper sequence' and then successful outcomes are guaranteed (Quarantelli and Hundley, 1969). Recovery policy making is intensely political as well. In fact, it is possible for a variety of patterns to be conceptually derived and empirically observed. Indeed, the process is altered by inaccurate appraisals of needs of disaster

stricken citizens, intense political pressure by citizens to rebuild as quickly as possible, inadequate time and resources devoted to complex recovery problem solving, and multiple and conflicting preferences of affected groups.

It should not be surprising, therefore, that several studies found the four stage sequential model of Haas et al. to be an inaccurate depiction of reality. In a study of 14 disaster stricken communities, Rubin et al. (1985) characterized the process quite differently. The four stages are not necessarily sequential, but can occur simultaneously or in different sequences. A key finding in two case communities, for example, was that replacement reconstruction was occurring in some locations at the same time that debris clearance was underway in other areas. Stuphen's (1983) study of a single community recovering from a flood supports the findings of Rubin et al. and her colleagues. Specifically, Stuphen supported the basic observation of stages of recovery activities. He did not, however, reinforce the orderly sequence of redevelopment activities shown in the model of Haas et al. Deviations from the model are attributed to variations in the extent of damage and the availability of resources within a given community. Problems with aid delivery typically stemmed from poor planning and subsequent weak local organizational capacity to respond to recovery demands.

Other studies in the Caribbean (Berke et al., 1992) and in the midwestern United States (Francaviglia, 1978) point to the structure of community power and influence as keys to understanding the timing and outcomes of redevelopment. These studies found that powerful interest groups, particularly from the business community, were able to take advantage of recovery aid because of their strong pre-disaster control over local institutions and ties to central authorities. These groups were able to pressure public authorities to

rebuild first in areas where they had a great interest. Their poorer neighbors were more likely to have weaker ties with public authorities, and thus the process of rebuilding was much slower for them.

In fact, Berke et al. found that parts of two communities in Jamaica were totally rebuilt within seven months after Hurricane Gilbert. Meanwhile, households in other locations that had sustained damage equal in magnitude were still clearing debris from streets and had only made temporary repairs to stop leaky roofs. This study and others (Anderson and Woodrow, 1989; Harrell-Bond, 1986) concluded that the international aid delivery system does not recognize the inherent conflicts of interest in existing community social structures. A similar case has been made for aid distribution programs (governmental and non-governmental) operating in the U.S. (May and Williams, 1986; Perea, 1991; Rubin et al., 1985).

Still other investigators (Quarantelli, 1989; Wilson, 1991) indicate that the redevelopment process is neither as ordered nor as predictable as suggested by the model of Haas et al. These studies maintain that the redevelopment process typically deviates from the presumed institutional model expected by state and federal governments. They also show that local jurisdictions rely on organizations such as public works and planning departments during recovery, rather than on local emergency or civil defense offices which are the usual centerpieces for state and federally supported disaster management programs in the U.S.

Since these state and federally supported pre-existing institutional relationships are unsuccessfully used at the outset of the disaster recovery process, citizens and officials commonly devise various 'adaptive strategies' (establishing a reconstruction task force, for example, or changing local zoning codes to allow for more affordable housing units to be built

during reconstruction) to respond to local needs. In an assessment of the City of Santa Cruz (California) earthquake redevelopment process, Wilson (1991) contends that citizens and local officials improvised such strategies in high pressured decision making environments. This process occurred outside the emergency management department of city government in which recovery programs were originally to be implemented. The outcome was cooperative adaptation among citizens and institutions. Indeed, Kartez (1984) observes that the local process of rapid learning is an important lesson in the behavior of institutions under stress. The individuals involved in this learning process realized the limitations of the institutional arrangements in place and consequently altered their behavior. The key was not inflexible programs formulated in accordance with central administrative procedures, as evidenced by recovery studies in developing (Berke et al., 1992; Solo, 1991) and developed countries (Mader, 1980; Rubin et al., 1985). Success was explained by aid delivery systems with a capacity for embracing error, learning with people, and building new knowledge and institutional capacity through action.

The basic challenge is to specify the conditions in which adaptive learning can take place before a disaster strikes. Kartez (1984), May (1991), Rubin et al. (1985) and others further indicate that disaster planners typically do not confront this fundamental issue, but maintain that the major obstacle to pre-disaster planning is in motivating elected officials and administrative staff to participate in planning before disaster strikes. There may always be apathy, however, towards planning for disaster events, given their low frequency (Kartez, 1984; Rossi et al., 1982). Moreover, some adaptation will always be necessary during disaster recovery. Of greatest concern, however, is the issue of developing institutional arrangements for disaster recovery planning that foster rather than

constrain learning. Such arrangements would also be capable of integrating useful knowledge generated from previous research into recovery planning programs.

This issue is of central importance to the field of development planning in developing countries. Specifically, this field has given considerable attention to how international aid can be used most effectively in building local capacity to undertake self-initiated and self-directed development projects (Uphoff, 1986). Development planning researchers have increasingly argued that preparing for sudden events, such as natural disasters, offer opportunities for devising institutional arrangements that can embrace new and changing conditions (Anderson and Woodrow, 1989; Cuny, 1983; Pantelic, 1991). Furthermore, disasters themselves offer opportunities to develop social resources. Often disaster stricken people and groups will mobilize and coalesce to meet needs not addressed by aid agencies (Oliver-Smith, 1992). The intention is to strengthen local capacity to recover and to undertake economic, social, and physical development projects once the recovery effort is completed. Thus the development planning field can potentially make an important contribution by suggesting factors that foster institutional capacity for undertaking adaptive learning before a disaster strikes. This potential contribution has begun to be recognized by the international community concerned with implementing the 1988 United Nations resolution that designated the 1990s as the International Decade for Natural Disaster Reduction (Paudley, 1990).

Moreover, the lessons learned about the transformation from deprivation to self-directed revitalization appear to cut across cultural boundaries. While there are cross-cultural differences in designing effective disaster and development planning institutions, various studies have observed more similarities than differences (e.g., Bolin and Bolton, 1983; Perry and Hirose, 1983;

Quarantelli et al., 1992). Thus, lessons derived from recovery experiences in differing societies can have much cross-cultural validity and utility.

CONCEPTUAL MODEL FOR UNDERSTANDING DISASTER RECOVERY

Overview

Several studies provide a starting point for developing a conceptual model (Rubin et al., 1985, Rubin, 1991; Mader, 1980; Mader and Blair-Tyler, 1991). The Mader study perhaps best represents the characteristics of this model. This study examined the earthquake recovery process in several case studies in Alaska and California to determine how to avoid reconstruction investments that would site buildings in the same high risk locations. A specific set of conditions needed to meet this demand were identified.

Mader found that the chances of implementing a better recovery investment and zoning strategy increase when four factors are present. First, land use planning measures must be adapted to 'fit' post-disaster needs and opportunities. Second, there should be local reliance on internal capabilities rather than sole dependence on external resources. Third, the community must have knowledge of requirements for external assistance. Fourth, there needs to be flexible administration of external assistance programs. Although tentative, these findings begin to specify the characteristics of effective redevelopment policies and institutional arrangements for addressing demands that occur in post-disaster land-use planning and reconstruction. Such characteristics are intended to overcome the predictable political and administrative obstacles to successful organizational adaptation during recovery.

Findings from Rubin et al. (1985), Mader (1980) and Blair-Tyler (1991), among others, suggest that the process by which

viable policies and collaborative institutional arrangements are developed emphasizes local participation and initiative and that effective response to recovery demands cannot be achieved in disaster recovery efforts through top-down, inflexible and standardized approaches. Success is based on a process of bottom-up policy and organizational development. This also suggests that the capacity of citizens and organizations involved in recovery to adapt to changing conditions is higher and the inter-organizational aid delivery systems are more capable of meeting the needs and capacities of disaster stricken citizens when intra-community and intergovernmental ties are strong.

Researchers in the development planning field suggest that this approach, described by scattered evidence in disaster research, is an application of 'local institutional development theory', as discussed by Uphoff (1986). So far, the local institutional development approach has been primarily applied to natural resource management, health care delivery and agricultural production under varying social, economic, and political conditions (Ascher and Healy, 1991; Korten, 1980; Uphoff, 1986). Research is needed on how institutional arrangements act as incentives or barriers to adapting responses that meet local needs, capacities, and opportunities during recovery. In particular, this approach can be applied at both the micro (intra-community) and macro (intergovernmental) levels of analysis.

Such past studies suggest that simply seeking local compliance with, and subordination to, external organizational (state, national and international) relief and rebuilding requirements does not produce the best results and may be dysfunctional as well. These studies also maintain that external programs for aiding community rebuilding do not always successfully match local needs or cannot be successfully implemented without intra-local and intergovernmental collaboration and cooperation.

But this problem of achieving cooperation between communities or aid recipients and external donors has been investigated to a much greater degree of generalization by researchers in the international development planning field. This field has repeatedly been faced with instances where the outcomes of external aid have departed from the expectations of donors and/or of central governments.

Korten (1980), for example, has developed an experience-based model for designing successful development aid strategies. As illustrated in Figure 1, the strategy consists of three broad dimensions: needs of aid recipients; aid program design, and organizational capacity of both donor and recipient institutions and groups. Efforts are successful when the recovery program in place is responsive to household needs and builds on strong organizations capable of achieving program goals. That is, a high degree of 'fit' among program design, household needs and the capacities of assisting organizations increases the chances of successful recovery efforts. The concept of fit is of central importance in the field of development planning as research has illuminated the important relationships among needs, program, and organizational capacity, concluding that performance of an organization is a function of fit achieved among these dimensions (Korten, 1980).

This model effectively describes some of the findings from disaster recovery studies. For example, Mader (1980) found that reconstruction efforts in response to the 1968 earthquake in Santa Rosa (California) were successful due to pre-disaster actions that helped local authorities clearly identify needs for specific types of recovery aid. In this case, local planning staff persuaded federal agencies (HUD and SBA) to allow the city to use aid for reconstruction to implement a pre-existing downtown revitalization plan. The plan was adopted by the city in 1968 (about one year before the earthquake), after several years of consensus

building efforts by planning staff, and of commissioning various economic, visual resource, and traffic circulation studies. Plan policies specified changes in permitted land uses, urban design standards, and parking provisions.

City officials originally anticipated that the plan would be implemented over a 10 to 15 year period. The disaster, however, was viewed by local officials as a window of opportunity for rapidly implementing the plan. The downtown sustained severe damages, and substantial amounts of federal aid was available for reconstruction. Local officials were able to use the plan as a factual basis for specifying how aid from federal agencies should be used. The outcome of this process was that local people were able to define their own goals, exert control over the use of incoming resources and tailor the design of recovery programs to local needs and capacities. Moreover, this process also achieved national economic development objectives.

Other findings (e.g., Rubin et al., 1985) indicate the difficulties that local governments have in using aid for rebuilding. These findings, however, make even more sense in light of a development planning model. Rubin and associates focus on lack of local organizational capacity and a poor fit at times between local needs and external aid program designs.

Examining these findings through a developmental planning model makes it clear that local organizational (as Rubin and associates argue) or recovery program designs must be changed, as some Bay area officials argued after the Loma Prieta earthquake (Kartez, 1991). Of course, many local officials often maintain that the third component, local needs, is what state and federal authorities want to change through the imposition of national program requirements because such local needs do not fit those requirements. This issue is exactly what development models like Korten's bring to light.

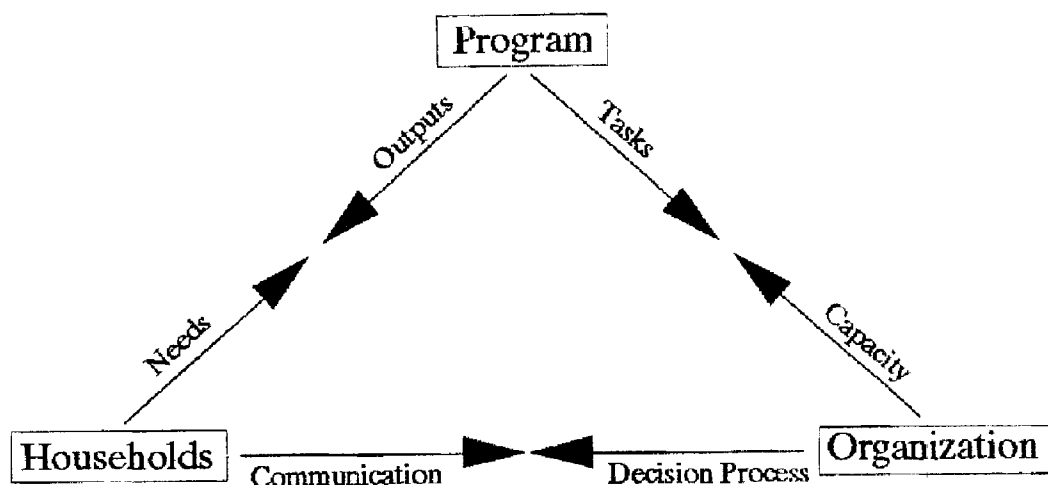


FIGURE 1 *Fit requirements for disaster recovery planning (adapted from Korten, 1980)*

Influences on Local Recovery

Recently, development planning researchers have argued that a useful model for explaining influences on local organizational development is premised on the concepts of horizontal and vertical integration. Indeed, various studies have focused considerable attention on conceptually defining and empirically testing the concepts (e.g., Paul, 1987; Uphoff, 1991). We first discuss how these concepts can be applied to the pre-disaster state of the community and how they influence post-disaster recovery efforts.

Warren (1963) defines a community's horizontal integration as 'the structural and functional relations among the community's various social units and subsystems'. Such integration links local people and organizations in an equalitarian manner. There is an inherent lack of superordinate-subordinate relationships. In other words, the parties are basically equal in power.

A community with a high degree of horizontal integration has a tightly knit social network among local organizations. The community is a true system of interdependent parts. It is a viable, locally based

problem-solving entity. Its organizations and individuals not only have an interest in public policy decisions, but they also tend to have frequent and sustained interaction. Thus local people have opportunities to define and communicate their needs, mediate disagreements and participate in local organizational decision making. Local government land use and development policies are more likely to fit the needs and capacities of citizens (Paul, 1987).

A community with a low degree of horizontal integration has a weakly knit social network. It is not an integrated system of specialized, though mutually beneficial, organizational parts. It lacks the ability to act with collective unity to solve local problems. Interaction is low among local government agencies and social sub-groups with an interest in public policy initiatives. The capacity to diffuse, adapt and implement plans and policy innovations is low. Thus the community fragments, and is unable to pull together and organize a unified effort to take control over its own affairs. Consequently, the fit between redevelopment programs and the needs and capacities of citizens is likely to be poor.¹