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DISASTER RELIEF AND REHABILITATION IN THE UNITED STATES:

A Research Assessment

Dennis S. Mileti

Colorado State University

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Together, the entire staff of Assessment of Research on Natural Hazards (J. Eugene Haas and Gilbert F. White, Co-Principal Investigators) developed the objectives, approaches, methods and procedures, and gave assistance which contributed to the production of this volume.

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Dennis S. Mileti
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ASSESSMENT OF RESEARCH ON NATURAL HAZARDS
AIMS AND METHODS

The Assessment of Research on Natural Hazards is intended to serve two purposes: (1) it provides a more nearly balanced and comprehensive basis for judging the probable social utility of allocation of funds and personnel of various types of research on natural hazards; (2) it stimulates, in the process, a more systematic appraisal of research needs by scientific investigators in cooperation with the users of their findings.

The basic mode of analysis is to examine the complex set of interactions between social systems and natural systems which create hazards from the extreme geophysical events. The chief hazards investigated relate to: coastal erosion, drought, earthquake, flood, frost, hail, hurricane, landslide, lightning, snow avalanche, tornado, tsunami, urban snow, volcano, and windstorms. For each of those hazards the physical characteristics of the extreme events in the natural system are examined. The present use of hazardous areas and the variety of adjustments which people have made to extreme events are reviewed. The range of adjustments includes measures to modify the event, as by seeding a hurricane; modifying the hazard, as by adjusting building or land use to take account of the impact of the extreme event; and distributing the losses, as by insurance or relief. Taking all of the adjustments into account, the impact of the hazard upon society is estimated in terms of property losses, fatalities and injuries, and systemic disruption. An effort is made to identify the directions of change in the mix of adjustments and in their social impact. As a part of this review, those forces in the national society which shape the decisions about adjustments are appraised.

Authorities in the field are consulted through the medium of literature review, workshops on specific hazards, a national conference which was held in October, 1973, and individual reviews. Where appropriate and practicable, simulations of the extreme events and of their social impacts were carried out. In selected areas scenarios of past and possible future events and their consequences are constructed.

In the light of this analysis the possible contributions of research to amelioration of the national condition with respect to each hazard are assessed. Each set of adjustments is reviewed in terms of its potential effects upon national economic efficiency, enhancement of human health, the avoidance of crisis surprise, the equitable distribution of costs, and the preservation of environmental options. Evaluation of particular research activities includes (1) the average sum of social costs and social benefits from application of a given adjustment in changing property use, and (2) reduction in average fatalities and casualties. In addition to the direct impacts of extreme events upon society, account is taken of the costs and benefits which society reaps in seeking to cope with the hazards, as in the case of costs of insurance or of control works.

In addition to calculating the average effects of hazard adjustments, an effort is made to estimate the degree to which the occurrence of a very rare event which has dramatic destructive potentialities, such as an 8.0 earthquake or a 200-year flood, would disrupt society.

Estimates also are made of the extent to which the adoption of an adjustment reduces the options of maintenance of environmental values, and the degree to which the pattern of distribution of income among various groups in society may be changed.

Research proposals are appraised in the light of the likelihood that the research undertaken could yield significant findings, and the likelihood that once the research is completed satisfactorily, the findings may be adopted and practiced by the individuals or public agencies in a position to benefit.

The United States as a whole is doing a competent job of dealing with some aspects of its natural hazards and a very ragged job of handling other aspects. The overall picture is one of rising annual property damage, decreasing loss of life and casualties, coupled with a marked growth in the potentiality for catastrophic events. On the whole, the public costs of adjustments are increasing.

The assessment reveals that very little is known about the dynamic relationships among many of the adjustments. It is difficult to predict with any confidence what the consequence of new Federal investments of initiatives will be in particular adjustments.

For each hazard a set of research opportunities deserving special consideration for early adoption is presented. In addition, three types of research which cut across the various hazards are assessed: warning systems, land management, and relief and rehabilitation.

Among the research basic to other aspects of natural hazards activity are: carefully planned post-audits of certain disasters by interdisciplinary teams; community observations over time of critical points (recovery policies and administration, health, mental health, and preventive measures) of change and of the effects of Federal-state-community interaction; and a clearinghouse service.

In most research fields it is noted that certain types of research which have claimed substantial amounts of public support offer little prospect of effecting a basic change in the character of the national hazard situation. In those instances there are new lines of emphasis which promise larger returns. Many of these involve more explicit collaboration of social scientists and natural scientists than has been customary in past. Wherever appropriate, the research recommendations include explicit provision for the translation of research findings into action by individuals or public groups.

To initiate effectively the desirable new lines of research will in some instances require a readjustment in legislative authority. In other cases it will require an increase in or reallocation of public funds for research. Much of it will involve changes in administrative procedures and policies of the responsible funding agencies. In many instances the effectiveness of the research will be linked strongly with the resolution of issues of public policy. These issues evolve around national land use management, financial assistance to sufferers from disasters, and the sharing of responsibility among local, state, and Federal agencies in designing and maintaining community preparedness.

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SUMMARY

Research on disaster relief and rehabilitation in the United States may have a great influence upon the national disaster scene at a time when nation, state, and local policies, both public and private, are in a state of flux.

Since 1953, the President has declared over 440 major disasters. In contrast to a total of 141 declarations by the President in the first decade (1953-62), there were 222 such declarations in the next ten years (1963-72). During 1972 and 1973, almost 23% (94) of all declarations made since 1953 were issued in just two years. This trend continued during the first half of 1974, during which 38 declarations were made by August 30th. Three general trends are apparent: 1. an increasing number of major disasters to which the Federal government will respond; 2. increasing kinds of aid which the Federal government will make available; and 3. increasing Federal expenditures for involvement. Federal involvement in relief continues to escalate, and an ever-widening gap continues between benefactor and beneficiary.

Relief and rehabilitation is performed by numerous groups, agencies and individuals, and is composed of varied activities cutting across national, state, and local boundaries. Several important processes in the adjustment are understood--its typical course of events, how people are helped, and who usually helps--but equally important facets remain in doubt: how the adjustment affects other adjustments and future vulnerability; how to best coordinate all the varied short- and long-term services which the adjustment includes; what those services should be in terms of their immediate and long-run consequences; and how to prepare for use of the adjustment.

Relief and rehabilitation is not a one-dimensional adjustment to natural disasters; it is a series of linked activities. These consist of three unique facets which are all related, may overlap in time, and may exist for different lengths of time depending upon the disaster event.

The emergency or *relief* period encompasses the first few hours or days after disruption and damaging impact, during which efforts are made to provide care for all inhabitants (food, water, clothing, shelter, medical care), and to stop continued loss and disruption directly related to the hazard agent.

The restoration or *rehabilitation* period is composed of the subsequent few weeks or months, during which actions are taken to put things and people together in such a way that they can function temporarily. For example, temporary housing may be offered subsequent to mass shelter, and the injured may be transported to regular hospitals after field hospitals are closed down.

Reconstruction is the third and final period; it is comprised of efforts to put things together and possibly to improve on the past. Changes are then seen as permanent.

In the last ten years the costs of relief and rehabilitation efforts to the Federal Disaster Assistance Administration were in excess of $1540 million; Small Business Administration Disaster loans exceeded $3000 million, with over $800 million canceled; and Farmer's Home Administration emergency loans exceeded $1375 million, with over $450 million canceled. Other Federal, state, local, and private agencies are also involved in relief and rehabilitation, increasing greatly the costs of the adjustment. Policy is in flux on the character of what and how Federal aid is offered. Public Law 93-288 shows intent to provide for more planning in the reconstruction of a community than ever before, and a shift of responsibility to states, including the authorization of new regional development agencies to assist in reconstruction. The nation has an opportunity to provide significant direction to the relief effort through research which will bear on new policy formation and preparedness.

Research Opportunities

There are four central categories of research opportunities on relief and rehabilitation: 1. what services should be made available; 2. how they should be delivered; 3. how to be sure that they will be delivered when they are needed; and 4. what are suitable research methods.

1. Services

Research is needed to determine the extent, if any, to which specified relief and rehabilitation policies influence other components of community vulnerability, preparedness, and adjustments such as land use planning and enforcement, building codes and their enforcement, and the purchase of insurance. It is urgent because of the increasing trend for relief and rehabilitation policy to direct the use of other adjustments; for example, Public Law 93-234 attempts to influence insurance, and Public Law 93-288 to control land use.

The feasible policy alternatives should be assessed in light of their primary effects; secondary effects; and long- and short-run effects vis-à-vis future vulnerability through links to the initiation and level of adoption of other adjustments. Disaster situations, with all of the attention they receive from public and voluntary agencies, can be catalytic in bringing to bear engineering, urban renewal, and social welfare activities for fresh and integrated approaches at reducing vulnerability in local communities.

This effort will require sophisticated analyses of political processes at local, state, and, to a limited extent, the Federal level. It will also require an examination of the working of pressure groups, as well as the economic and social interests of significant influentials in a community. It would best be conducted by an interdisciplinary team.

In a cross-hazard design, a variety of disaster-prone communities should be studied in concert to achieve comparability through standardized measures. These should be communities affected in the past, or potentially in the future, in which a variety of alternative relief and rehabilitation policies were or will be in operation. To permit generalization to the alternative policy issues, it should cover varied types of events, community policies, and areas. A sample of about 70 affected communities should be assessed.

An investigation of the effect of alternative policies on local economies might produce significant results after five years. Standardized indicators of aspects of the local economy such as unemployment, underemployment, tax bases, and trade should be developed. A series of disaster-stricken communities should be matched on relevant policy issues, community size, function, and other appropriate factors in the recovery of a local economy. Some 40 communities would be required.

The most direct and obvious indications of social disruption can be seen in changes in family functioning following disaster, and for an extended time period thereafter. A primary aim should be to find how to anticipate which communities, families, and individuals are most likely to suffer from a particular geophysical hazard. For slow-rising floods, the answer may not be too difficult, at least in certain years. For hurricane and drought, however, sampling becomes much more difficult.

The monitoring of families and individuals should cover an extended period of time and would be expected to be more intense in the immediate aftermath of disaster. Selection of samples should be from a variety of disasters, representing the spectrum of geophysical hazards.

2. Service Delivery

Searching studies need to be made of the methods for providing assistance. Two such studies commend themselves as promising information on the consequences of the various possible assistance policies.

Most voluntary and public agencies involved in relief and rehabilitation are striving to reach those they might serve; however, the evidence is that certain groups are under-represented when it comes to the dispersal of opportunities and benefits. Among these are the aged, the poorly educated, members of the lower socioeconomic classes, persons whose background has instilled a negative value for anything perceived as "charity", and a variety of other segments of the population.

Research on this issue would have three aims, each one contingent upon the findings of the others: to what extent services are inequitably distributed; why this is so; and what policy changes can be made to ameliorate the problem. It might best achieve its ends by assessing the equity issue in a variety of disaster situations such as Presidential, SBA, and FHA declarations, and by reviewing the full range of degree of disaster impact. For a four-year period an assessment could be made of the dispersal of services in all three phases of the adjustment in 30-35 disasters.

The coordination of all postimpact activity becomes more tenuous as new agencies are formed, old ones are discontinued, some reorganize, and shifts in personnel occur. Under Public Law 93-288, increased efforts are made to upgrade efforts at coordination and to build action for long-term recovery. However, if more and more responsibility for efforts moves to state and local organizations, as current

trends suggest, agencies without much experience will find themselves faced with a series of new events with which to cope. Although problems of coordination do exist in the emergency and early rehabilitation phases, the most serious problems of coordination are in later restoration and reconstruction, or in coordinating earlier relief and restoration efforts with long-term reconstruction.

A cross-hazard study is needed which would examine the ways of coordinating response both *within* restoration and reconstruction, and *between* relief, restoration, and reconstruction. For example, little is known about what temporary housing in restoration may mean to subsequent reconstruction. The research effort should view relief, restoration and reconstruction as a total system and should include analyses of all units within the system, and the role of personality traits and individual experience in shaping personal needs.

A variety of hazard types and degrees of impact should be assessed in terms of program effectiveness. It should make some 20-30 case studies, and follow them through for several years after the initial disaster through a good portion of reconstruction.

3. Timing of Service Delivery

The adoption and maintenance of preparedness is the result of a combination of factors, some of which are known to be how often a hazard repeats itself in a locality, community hazard awareness, and legislated requirements for preparedness. However, other factors are not known.

Because preparedness adoption and maintenance are conceptually the same regardless of hazard, the research should address itself to all natural hazards, and may well include man-made hazards in its purview. It would have several goals: 1. to identify what factors account for varying levels of preparedness; 2. to identify the factors affecting the intensity with which preparedness is maintained; 3. to determine what level of before-the-event preparedness is needed to achieve adequate postimpact performance; and 4. the transformation of the knowledge into practical action through such agencies and groups as DCPA, FDAA, and the University of Southern California, and through the establishment of action groups in other universities and state governments.

Study of "before" measures of preparedness, of factors explaining different levels of preparedness, and of "after" measures of

postimpact performance would require more than 100 communities because most communities in any such sample will not be subjected to serious events. There would be a small number of "experimental" communities (those suffering impact), and perhaps two types of control communities; communities which do not experience disaster during the course of the study (in addition to those which do), could nevertheless serve as sources of data for the studies of preparedness adoption and maintenance.

The study may well need to be continued for an extended period of time. Results may be expected on adoption and maintenance within three to four years. However, results pertinent to how preparedness relates to adequate postimpact performance might not be realized for one to two decades.

4. Research Methodology

Work is needed to develop and test the validity and reliability of methods for monitoring the short- and long-term effectiveness of all the efforts which comprise relief and rehabilitation. The aim would be to develop monitoring procedures which are socially acceptable and accurate in determining the primary and secondary consequences of efforts during the emergency, restoration, and reconstruction periods. It would require extensive pretesting, and later extensive field testing, with a design which covers varied types of events, regions of the country, and rural and urban communities. A minimum of some 60 to 80 different disaster and relief and rehabilitation efforts would need to be assessed. Once developed, the methodology would assist in carrying out most other research on relief and rehabilitation.

5. Central Research Center

Many alternative relief and rehabilitation policies exist in an atmosphere of continuous changes. However, improvements in policy and subsequent action generally come only when adequate data are available on their consequences. A program may have a desired outcome during the emergency and early restoration periods, but have a strong negative effect recognizable only during the later reconstruction period. An alternative program may work well in one part of the country, but poorly in remaining areas. Parts of certain programs may produce highly desired outcomes when used with lower social class clients, but not with persons of other socioeconomic levels, producing a high level of

inequity. The true consequences of new or altered programs are often unknown for many years. The hearings of the Senate Committee on Public Works in 1973-74 were the first major attempt to sift out the experience.

Improvements are not likely to occur when government policies are inconsistent and often in conflict, when the long-run effects of different programs are unknown, and when constraints to effectiveness are unknown. Although such knowledge is no guarantee for achieving improvements, it certainly is a prerequisite.

It should be the purpose of a central coordinating research center to initiate and coordinate research on relief and rehabilitation among interested researchers throughout the country, and to serve as a center through which findings could be made available to those responsible for practical action. A center could be established within an academic institution or some nongovernmental association. However, it should be formally linked to Federal and state agencies to facilitate the implementation of research findings.

CHAPTER I

SCOPE OF THE REPORT

What the activities and services of relief and rehabilitation are, and how they are provided to victims of disaster can have profound short and long-run implications in both a positive and negative sense to disaster victims and the communities in which they reside. Human suffering can be reduced or increased, individuals are assisted in restoring order to their disrupted lives, whole communities are put back together; however, the restoring or even increasing of potential for some future catastrophe may result by the rebuilding of a community in a hazardous area. The mix of activities, goods, and services which comprise the adjustment are far-reaching in their consequence, and can increase or decrease disaster-imposed distress to individual victims, affected communities, and society at large.

Relief and rehabilitation are among several major adjustments to natural hazards and disaster. Others include land use management, control and protection works, and building codes. Most others deal with hazards before any one disaster event. When all other pre-disaster adjustments fail and disaster results, relief and rehabilitation are the means whereby people pick up the pieces of fragmented lives. *Relief and rehabilitation efforts are necessary only when pre-disaster adjustments, taken together, do not prevent the natural environment from causing disaster.*

Disasters of various types have affected man, his works, and his communities for thousands of years. Descriptions of hundreds of such calamities are found within the cultural heritage of all persons, regardless of geographical or historical location. Most of these accounts detail stories of heroics, human suffering, and the ability of persons to overcome hardship and loss. While most of these accounts lack scientific precision, they do provide insights into the varied forms of helping disaster victims. Scientific studies, coupled with these historical accounts, reveal the many modes of relief and rehabilitation and its consequences.

Purpose

Disasters cost the nation over $10 billion and 620 lives annually (White and Haas, 1975). Each year thousands of people are affected, communities disrupted, and efforts undertaken to restore those persons affected to normal lives. This restoration is generally referred to as relief and rehabilitation. Estimates of the costs of such efforts are staggering. For example, in the last ten years the costs of relief and rehabilitation efforts to the Federal Disaster Assistance Administration were in excess of $1540 million; Small Business Administration Disaster loans exceeded $3000 million (with over $800 million canceled); and Farmer's Home Administration emergency loans exceeded $1375 million (with over $450 million canceled). Many other Federal, state, local, and private agencies are also involved in relief and rehabilitation, increasing greatly the costs of the adjustment.

This report will examine the adjustment of relief and rehabilitation in order to assess current knowledge about the adjustment, and to estimate the character and level of current opportunities for research which promise reductions in loss, disruption, and human suffering resulting from natural disasters in the United States.

The major conclusions reached in the report are that opportunities for research currently exist to: (1) specify what proper composition of goods and services should comprise the adjustment, considering both their short- and long-run consequences; (2) determine how those goods and services might best be delivered; (3) determine how preparedness might best be handled to maximize the benefits of the adjustment; and (4) develop an adequate methodology for research into the aforementioned areas of inquiry, and into the establishment of a center for coordinating hazard research.

Relationship to Other Hazard Reports

Individual hazard reports have been prepared by the Assessment of Research on Natural Hazards project for specific hazards (such as flood, tornado, earthquake and hurricane) in which relief and rehabilitation is examined as one of several adjustments to each hazard reviewed. This report, however, deals with the adjustment of relief and rehabilitation across hazards rather than as it applies to only one hazard.

The relief and rehabilitation research opportunities which are presented in the report relate to research recommendations on the

adjustment in the specific hazard reports in the following way. Research into some facet of the processes in relief and rehabilitation, for example, maintaining community preparedness for the key elements of relief and rehabilitation, has been called for in several reports. We hold the position, however, that despite differences in hazards, such research is conceptually the same across hazards. It is not necessary to study only floods to discover the key factors which account for maintenance of levels of preparedness for flood response. Generalizations regarding the basic process could also be discovered by assessing other preparedness systems for other hazards. A more fruitful, timely, and less expensive way to approach such issues is to conduct cross-hazard research on relief and rehabilitation. These are the type of issues dealt with in this report as we point to research which promises reward which is specific to the adjustment across hazards.

CHAPTER II

DYNAMICS OF RELIEF AND REHABILITATION

Adjustments to natural hazards encompass a wide range of activities including such things as appeals to supernatural powers, apathy, the application of technology, and different behaviors thought appropriate. The latter two activities result in adjustments such as control and protection works and warning systems. Any one adjustment can occur at any level of the social order (individuals, families, communities, states or nations), in harmony with, or contradiction to other adjustments. An individual may live and seek work only in "safe" areas, live only in a house that has extra hazard resistance, or set aside a significant financial reserve to be used in case of future loss from a geophysical hazard when living in a hazardous area. A family may arrange its finances to insure that adequate insurance protection will always be in force and may have an elaborate contingency plan for reassembling separated family members when an earthquake hits or a flash flood occurs. The school superintendent, the plant executive, and the governing board of the local church congregation all budget for the necessary costs of snow removal. Communities may, through their elected officials, put into effect an elaborate set of procedures to disseminate warning messages and insure rapid evacuation; they may also, but seldom do, establish and consistently enforce land use management regulations to minimize potential property losses.

Finally, decision-makers in any political entity may develop and utilize a whole range of adjustments, including the use of satellites to monitor major storm movements, dedicated communication networks to carry hazard information, contingency funding for relief and rehabilitation activities, and perhaps even a set of land use principles which, when enforced, may be most effective in mitigating hazard loss.

Adjustments may be of many types. They may have their principal use long before a disaster occurs, just prior to a hazard's strike, or immediately following its impact. Any adjustment may be primarily social,

primarily technological, or, more typically, a blend of both. An adjustment may be in use at one or more levels of society. Its adoption may be largely voluntary or imposed at any level by larger, more powerful components of society. Adjustments can vary in their effectiveness and the degree to which their use produces the consequences thought to be both desirable and feasible: reduced losses and reduced human suffering.

Definition

Relief and rehabilitation is composed of varied activities by numerous groups, agencies and individuals. Currently we do know several important processes of the adjustment (its typical course of events, how people are helped, and who usually helps), but we do not understand several equally important facets (how the adjustment affects other adjustments and future vulnerability, how to best coordinate all the varied short- and long-term services which the adjustment includes, or even what those services should be in terms of their immediate and long-run consequences, and how to prepare for use of the adjustment).

Relief and rehabilitation is not a one-dimensional adjustment to natural disasters, but is a series of linked activities. Some of these activities as a part of relief and rehabilitation exist before a disaster and are enlarged or modified after a hazard's strike (Dynes, 1970; Haas and Ayre, 1969; Committee on the Alaska Earthquake, 1970; Drabek, 1968; Barton, 1970). Others are instigated and exist only as a unique result of a hazard's strike. Those activities with the label of relief and rehabilitation consist of three unique facets which are all related, may overlap in time, and may exist for different lengths of time depending upon the specific characteristics of each unique disaster event. These are relief, restoration, and reconstruction.

Relief, or the emergency period, is the first response to disaster and can last a few hours, days, or weeks after a disaster occurs. During this initial phase of the adjustment, efforts are made to stop the continued loss and disruption caused directly by the disaster event. People are rescued, fed, clothed, and provided with medical care and shelter (Kates, *et al.*, 1973).

The restoration, or rehabilitation phase of the adjustment can last for a few days, weeks, or even months during which the lives of victims, families, organizations and the community as a whole are put together in such a way that they can function temporarily. For example,

temporary housing may be offered subsequent to mass public shelters, and the injured may be transported to regular hospitals, after field hospitals are closed down.

Reconstruction is the third and final phase of the adjustment. It may last for periods of years and is comprised of efforts to achieve permanent restoration in the community. Houses are rebuilt and temporary housing abandoned, new zoning ordinances drafted, enacted, and enforced, and economic recovery for the area achieved. The boundaries around these three phases of the adjustment are blurred and overlap in time in all disaster events.

The character of any relief, rehabilitation, or reconstruction program can serve to prevent future disasters (through the application of adjustments such as land use), and secondary disasters such as fires and explosions in the emergency period of any disaster event.

In social terms, relief and rehabilitation can be seen as consisting of two types of changes in a disaster-stricken community. These two changes cut across all three phases of the adjustment, but have declining impact as time passes: changes in the ongoing activities of individuals, families, organizations and other components of the entire community; and changes in the community's social structure. The latter refers specifically to new patterns of social organization which evolve both within and between disaster-response relevant individuals, groups, and organizations in the emergency period so that required activities can be performed. These changes are temporary, and gradually disappear as emergency needs are met and the restoration period ensues.

During normal times, particular traditional activities or functions are performed in a community for the benefit of its inhabitants. However, during disaster, especially in the relief phase, many of these traditional activities are significantly altered or even replaced by new ones. For example, the production, distribution and consumption of goods and services change.

Social control patterns and educational activities are altered as well. The disaster creates new or increased demands on a community, and, as a result, certain aspects of traditional community activity become irrelevant in the light of more pressing emergency needs. Those aspects of normal activities which do not appear central to emergency needs are replaced by more relevant activities. In a major disaster, schools may close, business activity may come to a standstill, and commodities and

health services may be distributed on the basis of need rather than ability to pay for them. This shift in priorities is most clearly seen during the relief phase of disaster.

The people and groups involved in relief and rehabilitation, both local and extra-local, comprise what is referred to as an emergency social system (Barton, 1970). The degree of reorganization that is required in both community activities and social structure depends in part upon the character of the natural event which caused the disaster--its onset speed and scope of destruction.

Response to disaster, through efforts at relief, rehabilitation and eventually reconstruction, brings individuals and the community increasingly closer to a state of restored "normalcy" in function. The basic notion is illustrated in Figure II-1: ongoing human life is disrupted by disaster; the disaster imposes a variety of new characteristics on that life; and relief, restoration, and reconstruction are activities through which the changes imposed by disaster are gradually abandoned as the pre-disaster mode of life is restored in the community.

This may not be accomplished in a desirable way for all those concerned. A community can be restored in broad terms while certain persons and families continue to suffer some of the negative consequences of a disaster. Likewise, many individuals and families can achieve complete restoration while several parts of the community-at-large may have yet to be completely restored. The consequence is not unlike a disaster which strikes only one portion of a community directly, leaving other areas of the community unaffected.

Disaster victims, whether individuals, families, groups or components of a community--such as its economy--do not exist in social isolation from the rest of that community. Individual victims are socially connected to other parts of society through churches, schools, voluntary associations, and the labor force. Although such groups may not be directly affected by disaster, they suffer indirectly through persons who were affected. This ripple effect also works in reverse; when schools, churches, and the economy of an area are impacted, individuals and families not directly affected by the disaster can suffer some of the negative consequences through affiliations with other parts of the directly affected community.

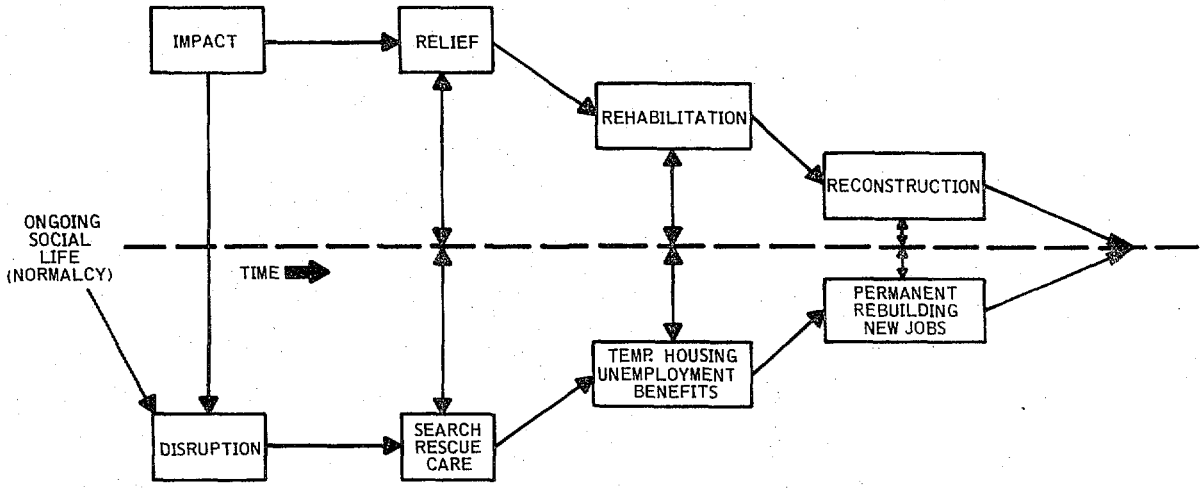

FIGURE II–1

RESTORATION OF "NORMALCY" THROUGH TIME

Composition

The onset of a natural hazard, the disaster it produces, and what occurs in its aftermath is usually a unique experience for persons who are affected. However, the relief and rehabilitation efforts after a hazard's strike are unique only to those who are experiencing disaster for the first time. Many similar patterns occur in every disaster. The ensuing discussion will summarize what is known about the recurring activities which comprise relief and rehabilitation in most disasters. Some general reference sources on the topic include Mileti, Drabek and Haas (1975); Barton (1970); Dynes (1970); Baker and Chapman (1962). Unfortunately, little is known about many important items: (1) how factors in relief can inhibit rehabilitation efforts, or how factors in both can inhibit long-term reconstruction; (2) how to make the dispersion of goods and services more equitable; and (3) how to coordinate efforts through all three phases (relief, rehabilitation, and reconstruction) of the adjustment.

1. Relief Activities

a. Search and Rescue

Search and rescue is one of the first actions taken following disaster. Studies have consistently shown that initial search and rescue work is carried out by persons who are in the impact area and that formal rescue organizations become involved at a later point (Dynes, 1970, p. 134; Kates, *et al.*, 1973). The family functions as a basic rescue group. The search and rescue activity of family members tends to be somewhat patterned. Attention is first directed at assisting relatives, followed by a concern for neighbors, friends, and finally strangers. Socially isolated victims--such as the aged living alone or persons in far-flung areas--are often overlooked by those persons who are concerned with helping relatives and friends, and constitute a problem in providing emergency aid during the initial emergency period. Individuals who enter the impact area from the outside are important since they are not committed to aiding specific victims. Local emergency organizations such as the police, civil defense and fire department, as well as outside groups like the national guard, gradually begin to dominate search and rescue activity after initially assuming a supportive role. All of these organizations usually bring more coordination and resources to the informal

rescue activity already in progress, although the informal response usually gives some type of aid to a major portion of the victims.

b. Care for Casualties and Survivors

Once the injured have been located and rescued, they must be provided medical attention. Hospitals are the major locus for the treatment of the more serious casualties following disaster in the United States (Quarantelli, 1970). Many of the injured are, however, also treated in first-aid shelters or temporary infirmaries in shelters. First-aid stations are often bypassed and the injured brought directly to more visible hospitals.

A number of factors are involved in the selection of particular hospitals by those transporting the injured, including the distance a hospital is from the impact area, and how familiar a hospital is to the official or unofficial driver. In high casualty disasters, which are geographically localized and which occur in a metropolitan area, publicly visible hospitals are likely to receive many casualties regardless of their distance from the impact area. A few hospitals often receive the bulk of casualties, causing them problems with congestion, communication, and resources. This is a problem in disasters with an especially large number of injured persons.

The survivors of disaster may be provided food, shelter, and clothing from many sources including the Red Cross, Salvation Army, service and fraternal groups, and even the military in some cases. However, emergency relief and shelter is most likely to come from friends and relatives (Moore, 1964; Drabek and Boggs, 1968). Most disasters are characterized by an *under*-utilization of shelters that have been established and stocked by formal relief organizations, but these may provide aid to over half of the displaced. In many disasters there is an overabundance of clothing, due in part to the generosity of outside sources. This convergence of clothing and other material often places an added burden on a community since it contributes to congestion and requires that personnel needed for other tasks and duties be used to handle it, and already strained facilities be used for storage (Taylor, Zurcher and Key, 1970; Barton, 1970). In major disasters, there is a greater dependence upon formal emergency organizations for relief services. Assistance to survivors often extends over a long period in a disaster with widespread destruction. Organizations like the Red Cross which become

involved in immediate aid to victims also participate in longer term rehabilitation efforts.

c. Enhancement of Community Morale

Studies have shown that disaster-stricken communities exhibit a high degree of solidarity. Part of this cohesion stems from the sharing of externally imposed problems, and participation in collective efforts to solve them. However, conscious efforts are also made, especially during the relief period, to enhance and nurture community morale (Dynes, 1970, p. 144). Actions are taken for the specific purpose of convincing community residents that they should not be disheartened because immediate problems will be solved and a better community will somehow rise from the tragedy.

Mass media organizations, public officials such as the mayor and governor, and religious leaders often play important roles in this kind of activity. The mass media provide the public with stories and anecdotes about the heroics and unselfish actions of local residents and organizations in the face of extreme odds. Local public officials make morale-boosting appearances and declare their faith in the stamina of the residents and in the community's tradition of overcoming adversity. Outside officials and organizations also support morale boosting efforts with frequent announcements that the community does not stand alone in its hour of need, and that they can be depended upon to provide assistance and resources which may not be available locally.

d. Maintenance of Community Order

During disaster, special social control measures are taken by groups and organizations in a community for the purpose of maximizing immediate relief efforts. In a major disaster, police forces, e.g., city, county, state, and several types of military units, such as the National Guard or members from a base located nearby, may all assume social control functions. The impact area becomes a magnet which attracts many kinds of persons including sightseers, those who are concerned about relatives and friends, and would-be helpers (Fritz and Mathewson, 1957). This makes the job of those engaged in relief activities more difficult. In response to this problem, attempts are usually made by officials to limit access to the impact area to relief workers and others with official credentials. Roadblocks are usually set up around the critical area which

are manned by guards, and a pass system is established.

Frequently, social control agencies anticipate serious looting problems. However, unlike in civil disturbances, there is little evidence that this takes place on a large scale during natural disaster in the United States (Quarantelli and Dynes, 1968). Similarly, there is little evidence that panic is a major problem during natural disaster in the United States, although it too is frequently anticipated (Quarantelli, 1954). More of a problem for social control agencies are those persons who converge on the impact area because they want to help or are curious, rather than persons who flee out of uncontrollable fear.

e. Protection Against Accompanying Hazards

Some disasters are accompanied by significant additional hazards. Disaster-relevant groups and organizations must not only engage in relief activities aimed at problems created by the impact of the initial hazard agent, but in activities related to the accompanying hazards as well. For example, in addition to their initial disruption, earthquakes may create fire hazards, tsunamis, and the danger of injury from fallen power lines and partially destroyed buildings. These additional hazards will call for the expansion of initial relief activities--search and rescue, care for survivors, social control--as well as such specific actions as fire suppression and debris clearance.

2. Restoration Activities

Although restoration (rehabilitation) activities are often initiated while relief efforts are still in progress, they tend to become most prominent after the latter have been completed. It is then that relevant community organizations and supporting groups can turn their attention to long-term problems. By the time rehabilitation efforts begin in earnest, many groups which performed vital relief roles have returned to more normal activities and social patterns. Proportionate to relief activities, there has been little research on rehabilitation (Mileti, Drabek and Haas, 1975; Bates, *et al.*, 1963). Perhaps this is related to the fact that many relief tasks have immediate consequences for disaster victims and are more dramatic in nature than rehabilitation activities.

Some restoration work on water, roads, and electricity is done during the relief phase of disaster when the success of relief activities is dependent upon it. Rescue efforts may be hampered by blocked highways,

and interrupted gas, electric, water, and telephone service may interfere seriously with efforts of hospitals to provide the injured with medical attention and with attempts by other relief organizations to assist survivors in other ways. Efforts by organizations such as private utility companies and public works agencies are initially directed at restoring these services to some minimal level of operation. During rehabilitation, however, the restoration of such services to their pre-disaster capacities becomes the goal of these organizations. Restoring a community to its pre-disaster state includes providing assistance to individuals, families, and private businesses, as well as governmental units.

During the rehabilitation phase of disaster, some groups and organizations look beyond restoration. They may see the disaster context as an opportunity to accelerate plans for change which had already been in progress, or as a chance to introduce new changes in the community (Anderson, 1970).

Some communities are able to recover more quickly and derive more benefits from disaster than others. Rogers (1970), for example, reports on the different recovery rates and benefits derived by several Alaskan communities from the 1964 earthquake. He notes that because it was the largest city in the state and the center of much governmental and construction activity, Anchorage benefited most from the post-earthquake reconstruction. Anchorage's economy also benefited from the fact that the city had the only major port facility in operation immediately after the disaster; it attracted freight business from Seward, Whittier, and Valdez, which it maintained for years. The port cities of Seward and Valdez did not fare as well. Seward's population and economy underwent a long-term decline despite rebuilding and major improvements to its port. Valdez failed to experience growth despite its relocation and rebuilding. Restoration, then, may involve more than merely returning to prior existing conditions. It is doubtful that most disaster-stricken communities can limit their long-term recovery efforts to a return to the status quo, or want only that.

3. The Emergency Social System

There are providers and recipients during relief and rehabilitation; the roles, of course, are not mutually exclusive. Those who are providers at one point may later become recipients. Recipients can include individuals and families in the impact area, groups such as businesses,

hospitals, and schools, and all levels of government.

Provider groups play the key role in the emergency social system which develops during disaster. These include pre-existing groups, as well as ad hoc or emergent groups which form spontaneously within a stricken community. Pre-existing provider units include established, expanding, and extending organizations. Established organizations undergo little structural change during disaster and perform their regular tasks in the emergency social system. Expanding organizations exist with a smaller ongoing active membership prior to impact and mobilize volunteers and reserve personnel when disaster occurs. Extending organizations perform tasks which they don't normally assume. The following typology shows the different kinds of disaster-relevant organizations (Dynes, 1970).

(1) Emergent Groups
(2) Pre-existing Groups
    (a) established organizations, e.g., police, fire departments
    (b) expanding organizations, e.g., Red Cross, Salvation Army.
    (c) extending organizations, e.g., construction company, Boy Scouts.

Examples of emergent providers would be informal search and rescue groups, debris removal groups, and the message or communications center. Emergent groups are usually active only during the relief phase of disaster. Police and fire departments would be examples of established organizations; Red Cross chapters, Salvation Army units, and state and local civil defense agencies would be examples of expanding organizations. Extending organizations are such disaster-activated units as church groups and Boy Scouts.

The emergency social system also manifests changes in inter-organizational relationships. Whereas during normal times many community organizations exhibit a high degree of autonomy, the demands of disaster require increased interaction and coordination between disaster-relevant organizations requiring decreased levels of autonomy. Furthermore, the involvement of non-local organizations in community activities is heightened in disaster. Conflict may result from the arrival of outside actors in the community and their efforts to coordinate the usually more autonomous community groups.

Table II-1 is presented as a summary of the activities which comprise relief, rehabilitation, and the emergency social system. In

TABLE II-1

ACTIVITIES OF RELIEF AND REHABILITATION

(1) Initial assessment of physical and human effects: through direct observation and contacting others, seeking to discover what has happened, who is hurt and who is safe.

(2) Efforts to secure self, family, and organization: a quick initial attempt to shore up and to save those persons and property immediately around the individual.

(3) Spontaneous search and rescue activity: cries for help and the sight of debris are quickly followed by spontaneous, mostly individual, efforts at finding the injured, stranded, trapped, and dead.

(4) Attempts to insure or reestablish public order: responsible officials and other persons believing that public order has or is about to break down take hurried actions to keep the curious and most of the altruistic out of the damaged area, to direct vehicular traffic, and to take steps thought to minimize the likelihood of looting.

(5) Spontaneous, sporadic attempts to limit secondary effects: blockades are quickly thrown up next to a fallen bridge, valves are shut off to stem the flow from obvious ruptures in the water system, and attempts are made to stamp out small fires and to take quick corrective action against a few obvious fire hazards.

(6) Attempts are made to mobilize previously existing emergency-relevant organizations: off-duty personnel are called in, directives for action are prepared, equipment and supplies are assembled, and all are combined with a continuing effort to ascertain the needs and priorities.

(7) Beginning actions of emergent groups and organizations: where certain needs are obvious and are not being met, e.g., search and rescue, traffic control, examination of buildings for safety, new groups form and carry out "needed" activities.

(8) News media arrive which eventually increases curiosity in other areas.

(9) Systematic attempts to limit secondary effects including systematic evacuation: pre-existing local organizations, in some instances with assistance from non-local organizations, take immediate steps to reduce any further threat to life and property.

(10) Convergence: the affected area acts as a magnet attracting persons, food, medicines, clothing and all manner of material. Much of the influx goes to key nodes in the emergency social system such as hospitals. In the early hours and days much of the influx is not in response to specific need, but is largely from a naive altruistic impulse to help (Fritz and Mathewson, 1957).

In addition to the convergence of persons and material, there is a communications convergence. Every mode of communication is soon jammed with inquiries concerning the location and health of residents and offers of help. The convergence is a mixed blessing. It creates all manner of logistical and other problems, but often in the cornucopia are some of the critically needed specialists, equipment, and supplies (Kates, *et al.*, 1973).

(continued)

(11) The overwhelming feeling is that all obvious needs, especially immediate human needs, should be met promptly regardless of the magnitude of the effort or the cost involved. Under such circumstances there is little patience for such normal procedures as keeping careful records, clearing decisions with higher level officials, coordinating plans before taking action and checking carefully on the eligibility of persons and groups who appear to be in need. Any person attempting to conduct business as usual will be met with expressions of incredulity followed by outpourings of hostility (Taylor, Zurcher and Key, 1970).

(12) Full implementation of the emergency community "superstructure" between the varied groups and organizations involved in conducting the mass assault; systematic efforts to provide needed emergency services: careful search and rescue with records being kept, care for the injured is no longer happenstance, identification of the dead, programs of inoculation, organized distribution of food and water as needed, organizing shelter for the homeless, provision of critical services by emergency organizations, emergence of the kinship ties of the affected as a source of aid.

(13) Organized debris removal and the beginning of emergency repairs: efforts are to normalize the physical setting so that the full range of activities can be carried out with relative efficiency.

(14) Efforts by public officials to boost the morale of the local citizens: through news releases and public appearances, citizens are told that the worst is over, that help is forthcoming, that the community will be rebuilt, and that "we shall overcome."

(15) Individual family assistance, temporary housing initiated, beginning of applications for disaster loans.

(16) Emergence of victim hostility toward bureaucratic relief organizations; continued stream of the curious even weeks later; old antagonisms re-emerge; more and more victims and would-be victims push to see that they get their "fair share" of technical assistance, grants and loans.

concert, the factors listed in the table are the major patterns which emerge in all disasters consistently.

This overview should make it clear that relief and rehabilitation efforts are not conducted only by previously existing, emergency-relevant organizations. Individuals are active on their own, and person-to-person assistance is very common. A large amount of victim assistance comes from kin groups and associates.

One important facet which often is not portrayed very well in any attempt to summarize post-disaster events is the profound sense of shock and sadness over the death, injury, and destruction on all sides, and the emotion of altruism. There is an incredibly widespread and very intense desire to help. In the first few days, at least, this general desire to help does not carry with it evidence of expectations of compensation or other reward. This has been called the "therapeutic community" (Fritz, 1961), the "altruistic community" (Barton, 1970), and a "therapautic mood" producing a cornucopia of varied types of assistance (Taylor, Zurcher and Key, 1970).

In addition, any activity in relief and rehabilitation can serve as a point of conflict in the emergency social system. A note of caution should be inserted here. It is our belief, based on some direct observation following a number of disasters, and on our examination of the relevant literature, that what has been presented above is a reasonably accurate representation of the phenomena it purports to describe. However, from a scholarly and scientific perspective we must point out that the empirical data base for the generalizations we have presented is narrow, as evidenced by a very recent, comprehensive review of all the relevant social science literature (Mileti, Drabek and Haas, 1975).

4. Variability in Relief and Rehabilitation

Despite the similarities in relief and rehabilitation efforts in most disasters, communities struck by disaster can manifest considerable variation in their relief and rehabilitation efforts. Differences can be noted, for example, in the duration, scope, and organization of efforts, as well as in the kinds of problems which beset them. These differences are directly associated and are a direct consequence of the physical characteristics of the natural hazard which strikes. The speed and scope of a natural hazard, particularly, seem to affect the character of relief and rehabilitation. The following types of disasters can be

delimited within these two important dimensions (Carr, 1932):

(1) fast--widespread
(2) fast--localized
(3) slow--widespread
(4) slow--localized

These four kinds of disaster have different consequences for communities; they place very different levels of stress on different parts of the community. Fast-widespread disasters such as those caused by flash floods, make the greatest demands on a community's relief and rehabilitation capabilities because they occur with little or no warning and impact a wide area. This type of disaster, if there has been strong impact which is caused by an agent like an earthquake, calls for an extensive relief and rehabilitation operation to be undertaken. In fact, it may require rehabilitation efforts to extend over a period of several years. Because the demands placed on a community by fast-widespread disaster are so great, many groups may have to take on volunteers, i.e., expand, and many emergent groups may have to be formed to perform disaster tasks which cannot be assumed by pre-existing organizations. Considerable outside assistance is also usually required. In such disasters, for example, the military often plays a major role in the emergency social system, including involvement in such activities as search and rescue, caring for casualties and survivors, and maintaining community order.

Fast-localized disasters, caused by such agents as tsunamis, may provide little or no warning. The scope of this type of disaster, however, is limited; massive outside aid may not be needed, at least in the large urban areas which possess the typical emergency resources. The extended family and kinship relations that victims have also serve as an important source of aid in this type of disaster. In most cases, pre-existing local emergency organizations are able to handle the emergency problems without the involvement of ad hoc groups (Drabek, 1969). Fewer transportation and communication problems are created for groups performing relief services than by fast-widespread disasters.

Slow-widespread disasters are caused by such agents as hurricanes. Like earthquakes, hurricanes create widespread destruction and social disruption which require a community to mobilize its own resources, as well as to seek support from outside groups like Federal agencies and the military. However, unlike the fast-widespread disaster, a warning can precede a progressive-diffuse disaster if the hazard is predictable,

frequently giving a community the opportunity to evacuate the threatened area, mobilize emergency organizations, and to make such preparations for assisting disaster victims as the opening of shelters.

Because some actions can be taken before hazard impact, and because they are limited in scope, slow-localized disasters, such as small-scale floods, create fewer problems for communities than the three types of disasters we have mentioned. The relief and rehabilitation operation which evolves in this type of disaster context is apt to be of short duration and can involve local organizations which normally provide the community with emergency services in key roles. As these official emergency organizations deal with the problems associated with disaster, most of the rest of the community, being relatively unaffected by it, carries on in a fairly routine fashion.

There are other characteristics of natural hazard agents besides their speed of onset and scope of impact which exert some influence on the nature of relief and rehabilitation. One of these is their recurrence. Communities which are repeatedly struck by a particular kind of natural hazard agent sometimes develop fairly routinized responses to them. Some, for example, may become fairly expert at coping with hazards such as floods and hurricanes. Relief and rehabilitation efforts following recurrent disasters in such communities assume a more institutionalized character than they would in communities which have had little experience coping with them. Areas which have developed organized responses to a recurrent natural hazard are said to have a disaster subculture (Moore, 1964, pp. 195-213).

Finally, whether or not a disaster is of such a nature that it generates additional hazards also affects the character of relief and rehabilitation. If an earthquake produces major fires or a hurricane spawns widespread flooding, the scope and duration of relief and rehabilitation efforts in a stricken community may have to be significantly expanded, and the number and types of groups participating in the emergency social system may have to be enlarged.

5. Constraints to Relief and Rehabilitation

Many factors operate to complicate and reduce the effectiveness of relief and rehabilitation after disaster: (1) the lack of complete coordination between all involved relief organizations and groups, such that there may be a duplication of efforts in some areas of responsibility,

or, of much greater significance, neglect of other areas; (2) the temporary, but extreme, work overload of local relief agencies; (3) built-in bureaucratic inflexibility which results in some inability to cope with unusual, or non-uniform, events; and (4) the lack of requisite legislation for required funds and necessary operations for relief, and more specifically, for rehabilitation.

Factors which work against the adjustment are not only limited to those providing relief. Some of the characteristics of the recipient population which tend to encumber relief and rehabilitation are: (1) an ignorance on the part of the victims as to the potential availability of relevant services and which agency or group can provide particular services; (2) the dispersion of the afflicted population over a large geographical area; (3) the lack of racial, ethnic, and economic homogeneity among the recipient population; and (4) a natural tendency on the part of victims being assisted to get hostile toward relief-giving organizations whose personnel may react defensively.

There is a recurrent dilemma in the relief and rehabilitation process. Decisions to act quickly to relieve suffering and to get the economy going again can often undermine those actions that should be taken for long-term recovery. Unfortunately, little is known about which specific decisions in the relief effort may indeed act as constraints in rehabilitation. Several of the major constraints to the adjustment are listed and briefly described in Table II-2. Such constraints exist at most social levels, e.g., individuals and families, groups and organizations, and the community. They exist in both those giving aid (providers) and those receiving aid (recipients).

Several items become obvious on the basis of this review. First, there are problems of upgrading the coordination of relief and rehabilitation efforts, given the variety of agents and agencies involved in the processes, the length of time over which long-term efforts occur, and the diversity of types of people aided. There are, however, increasing efforts at upgrading coordination of the national, region, and local levels. Second, little is known about how relief and rehabilitation operations serve to act as constraints to the reconstruction period following rehabilitation; how relief and rehabilitation affect further vulnerability, the general quality of life, and even things such as the local economy of the community, family life, and the mental health of individuals. Third, because of some of these constraints and other

TABLE II-2

CONSTRAINTS TO ADJUSTMENT

Provider Variables

(1) Individual performance. Some individuals may not perform adequately in provider roles. This may be especially true during the relief phase of personnel in emergent groups and volunteers in expanding organizations who assume tasks which are unfamiliar to them.

(2) Communication. As previously mentioned, inter-organizational coordination is vital during disaster. However, a lack of efficient and comprehensive inter-organizational communication can seriously impair such coordination and thereby reduce the effectiveness of relief and rehabilitation. Intra-organizational communication is also important. A lack of communication between components of the same organization can reduce response efficiency. This is particularly the case in, but not limited to, organizational field unit communications in relief.

(3) Resumption of non-emergency tasks. As previously noted, many community organizations referred to as extending groups assume new tasks during disaster. For example, churches have been known to extend their activities to providing food, clothing, and shelter for disaster victims. Such non-regular tasks may be effectively met for a short time by an organization; however, at some point it must return to normal duties. This cuts the contribution many extending organizations can make to long-term rehabilitation efforts.

(4) Voluntary funding. An organization which functions on voluntary contributions may find its capacity reduced as these funds run out. This is especially true if the organization is to participate in the rehabilitation process.

(5) Community experience. Previous community activity provides some learning which may be applied to subsequent situations. The absence of disaster experience may result in a less efficient and effective emergency response from providers.

(6) Systemic effects. The varied and changing policies for relief and rehabilitation can have negative effects on future vulnerability and long-term recovery.

(7) Preparedness. Low-levels of community preparedness for disaster retards the maximum benefits achieved from the adjustment.

Recipient Variables

(1) Dependency. Receiving the benefits of relief and rehabilitation requires victims to assume dependent roles. This produces psychological conflict in victims in a society such as ours, where independence is a strong social value (Taylor, Zurcher and Key, 1970; Bates, *et al.*, 1963). Effective relief and long-term rehabilitation efforts presuppose the willingness of recipients to accept aid from providers. However, it may be the case that some category of recipients is unwilling, or holds a negative value for accepting aid from providers.

(2) Inability to initiate contact. Relief, and especially rehabilitation efforts often require interaction in the process to be initiated by the recipient rather than the provider. This may result in the uneven distribution of aid (especially in the rehabilitation process where more formalized channels for aid exist than in relief) among those individuals who know how to interact with organizations and those who do not hold this knowledge, and those who know how to speak English and those who do not. However, several measures have been initiated to countermand such constraints as "ethnic dissonance."

(3) Decline in aid from close associates. In the initial period following a disaster, many evacuees are included in the families of friends and relatives. This relieves the burden of additional numbers of homeless in the community. However, as this source of aid declines, it can serve to perpetuate the need for publicly offered services.

unknown factors, aid is often disproportionately allocated across various social, economic and ethnic groups in a community. The aged rarely receive a proportionate share of aid and services. Such services should incorporate the means whereby their allocation might be equalized across all such groups.

6. Incentives for Relief and Rehabilitation

There are several incentives for the active participation of relief and rehabilitation organizations, not the least of which is the community's desire to remove the added economic burden placed on local revenues by structural damage of business and personal property, as well as to avert possible unemployment. In addition to the purely economic stimulus for relief and rehabilitation, there is a high premium placed on life and the alleviation of suffering in western culture. Disasters also provide an opportunity for relief organizations to justify their own existence and demonstrate their organizational value. As with constraints, incentives are easily divided into provider and recipient variables. In addition to those already mentioned, several other incentives are listed in Table II-3. Incentives such as these help to explain why the adjustment exists and will continue to exist as long as disasters occur.

7. Societal Factors

Several general societal trends can have a direct effect on the frequency of an adjustment's use and on its effectiveness. Research opportunities on relief and rehabilitation are also affected by such general trends.

a. Population

Three trends have been identified in the size and distribution of population: (1) population will continue to increase as the year 2000 is approached, then the rate will level off; (2) regional migration patterns will continue--California, Arizona, Nevada, Colorado, Texas, and Florida are growth leaders, while the Northeast is losing population, with the exceptions of Delaware, Maryland, and New Jersey which are increasing; and (3) rural-to-urban and suburban migration will continue, but at a slackened pace. In addition, most of the states which are leaders in net size growth are the same states that are above the national average in percent increase in urban population. Urbanization (which continues even

TABLE II-3

INCENTIVES FOR ADJUSTMENT

Provider Variables

(1) Opportunity to be altruistic. Disaster provides the opportunity for individuals and groups to be altruistic. This is most characteristic of relief, declining as time passes in any prolonged period of rehabilitation.

(2) Excitement. Disaster allows some individuals to get away from the routine through participation in emergency-activated groups. Again this is more true of relief than rehabilitation.

(3) Opportunity for reconstruction. Various community segments may seize the rehabilitation process as an opportunity to reconstruct some community structure, either social or physical, above previous levels. For example, "instant urban renewal" sometimes results in areas lived in by low-income segments of the population.

Recipient Variables

(1) Personal need. Regardless of the recipient unit involved, need for aid in its various dimensions is present and is a major force for relief and rehabilitation efforts.

(2) Personal gain. Regardless of the recipient unit involved, anticipated personal gain beyond pre-impact levels may motivate some to use available services. This is largely limited to rehabilitation rather than relief, since rehabilitation affords more avenues for aid enabling the passing of pre-impact levels.

in states which are losing population) will continue to increase concentrations of population. Such trends need not reflect increases in overall vulnerability; however, by increases in the population of any one place, vulnerability to catastrophic disasters and their accompanying losses is increased. As a consequence, the growth leader areas of the country are increasing in hazard vulnerability generally, and in catastrophic events specifically, while states losing population are experiencing decreasing vulnerability in the same manner. Population pressure in densely settled areas is causing expansion into areas which are subject to greater hazard risk. For example, there is development of areas of artificial fill in earthquake-prone cities in the West.

Any increase in the vulnerability of an area to a catastrophic event will increase the reliance on relief and rehabilitation in major disasters, and is impetus for current research opportunities on the adjustment.

b. Corporate Organization and Size

Corporations are becoming larger. There are increasing numbers of conglomerates with widely dispersed investments in a variety of industrial and commercial endeavors. If such increases in corporate size and diversification mean that there will be proportionately more financial reserves which could be used to cope with hazards (through any mix of pre- or post-event adjustments), the trend means that losses to hazards could be reduced. Regardless of trends in size, the increased tendency for physical dispersion makes the possibility of corporate self-insurance more feasible. In other words, large enterprises may be more able to install pre-event adjustments, and more able to withstand the destruction of some segment of their diversified interests or holdings.

Assuming no change in the installation of pre-event adjustments, the trend toward diversification means an increased capacity of such corporations to sustain loss. Any installation of pre-event adjustments would itself decrease overall vulnerability.

These general trends could affect relief and rehabilitation as an adjustment in two opposite ways. First, the increasing ability of corporations to install other adjustments can decrease the need for relief and rehabilitation by decreasing vulnerability. However, an increasing ability of corporations to cope with a hazard (through both pre- and post-event adjustments) could encourage the escalated development of hazardous

areas--thereby increasing vulnerability to catastrophic losses--and escalate the need for relief and rehabilitation when disaster strikes.

c. Citizen Participation

Citizen organizations have recently begun to have impact in areas such as public safety, consumer protection, and environmental issues. Governmental efforts have been made to respond to such groups with, for example, seat belts, crib, auto, and fire safety, and the testing of toys.

There does seem to be a trend to increased concern in many quarters, but it is unclear whether these concerns have carried over permanently to the natural hazards arena. Only a few examples of such cases exist, one of which stands out as a major departure in citizen response to relief activity. The Commonwealth of Pennsylvania brought a law suit as a complaint against relief activities following Hurricane Agnes in 1972. However, in other areas affected by Agnes, relief activity was seen by the citizenry as appropriate and expeditious. However, if this trend could be made to include the natural hazards arena, its effect on relief and rehabilitation could be dramatic by increasing the adoption of pre-event adjustments, decreasing vulnerability, and increasing levels of community preparedness to cope with future disasters. The League of Women Voters and Ralph Nader groups, for example, are agents which could give impetus to such a trend.

d. Other Societal Factors

A variety of the forces and trends which operate in society can have implications on any adjustment in the hazard system. The preceding trends reviewed have illustrated how such forces could affect relief and rehabilitation in a variety of ways, by either increasing or decreasing the effectiveness of the adjustment through preparedness and the need for its use.

The exogenous factors reviewed are only a small portion of all possible forces which might affect the adjustment. Others include: (1) an increasing revitalization of the basic value of individualism; (2) community action to decrease vulnerability; and (3) an increasing trend toward multi-family and mobile dwelling units, which is itself the result of larger economic forces.

Any research opportunities that exist at this point in time are affected by trends such as these, and should be undertaken in recognition

of the effect such trends may have on the adjustment.

8. Community Preparedness

Preparations for future emergencies are sometimes initiated by community groups and organizations during the rehabilitation phase of disaster, although few studies have addressed this issue. Such preparations can be viewed as efforts to rehabilitate a community in order to mitigate the impact of future hazard agents.

We know that disasters serve as catalysts for increased community preparedness, but that they don't have a lasting effect. The studies which have been done (Anderson, 1970 and 1970a; Drabek, 1968) identify the following kinds of changes in emergency planning produced by disaster: (1) the creation of written disaster plans where none previously existed, and the improvement of existing ones; (2) the enlargement of the staffs of emergency organizations; (3) the acquisition of emergency equipment such as standby generators and emergency vehicles; and (4) the establishment and improvement of emergency communications systems. Such changes have generally been forthcoming when community groups, as a result of their disaster experience, perceive the need for changes and also possess the capacity for effecting them.

Some community organizations experience an increased capacity to expand their emergency preparedness. Normally, organizations like civil defense, which often have the major assigned responsibility for disaster planning at the local level, have considerable difficulty convincing the public and political leaders that they have a vital community function to perform and deserve more than minimal support for their programs. However, following disaster, these organizations sometimes receive unprecedented financial support from city councils, state legislatures, and other sources, which enable them to expand their programs.

The importance of another type of support for facilitating changes in community preparedness has also been noted (Anderson, 1970a). Both Crescent City, California, and Hilo, Hawaii, experienced tsunami disasters in the 1960's, but extensive improvements in community preparedness came only in Hilo. One of the chief reasons for this was that outside experts, such as those at the Hawaii Institute of Geophysics in nearby Honolulu, were available to advise Hilo officials, while comparable advice was not sought or received by officials in Crescent City.

In general, community preparedness for relief and rehabilitation must begin with an understanding of how much of a hazard exists in a specific community, and how that community might best respond to it. Disaster response plans must be adaptable to situations of varying degrees of impact from all geophysical hazards in a community; such plans are best based on local vulnerability analysis and potential damage assessment. For any hazard, community preparedness must be based on a series of community-specific questions:

(1) What is the hazard?
(2) Where is it likely to occur?
(3) How frequently is it likely to occur?
(4) What is the range of magnitudes most likely to occur?
(5) What response will be required given varied degrees of impact?
(6) With what resources (personnel and material) can it be done?
(7) What approach, method or procedure would be best used?
(8) Who would be involved?
(9) What will they do?
(10) How will they do it?
(11) How would the total effort be best coordinated?
(12) Who will pay for it?

Seldom, however, can one plan provide for all possible events. A viable plan for community preparedness must be adaptable to all degrees of hazard impact, and address administrative and operational issues. It should specify the organization of the emergency social system--including its communication patterns, interrelationships between relevant units such as government agencies, utilities, voluntary organizations, the military, and other groups--and assign particular functions to each: coordination, welfare, health and medical, and law enforcement. Once the specifics of the total responding community are detailed, such a plan must calculate and provide for the optimum relationship between system capability and the varying levels of demand which could be placed on it.

Once good preparedness is achieved, it must be maintained over time. Little is known about what is required to maintain the important elements of preparedness. This knowledge should be pursued since preparedness can dramatically reduce loss of life, casualties and social disruption from disaster.

a. Constraints to Preparedness

It is one thing to have good community plans on paper, and quite another thing to be able to carry out those plans when disaster strikes. Preparedness, especially at the community level, should include the frequent enactment of those plans in practice exercises. Some factors which tend to work against the effectiveness of plans, as suggested by Dynes, *et al.* (1972), are the following: (1) plans often do not specify someone to assess the overall disaster situation; (2) provisions are often overlooked for communicating emergency information to all concerned; (3) a central command post is often ommitted from a community's plan; (4) inadequate planning for interorganizational coordination is frequent, for example, responding agencies or groups can act autonomously, which inhibits coordination; (5) plans rarely provide for all the different disaster demands which must be met once disaster strikes; (6) varied duties are often ignored in plans; (7) plans are rarely adaptable to all situations--communities often plan for only certain kinds of disaster impact; (8) plans rarely include specifying the way a community can return to normalcy; and (9) plans are not updated often enough to provide for changes in the community (pp. 77-79). The Defense Civil Preparedness Administration, through its on-site assistance program, is one agency attempting to reduce some of these constraints. Under this program, requesting cities and counties receive assistance from Federal and state officials in preparing and updating preparedness plans.

The adoption of preparedness programs is inhibited because: (1) existing plans are usually seen as adequate, (2) in some cases the adoption of plans must await the passage of legislation, (3) there is a lack of finances (OEP, 1972, Volume 1, p. 9), (4) community officials may lack the necessary knowledge for developing plans, (5) daily community demands often distort priorities, and other community needs usually take precedence over planning for disaster, and (6) a disaster creates a new type of task which has a different *quality* from normal demand loads. The level of interdependency among the varied responding units is altered. Recognizing this increased interdependency, each organizational official will temporarily accept the legitimacy of the emergent "synthetic organization" and yield to the requests coming from it. However, once this task is done, each official will seek to return to the previous authority structure wherein the degree of autonomy granted each respective unit is far greater.

Other relevant factors may be constraints to the adoption of upgraded preparedness; however, little is known about what these factors may be.

A comprehensive program for the development of preparedness is currently being conducted in many California cities and counties which may ameliorate some of these constraints. The program is sponsored by the Defense Civil Preparedness Agency and the California Office of Emergency Services, and is being implemented by the University of Southern California Institute for Disaster Preparedness. Among the goals of the program are: the training of officials and personnel in direction and control under emergency conditions; increasing the awareness that individual skill area capability is not enough for large scale disasters; and development of a local capability to carry out simulation exercises (Meyer, 1969). In such simulation exercises, officials may be learning to switch in and out of the appropriate disaster-related authority structure, and as a consequence may be more proficient in making the transition during a real disaster.

b. Incentives for Preparedness

As previously stated, little is known about the factors which account for the different degrees of preparedness in communities. Community-level hazard awareness is, without a question, a significant incentive. Often, preparedness plans are reviewed, updated, and expanded after a major disaster in a community, when prior plans proved to be inadequate. In such cases awareness of the hazard increases; the influx of money from outside the community and possible personal or political gain by those in power may also provide incentives.

CHAPTER III

RELIEF AND REHABILITATION IN NATIONAL PERSPECTIVE

Relief and rehabilitation is much more than what is provided by the Federal government to those affected by disaster. The full range of activities, specified in Chapter II, cuts across all levels of government, involving persons in all walks of life. Nevertheless, a significant portion of the various activities which comprise the adjustment stems from Federal programs and policy. Any change in Federal policy alters some portion of the adjustment. It is the purpose of this chapter to review the different types, history, and cost of Federal involvement in relief and rehabilitation and community preparedness. In addition, the present Federal policy on the adjustment will be summarized and trends projected into the future.

Types of Federal Involvement

Federal resources are made available to disaster-stricken areas through the provision of services, supplies, equipment, and manpower, and by the allocation of congressionally authorized funds for relief, rehabilitation and reconstruction purposes. Four definitions of disaster exist which define the mode of Federal involvement: major disasters declared by the President; emergencies declared by the President; disasters declared by either the Small Business Administration (SBA) or the Farmer's Home Administration (FHA); and disasters in which no formal declaration is made.

The President, at the request of the governor of an affected state, can declare a major disaster if damage is of sufficient severity and magnitude as to exceed state resources and capabilities for effective response. Until recently, Public Law 91-606, as amended, provided the range of benefits available to state and local governments, individuals, non-profit enterprises, and businesses. Some of the primary benefits included home loans, temporary housing, the restoration of public facilities, community disaster grants, debris removal, unemployment compensation,

coordination of relief organizations, and emergency relief support teams. Recently, Public Law 93-288 added certain new benefits and modified others, for example, 100% grants for repairing or reconstructing disaster-damaged public educational, park, and recreational facilities. Other noteworthy changes included a 25% community loan program, the establishment of a Recovery Planning Council for affected areas, and an individual and family grant program for disaster-related needs and expenses.

The benefits provided by the Federal government in cases of a Presidential declaration of a major disaster are subject to the following major considerations: (1) Federal assistance can be applied in a manner to suit the level of destruction incurred, which is subject to concurrence with the governor, and in amounts necessary to supplement individual, state and local resources, including equipment and personnel as well as monetary aid; and (2) Federal assistance to individuals, non-profit organizations, and businesses is conveyed directly, as in the case of loans and temporary housing, and indirectly through state and local agencies, as with grants to individuals, unemployment payments, and food stamps.

The President can declare an emergency, rather than a major disaster, when the governor of a state certifies that danger from, or damage caused by a natural hazard requires Federal emergency assistance to supplement state and local efforts to save lives, protect property, public health and safety, or in order to avert or lessen the threat of a disaster. Although extensive Federal help is available when such an emergency is declared, benefits provided for individual and governmental losses are not as inclusive or sizable as those in a major disaster.

The Federal government may also become involved in disasters in which neither a Presidential declaration of a major disaster or an emergency is made, because of statutes which authorize the heads of the Small Business Administration or the Farmer's Home Administration--on their own prerogative--to make loans to individuals and small businesses, and to provide other aid to agriculture in stricken areas.

In cases in which no disaster declaration of any sort is made, other Federal programs (such as urban renewal) may still involve the Federal government in relief and rehabilitation. These programs can be a significant part of local long-range rehabilitation efforts. However, they are not brought into action by existing disaster legislation; they continue to function in their normal pre-disaster capacities. For example, heavily damaged areas of a city can be incorporated in a new or

enlarged urban renewal program. Estimates of the portion of Federal expenditures for these programs which are directed at post-disaster activities are not available.

Approximately 30 volunteer agencies and groups, such as the American National Red Cross--which is congressionally chartered as a disaster relief agency--and the Salvation Army, have played a very significant role in both declared and undeclared disasters, and continue to do so. The increasing involvement of the Federal government in major disasters (with food stamps, for example) has relieved some of the financial burden formerly borne by these organizations and further commits Federal expenditures to disaster relief.

History of Federal Involvement

Public Law 81-875, enacted in 1950, provided for the first permanent program of Federal disaster assistance to state and local governments. Prior to its enactment, assistance from the Federal government was provided only in cases of special appeal after a disaster had occurred. Between 1803 and 1950 there were over 100 distinct cases in which Congress passed assistance acts in response to special appeals.

Public Law 81-875 was concerned primarily with Federal assistance to state and local governments; however, it did authorize a minimum amount of disaster aid to individuals through cooperation with the Red Cross in the distribution of relief supplies. Public Law 82-107, enacted in 1951, amended Public Law 81-875 and authorized the use of emergency housing for disaster victims. Public Law 83-134, enacted in 1953, further amended Public Law 81-875 to allow for the donation and loan of Federal surplus commodities to state and local governments and individuals. Public Law 87-502 was enacted in 1962 and expanded the definition of a state, making Public Law 81-875 applicable to all of the United States and its possessions. It also authorized the emergency repair and temporary replacement of damaged state government facilities; previously only public facilities owned by local governments were recipients of such aid.

The expansion of Federal programs for assisting disaster victims accelerated after the Alaskan earthquake of 1964. Public Law 88-451 increased Federal contributions for damage in Alaska from 50% to 94.9% for highway construction, authorized the matching of state funds for paying mortgages, provided additional assistance for public facilities through FHA loans, and permitted the Small Business Administration to make 30-year

loans on dwellings. Public Law 89-41, the Pacific Northwest Relief Act of 1965, authorized $70 million for the repair and reconstruction of damaged highways in that area, which were not eligible under Public Law 81-875.

In 1965, Public Law 89-339, the Southeast Hurricane Disaster Relief Act, (passed as a result of Hurricane Betsy) for the first time provided a forgiveness feature for SBA disaster loans. A $1,800 forgiveness was provided for after the first $500 of the loan was repaid. However, the law applied only to Hurricane Betsy victims and did not provide the forgiveness benefit to victims of other disasters.

Public Law 89-769, enacted in 1966, further amended Public Law 81-875 and is an important landmark act in the history of disaster legislation. For the first time benefits to the private sector were made permantly available, including such assistance as the following: (1) the adjustment of disaster loans; (2) loan refinancing; (3) 50% grants for the repair and reconstruction of public facilities; (4) up to 100% grants for the repair and reconstruction of public higher educational facilities; (5) priority for Federal aid applications for public housing, urban renewal and public facility grants; (6) the authority to use civil defense communications for disaster warnings; and (7) the inclusions of rural communities, unincorporated towns, and villages as communalities capable of applying for Federal disaster aid through some state or local government.

In 1969, Public Law 91-79, the Disaster Relief Act of 1969, was enacted. The increased range of Federal benefits it provided included: (1) temporary housing with the possibility of rent adjustments for up to 12 months, with rental charges not exceeding 25% of the total family income; (2) grants not exceeding $250,000 to states for disaster plans on a 50% matching basis; (3) re-establishment of the $1,800 forgiveness on Small Business Administration and Farmer's Home Administration loans, with interest rates at the cost to the government; (4) provision for a Federal coordinating officer to oversee all relief activities; (5) disaster unemployment insurance; (6) grants for debris removal; and (7) food coupons to low-income victims.

The Disaster Relief Act of 1970, Public Law 91-606, repealed all previous disaster legislation and established a comprehensive, expanded program of assistance to both public and private sectors. The forgiveness amount of Small Business Administration and Farmer's Home Administration loans was increased to $2,500; loans were authorized for

major sources of employment; temporary housing was made free of rental for one year; grants for losses to public facilities were doubled to 100%; and community disaster grants were authorized. Among the new benefits it made available were the provision of legal services, relocation assistance, emergency public transportation, grants for removing damaged timber from private lands, predisaster aid, and disregard of the age of applicants for assistance.

Public Law 92-209, enacted in 1971, authorized grants of 100% to repair or reconstruct private non-profit medical facilities damaged or destroyed in major disasters. Public Law 92-385, enacted on August 16, 1972 and repealed on April 20, 1973, further revised the Federal disaster loan program to forgive up to the first $5,000 and to lower the interest rate to 1% on any additional balance. This financial resource became available to disaster victims not only after a Presidential disaster declaration (as was the case prior to Public Law 92-385), but also after SBA and FHA disaster declarations.

The act called for a comprehensive review and revision of Federal disaster assistance programs. As a result, the proposed Disaster Preparedness and Assistance Act of 1973 (S. 1840) was submitted by the President to the Congress on May 8, 1973. This bill reportedly was designed to (1) standardize benefits for disaster victims, (2) improve the execution of the assistance program, (3) prevent the misuse of benefits, (4) strengthen preventive measures to minimize future losses, and (5) increase the role of state and local governments in implementing the disaster program. The bill failed to become law.

The Disaster Relief Act of 1974, Public Law 93-288, repealed all but the loan section of the Disaster Relief Act of 1970 (Public Law 91-606) and chartered a number of new programs and features, as well as furthering many provisions of the old law, the more significant of which can be summarized as follows:

(1) "major disaster" was redefined to include additional causes for disasters and to permit a different level of response for a major disaster than for those of lesser impact;

(2) provisions for disaster planning, preparedness, and mitigation were strengthened;

(3) the acquisition of available insurance to protect against future disaster loss on any public property repaired or restored with Federal assistance was required;

(4) civil and criminal penalties for violation of United States disaster relief laws was stipulated;

(5) the President was authorized to assure the availability of construction materials needed in major disaster areas;

(6) 100% grants for repairing or reconstructing public educational, park, and recreational facilities and non-profit private educational, utility, emergency, medical, and custodial care facilities, including those for the aged or disabled and facilties on Indian reservations were provided;

(7) grants to state and local governments were authorized at 100% of the estimated cost for repair, reconstruction, and debris removal costing less than $25,000;

(8) an optional 90% grant program for damaged public facilities, providing greater flexibility and local discretion was established;

(9) maintenance of adequate stocks of food commodities for distribution in major disaster areas was mandated;

(10) 75% grants to states (retroactive to April 20, 1973) were provided for the purpose of making funds available to individuals and families for disaster-related expenses and needs;

(11) loans were authorized to any local government for lost tax revenues (not to exceed 25% of annual operating budgets), of which portions may be canceled if future revenues are insufficient;

(12) professional counseling services for mental health problems caused or aggravated by a disaster were authorized;

(13) a long-range economic recovery program for major disaster areas was established, including grants and loans for public works and development facilities, with a total authorization of $250 million;

(14) disaster unemployment assistance was extended to a maximum for one year;

(15) Presidential powers to provide emergency assistance were broadened;

(16) disaster assistance administrative procedures and controls were clarified and strengthened.

Table III-1 traces the major legislative history of Federal involvement in relief and rehabilitation, and includes the innovative features of the most recent acts. Public Law 93-288 is a landmark piece of legislation because it provides for more planning in the reconstruction of disaster areas than ever before, and there is a definite partial shift of responsibility to the states in carrying out relief and rehabilitation activities.

Costs of Involvement

Any figures on the cost of any Federal expenditures in relief and rehabilitation underestimate the true cost to the Federal government and of the adjustment. Costs absorbed by individual victims and local and state governments would add considerably to total estimates. It has been estimated that natural hazards cost the nation $10 billion and 620 lives annually (White and Haas, 1975). This estimate is itself incomplete; it says nothing of the social costs which result from the disruption of family and community life.

The following tables are presented in order to estimate the direct cost of the adjustment to the Federal government. Table III-2 presents direct Federal expenditures for disaster assistance for the 1953-1973 period, which totalled over $4 billion, but does not take into account the costs of items such as subsidized interest rates on disaster loans nor indirect costs such as agency salaries. The costs attributed to the eight Federal agencies in the table reflect the costs of providing the following services: (1) Federal Disaster Assistance Administration--direct relief expenditures from the President's emergency fund and reimbursement of other Federal agencies for disaster-related costs; (2) Small Business Administration--forgiveness credit or the cancellation of principal on disaster loans; (3) Farmer's Home Administration--forgiveness credit or the cancellation of principal on disaster loans; (4) Department of Agriculture--cost of food commodities and coupons provided to disaster victims for the 1969-73 period; (5) Federal Highway Administration--repair and reconstruction of disaster damages to highways on Federal-aid systems; (6) U. S. Army Corps of Engineers--emergency flood preparation, fighting and rescue operations, and repair or restoration of flood control works threatened, damaged or destroyed by floods; (7) Veteran's Administration--

TABLE III-1

LEGISLATION FOR FEDERAL INVOLVEMENT IN RELIEF AND REHABILITATION

1803-1947	Special acts (128)--to provide relief for victims of specific disasters.
1947 PL 80-233	First general disaster relief act; surplus Federal property transferred to state and local governments.
1950 PL 81-875	Federal funds authorized for emergency repair and replacement of public facilities of local governments.
1951 PL 82-107	Authorized emergency housing.
1953 PL 83-134	Permitted loan or donation of Federal surplus property to state and local governments for repair of public facilities and for individual rehabilitation.
1962 PL 87-502	Extended coverage of PL 81-875 to include state public facilities and Guam, American Samoa, and Trust Territory of the Pacific Islands.
1964-1965 PL 88-451	1964 Alaska earthquake assistance.
PL 89-41	1964-65 flood damage assistance to California, Idaho, Nevada, Oregon, and Washington.
PL 89-339	Hurricane Betsy (1965) assistance to Florida, Louisiana, and Mississippi with a forgiveness of $1,800 on SBA loans.
1966 PL 89-769	Further expanded PL 81-875 with additional disaster relief benefits including: --The adjustment of disaster loans, --Home mortgage refinancing, --50% grants for the repair and reconstruction of public facilities, including those under construction at the time of a disaster, --Up to 100% grants for the repair and reconstruction of public higher education facilities, --Priority for applications for aid to housing projects above all other applications, --The authority to use civil defense communications for disaster warnings, --The inclusion of rural communities, unincorporated towns and villages as units capable of applying for Federal aid, --Affirmed OEP authority to coordinate all Federal disaster assistance programs, and OEP responsibility for disaster preparedness liaison with state and local governments.
1969 PL 91-79	Comprehensive act covering most aspects of prior legislation but limited to 15 months (expired on December 31, 1970); provisions included: --Designation of a Federal coordinating officer to coordinate all relief activities during a major disaster, --Federal agency cooperation in rendering disaster assistance, --Federal assistance authorized up to $250,000 in 50% matching grants to states for development of disaster plans, --Debris removal from public and privately owned lands and waters by Federal agencies and grants to state and local governments for this purpose, --Forest and grassland fire suppression grants to states, --Temporary housing for up to 12 months with rentals adjusted to not more than 25% of family income, --SBA, FHA, VA loans at cost to government for borrowing, --$1,800 forgiveness after repayment of the first $500 on SBA and FHA loans, --Authority to distribute food commodities and coupons to disaster victims, --Federal unemployment compensation, --Federal funds for purchase of timber in disaster areas, --Restoration of U. S.-owned facilities in disaster areas, --Federal contribution of 50% to state governments to repair and reconstruct roads and highways not on any Federal-aid highway system.
1970 PL 91-606	Comprehensive disaster assistance act with no expiration date; most provisions of PL 91-79 included, and new ones added covering: --Emergency support teams, --Use of local firms and individuals, --Coordination of relief organizations, --Nondiscrimination in providing disaster assistance, --Emergency communications, --Provision of emergency public transportation, --Disregard of age of applicant for assistance, --Aid to major sources of employment, --Provision of legal services, --Grants to states and local governments to repair or reconstruct public facilities increased from 50% to 100%, --Reimbursement for Federal agencies, --Federal utilization of state and local services and agencies, --Protection against duplication of benefits, --Pre-disaster assistance, --Minimum standards for residential structure restoration, --Relocation assistance to victims, --Free temporary housing for one year without regard to income, --Sale of temporary housing to occupants authorized, --Interest rate on SBA and FHA disaster loans, in disasters declared by either the President or the agency, reduced to 2% less than government cost, but in no case more than 6%.

TABLE III-1 (continued)

1971 PL 92-209	Amended PL 91-606 to authorize Federal grants for repair, reconstruction, or replacement of medical care facilities owned by private tax-exempt organizations damaged or destroyed by a major disaster--up to 100% of net cost for existing facilities, up to 50% for those under construction.
1972 PL 92-385	Forgiveness was increased up to the first $5,000 and an interest rate of 1% on any additional balance for disasters declared by the President, the SBA or the FHA; 100% grants for the repair or reconstruction of damaged facilities of non-profit, private educational institutions.
1973 PL 93-24	Forgiveness feature rescinded for all disaster loans; interest rate increased to 5%; grants for non-profit, private educational institutions repealed.
1973 PL 93-234	Flood Disaster Protection Act; doubled the amount of coverage for subsidized insurance; erosion losses eligible for coverage; Federal aid to projects in flood-prone areas prohibited unless covered by flood insurance; no Federal financial assistance or guaranteed loans after July 1, 1975 for structures in flood hazardous areas unless local community participates in the flood insurance program.
1974 PL 93-237	Reinstated for a 90-day period FHA disaster loans at 1% interest and $5,000 forgiveness for farmers living in counties designated major disaster areas between December 27, 1972 and April 20, 1973.
PL 93-288	Comprehensive disaster assistance act enacted on May 22, 1974; includes most previous benefits with new ones added covering: --Presidential declaration of "emergency" as well as major disaster, --Added hazards of tsunami, volcano, landslide, mudslide, explosion, --Encourages local and state adoption of insurance; mandatory on public property, --Encourages hazard mitigation such as land use and construction regulations, --Long-range economic recovery program, --Recovery Planning Council for affected area to coordinate long-range economic recovery programs, --Post-disaster critiques and evaluations, --Prevention included as a component of preparedness, --Agreements with private communication systems for warning reimbursement, --Governor of affected state has to provide information before President can act, --Repair of farm fencing, --Any Federal agency may accept and utilize services or facilities of any local or state government and fix compensation, employ experts, and contract needed goods and services, --Mandatory priority of applications for housing and public facilities over all other applications, --Criminal and civil penalties for fraudulent requests for aid and wrongfully applying proceeds of a loss or cash benefit, --Mitigation of hazards through land use and construction practices for Federal facilities repaired or reconstructed after a major disaster, --Up to 100% grants for repair or reconstruction of private non-profit educational, utility, emergency, medical, and custodial care facilities, including those for the aged or disabled and facilities on Indian reservations; includes all educational, public park and recreational facilities, --Option of state to obtain grants equal to 90% of Federal estimate of total cost of repairing or replacing all damaged facilities to use and administer as the state deems appropriate, --Installation of essential utilities for temporary housing at Federal expense when determined to be in the public interest, --Sale of, or other availability of temporary housing units to states or local governments, --One year availability of unemployment benefits for disaster victims not eligible under state laws, --75% grants to states to make funds available to individuals and families with disaster-related necessary expenses and serious needs, --Required Federal provision of food commodities, --Loans to any local government for lost tax revenues (not to exceed 25% of annual operating budget); all or portions may be canceled if local revenues are insufficient, --In lieu contribution at 100% of estimated losses to state and local governments for repair, reconstruction, debris removal in disasters costing less than $25,000 to be spent as determined necessary by those governments, --Public works and development facility grants and loans, guarantee of private loans, and technical assistance for economic recovery authorized, --$250 million authorized for long-range economic recovery programs in major disaster areas, --Crisis counseling assistance for mental health problems caused or aggravated by major disasters, --Environmental impact statements not required for emergency activities, debris removal, or restoration of facilities to pre-disaster condition; --President authorized to assure availability of construction and other materials in disaster areas,

(OEP, 1972, Volume 1, pp. 171-172; Norton, 1974; U. S. Senate, 1974, p. S2221).

TABLE III-2

DIRECT FEDERAL EXPENDITURES FOR DISASTER ASSISTANCE, 1953-73

	AGENCY	AMOUNT
1.	Federal Disaster Assistance Administration (FDAA), formerly Office of Emergency Planning and Office of Emergency Preparedness (OEP)	$1,844,827,290
2.	Small Business Administration	809,254,922
3.	Farmers Home Administration	448,180,766
4.	Department of Agriculture	18,415,159
5.	Federal Highway Administration, formerly Bureau of Public Roads	484,637,000
6.	U.S. Army Corps of Engineers	299,341,940
7.	Veterans' Administration	2,000,000
8.	Office of Education	102,330,691
9.	Federal Insurance Administration	46,774,000
	Total	$4,051,761,768

(U. S. Senate, 1974, p. S2221)

losses on VA home loans because of disasters; (8) Office of Education--repair, restoration and reconstruction of disaster damaged public elementary and secondary school buildings, debris removal, and purchase of equipment and supplies; and (9) Federal Insurance Administration--net program costs of the national flood insurance program for the 1969-73 period.

Tables III-3 through III-6 are presented to illustrate the yearly costs of disasters to the Federal government through the operational programs of FDAA, SBA, and FHA. In these tables dollar costs have been made constant by using 1967 as the base year and equal to 100. A review of these tables illustrates that Federal expenditures for relief and rehabilitation have increased dramatically in recent years. For example, the trend is evident if Federal disaster assistance expenditures for obligations by OEP and FDAA are broken down into five-year categories: 1953 through 1957 ($33.4 million); 1958 through 1962 ($69.6 million); 1963 through 1967 ($251.5 million); and 1968 through 1972 ($1,663.8 million).

One of the prime reasons for increased Federal costs is the trend toward increasing the legislated availability of new and expanded benefits authorized by Congress. In recent years, the Federal government has been assuming part of the costs previously incurred by private relief organizations. For example, as a result of a Presidential declaration of a major disaster, the Federal government may provide many household and other supplies distributed by these agencies and assume all costs for temporary housing. Likewise, Federal assumption of responsibility for major reconstruction and repair programs through low-interest loans have reduced Red Cross expenditures for housing. Following Hurricane Camille in 1969, the Red Cross spent over $6 million building or repairing homes; however, after Hurricane Agnes (with almost twice as many families assisted), such expenditures were limited only to temporary minor repairs, and only $125 thousand was spent.

Federal Roles in Community Preparedness

Federal involvement in community preparedness operates on the assumption that it is essential for preparedness programs to be combined efforts of Federal, state, and local governments. The Federal effort is now based in the Defense Civil Preparedness Agency (DCPA) and in the Federal Disaster Assistance Administration (FDAA), whose tasks include

TABLE III-3

NUMBER OF MAJOR DISASTERS AND ESTIMATED FEDERAL DISASTER ASSISTANCE ADMINISTRATION EXPENDITURES

Year	Number of Declared Major Diasaters	Estimated Required FDAA Expenditures[1]
1953	14	$ 1,844,274
1954	17	6,470,393
1955	18	12,080,838
1956	16	3,396,204
1957	16	10,618,246
1958	7	3,920,599
1959	7	4,057,310
1960	12	7,330,247
1961	12	10,570,010
1962	22	43,732,493
1963	20	9,951,121
1964	25	120,948,534
1965	25	81,307,904
1966	11	10,442,370
1967	11	28,826,139
1968	19	14,788,414
1969	29	264,100,236
1970	17	113,815,978
1971	17	278,767,823
1972	48	992,305,887
1973	46	264,176,757
1974 (through August)	38	----------
Total	447	2,283,451,868

(U. S. Senate, 1974, p. S2221; Norton, 1974)

[1] In constant dollars, 1967 = 100

TABLE III-4

SMALL BUSINESS ADMINISTRATION DISASTER LOANS, 1954-74

Fiscal Year	Number of Loans	Total[1] Amount	SBA Share[1]	Amount[1] Canceled
1954	157	$ 519,478	$ 519,478	----
1955	1,086	5,668,183	5,615,623	----
1956	3,309	33,301,700	31,876,874	----
1957	1,597	10,393,331	9,795,151	----
1958	1,559	13,844,661	13,417,073	----
1959	908	7,361,398	7,210,449	----
1960	625	3,702,185	3,590,809	----
1961	2,778	21,360,501	20,522,740	----
1962	6,106	34,125,203	33,469,177	----
1963	2,305	17,600,413	16,949,661	----
1964	2,509	43,985,862	42,583,503	----
1965	3,891	70,338,188	67,708,651	$ 32,876,069
1966	30,950	193,276,082	191,539,131	----
1967	2,035	24,237,021	23,769,036	----
1968	14,126	118,743,704	118,138,722	----
1969	2,128	25,476,463	25,344,331	----
1970	17,011	211,873,580	211,696,017	31,466,045
1971	57,407	387,510,260	387,324,243	38,899,938
1972	93,342	450,287,138	448,782,525	265,251,234
1973	215,001	2,307,912,160	2,306,759,568	656,206,367
1974 (July 1-Nov. 30, 1973)	44,350	401,280,000	399,760,000	144,474,626
Total	503,180	4,382,797,510	4,366,312,762	1,169,174,279

(U. S. Senate, 1974, p. S2222)

[1]In constant dollars, 1967 = 100

TABLE III-5

FARMERS HOME ADMINISTRATION
EMERGENCY LOANS, 1950-73

Fiscal Year	Amount[1] Obligated	Amount[1] Canceled
1950	$ 19,580,082	----
1951	13,655,591	----
1952	22,402,857	----
1953	30,866,219	----
1954	65,855,134	----
1955	64,171,116	----
1956	65,238,243	----
1957	53,339,073	----
1958	50,735,355	----
1959	31,873,177	----
1960	18,743,862	----
1961	22,005,097	----
1962	54,472,465	----
1963	54,341,402	----
1964	45,086,261	----
1965	72,124,927	----
1966	97,402,351	6,856,236
1967	94,604,930	305,486
1968	112,328,476	----
1969	130,776,414	----
1970	108,210,494	2,883,579
1971	165,926,677	21,581,118
1972	151,387,416	10,331,365
1973	847,804,531	623,223,299
Total	2,392,932,250	665,181,083

(U. S. Senate, 1974, p. S2222)

[1]In constant dollars, 1967 = 100

TABLE III-6

FARMERS HOME ADMINISTRATION HOUSING
DISASTER LOANS, 1966-73

Fiscal Year	Number of Loans	Amount Obligated[1]	Amount Canceled[1]
1966	194	1,646,371	----
1967	92	1,161,500	----
1968	309	925,922	----
1969	113	1,043,323	----
1970	405	5,384,292	----
1971	486	6,451,211	152,529
1972	273	2,824,063	908,571
1973	1,694	11,475,149	5,478,183
Total	3,566	30,911,833	6,539,283

(U. S. Senate, 1974, p. S2222)

[1]In constant dollars, 1967= 100

fostering the development of state and local organizational plans to cope with disasters. FDAA also serves as a source of assistance to the states in developing plans and programs for assisting individuals suffering losses as a result of major disasters (OEP, 1972, Volume 1, p. 1).

Under Public Law 93-288, the President is authorized to establish a program of disaster preparedness that uses the services of all appropriate agencies for the following purposes: (1) preparation of disaster preparedness plans for mitigation, warning, emergency operations, rehabilitation and recovery; (2) training and exercises; (3) post-disaster critiques and evaluations; (4) annual review of programs; (5) coordination of Federal, state and local preparedness programs; (6) application of science and technology; and (7) research. Since 1950, however, policy still places the Federal role in a supplementary position to state and local governments.

A contract with the Federal Disaster Assistance Administration (which was at that time the Office of Emergency Preparedness) enabled the Council of State Governments to prepare the Example State Disaster Act (OEP, 1972, Volume 2), as well as Guidance for State Disaster Planning (OEP, 1972, Volume 2), illustrating features of a state disaster plan. Guidance for community preparedness programs at the state level can proceed to individual counties within a state. Guidance for the Development of a County Emergency Plan, issued by the California Community Emergency Planning Program--part of the California Office of Emergency Services--serves as an illustration (California Disaster Office, 1969).

In October, 1969, the Federal government began providing 50% matching grants to states up to $250,000 to help fund the development of state disaster plans. In addition, matching funds not to exceed $25,000 per year may also be provided for improving, maintaining, and updating state disaster assistance plans. However, only about half of the states have participated in this program, and only one has received the full $250,000 grant. Under Public Law 93-288 these funds continue to be authorized, but on a 100% non-matching basis (except for annual maintenance grants), and include disaster prevention as a component of preparedness.

Under the same act, Federal commitment to disaster preparedness continues to be applied to disaster warnings as a component of preparedness. The President is authorized to take the following actions: (1) insure that all appropriate Federal agencies are prepared to issue

warnings to state and local officials; (2) direct appropriate Federal agencies to provide technical assistance insuring timely and effective warnings; (3) make available civil defense communication systems; and, for the first time, (4) enter into agreements with private or commercial communication systems on a reimbursable or non-reimbursable basis for the provision of warnings.

An example of Federal involvement in the development of local and community preparedness is presented in the Outline Plan for Federal Response to a Major Earthquake, issued by OEP in 1971. This plan reviewed the planning responsibilities of varied Federal agencies in response to a major earthquake. In the same year, OEP commissioned several damage assessment studies on the assumption that community preparedness for a major disaster in a metropolitan area requires a detailed vulnerability analysis. One of these focused on the San Francisco Bay area; A Study of Earthquake Losses in the San Francisco Bay Area (National Oceanic and Atmospheric Administration, 1972) serves as a prototype of a planning program based in highly detailed community-specific vulnerability analysis. It is intended to extend such action to other high risk earthquake areas. Viewed as a pilot project in the eventual formulation of integrated national planning for all disasters, this study was the first attempt to base preparedness planning on specific localized vulnerability analysis (OEP, 1972, Volume 1, p. 9; OEP, 1972a, pp. 1-2).

A vulnerability analysis for preparedness conducted at the Federal level resulted in the Interim Federal Earthquake Response Plan (OEP, 1973a) for the San Francisco Bay Area. This attempted to specify Federal response to needs for relief and rehabilitation and was designed to complement a state plan for response then being developed. The plan assumed that various levels of response will be required, depending upon the magnitude of an earthquake, the epicenter location, the season of the year, and the time of day of impact.

Present and Future Involvement

The modes through which the Federal government is committed to the distribution of benefits, as well as the costs of their availability seem to have increased markedly during a relatively short period of time. As more benefits are increasingly made available, their costs in Federal expenditures for relief and rehabilitation seem to increase inevitably with each new piece of legislation. In addition, the number of

Presidential major disaster declarations has been increasing. Since 1953, the President has declared over 440 major disasters with a varied incidence by year; the number ranges from lows of seven in both 1958 and 1959, to highs of 48 in 1972 and 46 in 1973. In contrast to a total of 141 declarations by the President in the first decade (1953-62), there were 222 such declarations in the next ten years (1963-72). Every record was surpassed during 1972 and 1973, however, when almost 23% (94) of all declarations made since 1953 were issued in just two years. This trend continued during the first half of 1974, during which 38 declarations were made by August 30th (see Table III-3). Three general trends seem to exist; (1) an increasing number of major disasters to which the Federal government will respond, (2) increasing kinds of aid which the Federal government will make available, and (3) increasing Federal expenditures for involvement. Cochrane (1974) has suggested that Federal involvement in relief will continue to escalate, and also that an ever-widening gap exists between benefactor and beneficiary: one income group or region of the country will be taxed for relief which benefits others.

In light of the recent enactment of Public Law 93-288, the issue of future involvement becomes an assessment of the likely consequences of this newly revised Federal policy. Two major shifts in Federal policy are reflected in the act. First, there seems to be a clear intent to provide for more planning in the reconstruction of a community than ever before, as well as planning in general. Second, there seems to be a partial shift of responsibility to the states to carry out certain relief and rehabilitation activities. For example, the law provides an individual and family grant program (Section 408) which is a grant to the state, the purpose of which is to help individuals meet disaster-related expenses or needs. These policy modifications raise several general questions relevant to future research opportunities on the adjustment: (1) can relief and rehabilitation policy really be structured broadly enough to reduce hazard vulnerability?; (2) can relief and rehabilitation be used to maximize the benefits to be reaped from the use of other adjustments, and if so, how can this be best achieved?; (3) which alternative relief and rehabilitation policies can be most effective in reducing future catastrophic potential?; and (4) how should relief and rehabilitation programs be applied to achieve the most benefit to be earned by the use of the adjustment? The two aforementioned shifts in Federal policy may be seen

as almost experimental attempts to maximize relief and rehabilitation benefits; their consequences are as yet unmeasured.

CHAPTER IV

RESEARCH OPPORTUNITIES

On the basis of the foregoing analyses, areas of research on relief and rehabilitation which currently promise the greatest reduction in hazard losses are indicated.

In attempting to assess research opportunities, the effort has been to canvass the full range of relief and rehabilitation measures, the dynamic factors affecting them, the total benefits and costs to society of current policies, and the likely consequences for society of introducing new information and techniques through research. In no case has it been practicable to identify all of the forces at work or to specify the full social impacts of different policies. This fact in itself indicates the desirability of pressing harder for investigation of social response to relief and rehabilitation. The findings presented here represent a judgment based upon sifting of seasoned experience, a necessarily incomplete cost-benefit analysis, and a critical examination of social and physical factors affecting the needs for, and uses of relief and rehabilitation.

There are four central issues for research opportunities on relief and rehabilitation: (1) what services should be made available; (2) how they should be delivered; (3) how to be sure that they will be delivered when they are needed; and (4) what a good research methodology for carrying out research on relief and rehabilitation is.

In a subsequent section of the chapter, after the specific research opportunities centering on these four questions have been addressed, attention will be centered on three additional important questions: (5) why research is needed and what benefits can be expected; (6) how to be confident in payoff; and (7) why a central coordinating research center is needed to assist in initiating and coordinating research among interested researchers throughout the country.

Needed Services

1. Relationship to Other Adjustments and Future Vulnerability

Research is needed to determine the extent, if any, to which certain relief and rehabilitation policies influence other components of community vulnerability, preparedness, and adjustments such as land use planning and enforcement, building codes and their enforcement, and the purchase of insurance. This research is needed immediately because of the increasing trend for relief and rehabilitation policy to direct the use of other adjustments; for example, as Public Law 93-234 attempts to influence insurance, and Public Law 93-288 to control land use.

There is considerable speculation, but actually very little available evidence, about how, or even if certain relief and rehabilitation policies (presumably known in advance of disaster impact) affect future vulnerability to disaster-caused loss and disruption. Will current provisions for rebuilding outside of a hazardous area allow efforts to reduce future vulnerability to occur after some disasters? Does the availability of the present cornucopia of relief and rehabilitation services increase the chances of having community public officials and other influentials intentionally avoid difficult and potentially controversial pre-disaster land use and building code decisions? Does knowledge of or beliefs about certain relief and rehabilitation policies contribute to lower levels of community preparedness, and to what extent is this so?

Quite apart from what the announced relief and rehabilitation policies and programs are prior to any disaster, the planned and unplanned relief and rehabilitation activities that take place are likely to have a significant shaping influence on the subsequent reconstruction phase in the damaged community. For example, what is the influence of the type and placement of temporary housing on future vulnerability and quality of life in the city? Does the providing of grants to repair damaged homes in the flood plain speed community recovery but keep vulnerability at an unacceptably high level? How is it possible during the restoration period to speed the decision regarding a permanent change in land use, e.g., permanently vacating a heavily damaged commercial area? Should the upgrading of repairable structures to some *national* set of standards be required for federally financed or insured loans, and if so, with what effect on the speed of recovery?

The basic question is broad: how do alternative relief and rehabilitation policies affect vulnerability to disaster at local levels through links to the level of adoption of other adjustments? Alternative policies may appear on the surface as positive, but have larger negative implications; some may appear negative, but have very beneficial implications in the long run.

In short, all feasible policy alternatives must be assessed in light of all their implications: primary effects; secondary effects; and long- and short-run effects vis á vis future vulnerability through links to the initiation and level of adoption of other adjustments. Disaster situations, with all of the attention they receive from public agencies, can be catalytic in bringing to bear engineering, urban renewal, and social welfare activities for fresh and integrated approaches at reducing vulnerability in local communities.

This effort will require more than survey research or some experimental studies in hypothetical decision-making. It requires sophisticated analyses of political processes at local, state, and, to a limited extent, even the Federal level. It will also require an examination of the working of pressure groups, as well as the economic and social interests of significant influentials in a community. The research would best be conducted by a team of interdisciplinary scholars in the fields of political science, sociology, law, and geography.

The issues to be addressed are very complex and the answers can be reached with more ease, less expense, and in a shorter time period with an integrated major effort than with small research efforts aimed at each individual issue. Such a major effort would also allow an assessment of the links between each individual issue.

The research would seek to determine the effect of alternative relief and rehabilitation policy issues on issues including: (1) land use planning and enforcement, (2) building codes and enforcements, (3) insurance, (4) community preparedness, (5) engineering works, (6) speed of recovery, (7) quality of life, and (8) how these issues, coupled with the alternative relief and rehabilitation policy issues, affect future vulnerability.

In a cross-hazard design, a variety of disaster-prone communities should be studied in concert so that comparability between each event could be achieved through the use of standardized measures. These should be communities affected in the past, or potentially in the future,

in which a variety of alternative relief and rehabilitation policies were or will be in operation. In order that findings could be generalized to the alternative policy issues, the design of the study should cover not only varied types of events, but also varied community policies and areas of the country. A sample of affected communities, about 70, should be assessed to insure a large enough number of sample units, give the variety of events and community policies which would be reviewed, to provide for the generalizability of the findings, and to allow communities to be matched on a variety of the aforementioned factors in an experimental design. No example of this type of research design exists in the hazard arena; however, on a much smaller scale, Clifford's study of disaster response (1956) shows that two stricken communities can be compared if standard factors are assessed in the communities.

Policy implications would be forthcoming out of such an endavor, conducted for a period of six to ten years with an effort of 15 person years* per year.

2. Impact on Local Economy

Public Law 93-288 provides for a long-term effort to coordinate the recovery of disaster affected local economies. However, the numerous other factors which now exist as part of the adjustment can affect the local economy in positive and negative ways--many of which are presently unknown. For example, under what conditions does the extensive use of non-local labor and business firms have a more desirable effect on the local economy than using almost all local labor and business?; and under what conditions is the local economy aided or negatively affected by the speed of rebuilding? Answers are needed to questions such as these to direct policies relevant to the recovery of local economies.

With the current trend toward a less standardized adjustment across the country as individual states assume a more influential role in determining services available, the potential to conduct some careful comparative studies appears to be great.

A research effort designed to assess the effect of alternative policies on the local economy might produce significant results after five years, with a total outlay of five person years annually. Standardized

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*A person year is the amount needed to support one research worker, including staff and travel, for one year; currently $60,000.

indicators of aspects of the local economy such as unemployment, under-employment, tax bases, and trade should be developed. This study should match a series of disaster-stricken communities on relevant policy issues, community size, function, and other appropriate factors, and in quasi-experimental fashion seek to reveal the effect of alternative policies on the key factors in the recovery of a local economy. Some 40 communities should be examined to allow scientific comparisons to be made.

3. Family Functioning and Mental Health

Since the family is the basic unit to society, the most direct and obvious indications of social disruption produced by disaster impact can be seen in changes in family functioning following impact, and for an extended time period thereafter (Drabek, *et al.*, 1973). The referenced study is the first and only published longitudinal, quasi-experimental research effort on human response to disaster. It needs to be replicated across hazards with different analytical characteristics such as type of event, amount of loss, and different relief and rehabilitation efforts.

A series of coordinated research studies on this topic that would collectively lead to an integrated design is needed. The design should be enlarged to include immediate post-impact data collection. Even that effort would be absolutely minimal because of the complex and very large set of variables which influence family functioning. Consideration must be made of the possible relation of the location and character of emergency shelter and temporary housing on family income and employment, educational progress and school attendance of the children, and the physical and mental health of each member of the family. The possible interplay among educational activity, employment, and health, quite apart from the influence of housing, indicates the possible dynamics of the family as a small, sometimes volatile, social system.

The components of family functioning which would be assessed should include intra-family decision-making patterns, roles, differentiation, conflict rates, degree of solidarity. Kin linkages, as well as links to other social systems such as the neighborhood and friendship groups should be assessed.

One of the primary questions concerns how best to anticipate which communities, families, and individuals are most likely to suffer from a particular geophysical hazard. For slow-rising floods, the answer may not be too difficult, at least in certain years. For hurricane and

drought, however, sampling becomes much more difficult. For earthquake and tornado it becomes almost impossible within any tolerable cost limits to select a sample in advance of disaster impact and recontact the same families afterward. Thus, some variation in research design is required. But the complexity of the research design should not be permitted to cloud our recognition of the need for the findings. The monitoring of families and individuals selected for study should cover an extended period of time. This monitoring of families and individuals selected would be expected to be more intense in the immediate aftermath of disaster, and to decline in intensity over time. Selection of samples should be from a variety of disasters, representing the spectrum of geophysical hazards. At a level of seven person years per year for the first five years, followed by five person years for a following period of two to three years, the study would provide information about minimal family and mental health services needed during disaster, and in subsequent years.

Service Delivery

Searching studies need to be made of the methods for providing assistance. Two such studies commend themselves as promising information on the consequences of the various possible assistance policies that are open to the nation.

1. Equity

Most agencies involved in relief and rehabilitation are striving to reach those they might serve; however, data indicate that certain groups are, in fact, under-represented when it comes to the dispersal of some disaster-related opportunities and benefits. Among these groups are the aged, the poorly educated, members of the lower socio-economic classes, persons whose background has instilled a negative value for anything perceived as "charity", and a variety of other segments of the population. These groups are not the same in all areas of the country; the groups who, for whatever reason, do not receive a just and fair share of relief and rehabilitation differ according to geographical region and sub-culture.

A research effort on this issue would have three aims, each one contingent upon the findings of the latter: (1) to what extent services are inequitably distributed; (2) why this is so; and (3) what policy changes can be made to ameliorate the problem. This research might best achieve its ends by assessing the equity issue in a variety of disaster

situations such as Presidential, SBA, and FHA declarations, and by reviewing the full range of degree of disaster impact. Several of the many items which might be looked at are socioeconomic class, ethnicity, literacy, and religion. The effort could be accomplished with expenditures of three person years annually for a four-year period. During that period, an assessment could be made of the dispersal of services in all three phases of the adjustment in 30-35 disasters. This number would insure an adequate representation of hazard types, areas of the country, and community types.

The findings from this study need not impugn anyone's motives, but would reveal the unintended and unanticipated consequences of present organization and agency policies and procedures to provide a base for the refinement of present policies.

2. Coordination

The coordination of all post-impact activity (relief, restoration and reconstruction) becomes more tenuous as new agencies are formed, old ones are discontinued, some reorganize, and shifts in personnel occur. Some agencies respond to victim's needs slowly. Under Public Law 93-288, increased efforts are made to upgrade efforts at coordination. However, if more and more responsibility for efforts moves to state and local organizations, as current trends suggest, agencies without much experience will find themselves faced with a series of new events with which to cope.

Data indicate that although problems of coordination do exist in the emergency and early rehabilitation phases, the most serious problems of coordination are in later restoration and reconstruction, or in coordinating earlier relief and restoration efforts with long-term reconstruction.

A general cross-hazard study is needed which would examine and focus on the issue of coordinating response both *within* restoration and reconstruction, and *between* relief, restoration, and reconstruction. A variety of public agencies (at all levels--Federal, state, and local) and private agencies are involved in disaster response across all three activities. The Federal Disaster Assistance Administration does assign varied tasks to varied agencies in relief; however, each agency operates separately according to its own bureaucratic procedures. No central information source exists to provide information transfer or organization beyond one that might emerge during the emergency period, to dissolve

shortly thereafter. Few attempts are made to coordinate efforts between relief, rehabilitation, and reconstruction. Public Law 93-288 reflects an increased awareness of this problem. However, little is known about what temporary housing in restoration may mean to the subsequent reconstruction period. Little coordination traditionally exists *between* short-term and long-term assistance.

Research is needed to address the policy questions of how best to coordinate what goes on in relief with what goes on in restoration; both should be coordinated with what comprises reconstruction. The basic issues to be addressed include inter-agency communication and the coordination of services delivered between all three phases of the adjustment.

The research effort should approach the problem by viewing relief, restoration and reconstruction as a total system rather than three separate entities. Although this perspective is not new in the hazards arena, no study to date has applied the perspective to all three phases of the adjustment. Drabek's studies of the coliseum explosion at the Indiana State Fairgrouds, and of floods in Denver are excellent examples of emergency disaster response conceptualized as a total system of responding units. Clifford's analysis of the Rio Grande Flood illustrates how communities can be approached as systems. Future research using this perspective, however, should include analyses of all units within the system, the role of personality traits and individual experience in shaping personal needs, and apply the perspective across all three phases.

Such a research endeavor should look to a variety of disaster situations for its data. A variety of hazard types and degrees of impact should be assessed in terms of program effectiveness and coordination of all services. Policy conclusions could be drawn from this. In order that such a project might have the time and scope to accomplish such a task, it should look at some 20-30 case studies, and follow them through for several years after the initial disaster to assess coordination through a good portion of reconstruction. At a rate of five person years per year, the study would provide relevant policy findings of utility to local, state, and Federal agencies within a four-year period.

Timing of Service Delivery

The activities of relief, rehabilitation, and reconstruction are performed by a variety of sources, ranging from emergent emergency groups to local, regional, state and Federal governments. Most of those

activities, especially in rehabilitation and reconstruction, are set by legislated policy; for these, as well as most other aspects of the adjustment, preparedness is a key factor in maximizing the benefits of the adjustment.

We have heretofore pointed to research which would help determine the most beneficial mix of programs, and relationships between those programs and those involved in providing the services of the adjustment. Preparedness to transform those programs and policies into practical action at local levels must be attained if payoff is to be achieved. Despite efforts by such groups as DCPA and FDAA, who hold the primary responsibility, and groups such as the University of Southern California, who have special training and education programs, constraints against the adoption of local preparedness are high: (1) more routine community problems which are immediate and visible supersede preparing for rare hazard events; (2) the requisite legislation of funds is difficult at local levels for events which may not occur; (3) when adopted, preparedness is difficult to maintain at some functional level and often falls into decay; and (4) there is never a guarantee that even the most detailed disaster response plan will work after several years because of change in community vulnerability, change in the composition of a community, and the uniqueness of each disaster event. There are a number of organizations of public administrators, such as the Conference of Mayors, which might be involved in a more extensive program of training and information dissemination.

Current research opportunities now promise to help upgrade the benefits to be reaped through the adjustment by giving us more knowledge about the adoption and maintenance of preparedness at the local level.

The adoption and maintenance of preparedness is the result of a combination of factors, among which are how often a hazard repeats itself in a locality, community hazard awareness, and legislated requirements for preparedness. Many unknown factors also affect preparedness.

Research into the adoption and maintenance of preparedness would generate needed knowledge in the most efficient and least costly manner by being integrated into one effort. Because preparedness adoption and maintenance are conceptually the same regardless of hazard, the research effort would best realize results by addressing itself to all natural hazards, and may well include man-made hazards in its purview. This integrated cross-hazard comparison of preparedness adoption and

maintenance could produce information applicable to all hazards.

Such a study should seek several research goals: (1) to identify what factors account for varying levels of preparedness; (2) to identify the factors which account for the intensity with which those plans are maintained; (3) to determine what level of before-the-event preparedness is needed to achieve adequate post-impact performance with criteria including the delivery of safety, health, and welfare services, vulnerability reduction, and coordination between relief, rehabilitation, and reconstruction activities, and (4) the transformation of the knowledge into practical action through such agencies and groups as DCPA, FDAA, and the University of Southern California, and through the establishment of other action groups in other universities and state governments.

The study should determine the varying degrees to which communities are in a ready state, and reveal the alternative forms and modes of organization, maintenance, and other factors which explain such varied degrees of readiness. These background factors can be used to explain readiness; however, no one type of plan will be most successful for all communities and times. It is necessary to determine how varied degrees of readiness (determined in a pre-disaster community) provide varied levels of post-impact performance.

In this way the effort requires "before" measures of preparedness and of factors explaining different levels of preparedness, and "after" measures of post-impact performance through all phases of the adjustment. These requirements necessitate a very large number of communities in the study. It will require more than 100 communities in a purposive sample to get the required data base and post-impact measure, since most of the communities in any such sample will not be subjected to serious hazard impact during any given five or ten-year period.

With a large panel of communities for this type of quasi-experimental research, there will be a small number of "experimental" communities (those suffering impact) and perhaps two types of control communities; communities which do not experience disaster during the course of the study (in addition to those which do) could still serve as sources of data for both preparedness adoption and maintenance.

Due to the scope of the endeavor, the study may well need to be continued for an extended period of time. Results may be expected on adoption and maintenance within three to four years. However, results

pertinent to how preparedness relates to adequate post-impact performance might not be realized for one to two decades. The study should be maintained at an annual expenditure of 20 person years for at least a ten-year period.

Research Methodology

Fundamental to every research effort is the need to develop an acceptable, pointed, and accurate methodology to ascertain the dynamics of social and economic change in the aftermath of disaster. This tool must be developed if we are to generate accurate, reliable, and usable findings.

Research is needed to develop and test the validity and reliability of an acceptable methodology for monitoring the short- and long-term effectiveness of all the efforts which comprise relief and rehabilitation. The methodology should determine the primary and secondary consequences of efforts during the emergency (relief), restoration (rehabilitation), and reconstruction periods following disaster. The aim would be to develop scientific monitoring procedures which are both socially acceptable and accurate.

Some officials in disaster are concerned with the image and domain of their agencies and groups. In the past, disaster researchers have found that they have attempted to undercut any system of monitoring they consider too threatening or otherwise unacceptable. Disaster researchers have themselves often not taken into account that they are dealing with harassed, overworked agency officials. To the extent that monitoring entails contacts with, and detailed questioning of clients, especially on sensitive matters, it must be conducted with an acceptable methodology.

At the same time, the information secured must be accurate and deal with the significant indicators of short- and long-term program impact on the complex social system; primary, secondary and tertiary impacts are experienced directly and indirectly by most segments of the community and population. A tentative list of indicators by which all facets of program impact may be measured include: medical care, shelter, unemployment, underemployment, restoration of living standards, duration of uncertainty about economic compensation, tax-base and local business recovery, and how these items affect human dignity in the receipt of aid.

For the three aims to be realized, the research effort will require extensive pretesting, and later extensive field testing, with a design which covers varied types of events, regions of the country, and rural and urban communities. By looking at a variety of types of events and areas affected, confidence in the methodology's working in a variety of circumstances and places will grow.

It is important to establish that the methodology can be used without significantly altering any of the relief and rehabilitation processes that would have normally taken place. Confidence in this will require the use of a set of quasi-experimental research designs in the field testing. In this way, families, groups, organizations, communities, and regions affected by disaster can be matched on a variety of key factors (such as relief and rehabilitation policy, degree of disaster, and community type), and monitored differentially to ascertain whether the processes and impacts are altered by the monitoring process being developed.

The entire effort requires that a variety of hazard types and events be assessed in different areas of the country, in different types of communities, and with a quasi-experimental field design. To achieve these necessary components of the research effort, a minimum of some 60 to 80 different disaster and relief and rehabilitation efforts would need to be assessed. The total effort, including the field testing of the procedures for monitoring the long-term implications of a variety of efforts, may well take a decade with an expenditure of an average of ten person years per year, or 100 person years for the total effort. Once developed, however, the methodology would serve in carrying out most other research on relief and rehabilitation.

Since the implications of relief and rehabilitation inhere in no discipline boundaries, this effort must be interdisciplinary--including the relevant fields of economics, sociology, geography, and political science.

These research opportunities, in terms of current or projected expenditures, additional research expenditures in person years, and amount of time needed for the research are summarized in Table IV-1.

TABLE IV-1

FUNDING LEVELS FOR RESEARCH

	Current Annual Level[1]	Suggested Additional Research in Person years[2]	Time Horizon for Research
Research methodology	0	100	10
Relationship to other adjustments and future vulnerability	0	150	10
Impact on local economy	2[3]	25	5
Family functioning and mental health	1[3]	45	7
Equity	0	12	4
Coordination	2[3]	20	4
Preparedness	2	200	10

[1] 0 = no expenditure or less than $10,000
1 = 10,000 - 100,000
2 = 100,001 - 1,000,000
3 = 1,000,001 - 2,000,000
4 = 2,000,001 - 4,000,000

[2] Funds needed to support one research worker, including staff and travel, for one year; currently $60,000.

[3] Public Law 93-288 includes estimated efforts.

Expected Benefits of Needed Research

In the aftermath of disaster, people are rescued, fed, clothed, sheltered, and given funds for rebuilding. The relief-giving groups disperse their services, and Federal aid is always made available through one means or another. In general, people manage to overcome obstacles and restore their lives. One reality of American society is that we will continue to have relief and rehabilitation activities following most natural and man-made catastrophes. This assumption about the future, however, is more than a prediction based on a past trend. It is also based on the American fabric of values: an altruistic value of helping those suffering the consequences of an "act of God", and a zeal to reduce personal cost.

One such institution is our political system, which traditionally serves as a source of relief and rehabilitation activities, services, and aid offered victims. In very precise terms, something is, and will always be offered the afflicted by our political system because of the perceived negative personal political costs those in power anticipate will be their windfall if they adopt a non-altruistic posture.

It is our position that research will upgrade the activities which presently comprise the adjustment in light of the implications those activities carry to individual victims, the affected community, and the hazard potential in the country. Such research is warranted in light of the fact that relief and rehabilitation activities will continue without much assessment of their implications, costs, or true effectiveness.

Several encouraging changes can be expected in public expenditure, political distress, and social irritation from policy which research can reveal. It can be expected that political distress and social irritation would decrease as refinements in the adjustment are made. No guarantee of this is possible; altered policy may alleviate old areas of social unrest only to create new ones. Public expenditure may increase or decrease. Determination of such a trend is possible only after the policy revisions which research can produce are stated. However, whether expenditure increases or decreases in actual amounts, it can be expected to increase any estimates of the cost-benefit or cost-effectiveness measures of the adjustment if research achieves its goal.

Other possible gains can be expected from taking advantage of the research opportunities. Catastrophe potential for hazards is increasing; even though the average number of yearly deaths resulting from some hazards is declining, data indicate that deaths resulting from catastrophic events are increasing. One might also suspect that social disruption from such events is increasing. Patterns of urbanization in the country also suggest that the potential for large-scale catastrophes is increasing. Relief and rehabilitation function to mitigate loss and continued disruption most dramatically in just such major catastrophic events.

Two forces are operating to give credence to the research opportunities on relief and rehabilitation: (1) an ever-escalating potential for catastrophe, and (2) the previously described American value to implement the adjustment and mitigate the effects of the event,

thereby insuring the use of the adjustment. National gain in terms of the average dollars that could be saved is difficult to estimate. As previously specified, taking advantage of the research opportunities which currently exist is no guarantee that cost will decrease; indeed, it may even increase the level of expenditure *on the adjustment*. However, it may well reduce many of the hidden costs involved in the aftermath of disaster because the overall effectiveness of the adjustment will increase. This will minimize individual misery, social disruption, and other negative (many unknown) consequences of the adjustment on other aspects of social life and future vulnerability.

For example, the traditional use of temporary housing units, while certainly alleviating the plight of victims, may indeed serve only to complicate their lives: the haste with which the units are provided does not allow changes in school enrollments to be taken into account, workable plumbing to be installed, or accessibility to laundry and shopping centers to be considered. In the past, forgiveness clauses in disaster loans have traditionally been for purposes of *rebuilding*, rather than for *relocating*. Such a policy stance, when applied to a flood disaster, encourages the redevelopment of the flood plain, thereby offering no remedy for the escalation of the potential for some future catastrophe. With the enactment of Public Law 93-288, however, relocation is now a real alternative which may have a very positive effect on reducing future vulnerability.

Confidence in the Payoff

Several factors provide for confidence that research on the adjustment would be implemented or adopted by relevant agencies and communities so that potential payoff might be realized. First, those involved in any research project dealing with practical and applied issues must realize their obligation to deal with the application of relevant results. A major responsibility of those researchers engaged on a project must be to get their results translated into action; this goal should be as major an objective to any research effort as ascertaining the immediate research goals of the project. Consulting, teaching, publishing in mediums which will carry the information to those who might use it, and participating in a variety of conferences are four means with which to begin.

Second, the research endeavor must be able to issue applied recommendations that can be implemented. Methods of design which are earthquake-resistant are now in common use in the state of California for dams and other hydraulic structures, and originated out of recommendations of earthquake design researchers and their applied research endeavors and concern to make those recommendations known. The same results could be expected in other lines of research if the researchers concern themselves with implementation.

In addition, it has been the experience of several applied researchers that research results are given practical implementation if community and agency decision-makers perceive the need. Again, the responsibility for creating this atmosphere falls upon the shoulders of the researchers.

In addition to these, we might also expect implementation to be the result of what we might term "the residual effect." In research on the response of three Alaskan communities to tsunami warnings (Haas, 1971), the researchers report that community awareness of the hazard increased in community leaders purely as a result of their fieldwork. As a result, warning systems, at least for the time on which information was available, were upgraded simply because of the raised awareness the fieldwork brought to warning officials in the communities. The same result might be expected in reference to research on preparedness for relief and rehabilitation. Although reliance upon this "residual" benefit of the research alone for implementation is far from sufficient, it too must be considered in the net applied benefit of any research endeavor.

In addition, the history of major legislation on relief and rehabilitation policy adoption and changes suggests that bills are frequently and expeditiously passed and signed into law in the immediate wake of major catastrophes. Because this seems to be a good time to get disaster policy enacted, policy implications which are the product of research should be prepared and made available to public officials and legislators for inclusion in the political system at just such times.

Many of the research opportunities take on the character of social experiments. Some comparable research efforts in other arenas illustrate the benefit potential to be reaped by such efforts, and the similar demands that they have made on the research community because of this design. These are the negative income tax studies reported on by Heffernan (1972), and the pre-sentence experiments by the VERA Institute

of Justice (Lieberman, *et al.*, 1971); both of these will serve as analogous examples of what we mean by a social experiment.

Two separate social experiments were constructed to determine if negative income tax, or a guaranteed minimum income for lower income families, could affect participation in the labor market. Control groups, to which no guaranteed income was offered, and experimental groups, to which varied minimum incomes were given, were established. After one year, a tentative conclusion was reached that guaranteed incomes had no detectable influence on participation in the labor market.

The Bronx Sentencing Project of the VERA Institute of Justice was another type of social experiment not unlike the type of social experiments proposed for some facets of relief and rehabilitation. In the State of New York a judge can make a probational or conditional discharge determination of persons found guilty of misdemeanors on the basis of two items: the nature of the crime; and the history, character, and condition of the defendant. The latter, however, requires that a lengthy report be submitted to the judge by the Office of Probation; for a variety of reasons such reports appeared in less than 20% of the misdemeanor cases--excluding, under the law, 80% of the cases from the option of non-prison sentences.

Using this past history as a control group, VERA developed a shortened report. It was implemented and, as a result, in the first eight months of the project non-prison sentences were given in 83% of the cases in which the VERA form recommended such a sentence. With the advent of VERA, many defendants who probably would have been imprisoned because of no pre-sentencing report were granted supervised or unsupervised release. As a result of the findings from the project, a new Criminal Procedure Law went into effect in New York, permitting the use of short form reports on pre-sentencing adult misdemeanants. Now used throughout the state, indications show the same results determined by the VERA project.

Such social experiments, although different in specific purpose, could be used as a technique for determining the effect of many alternative relief and rehabilitation policy issues. The implications that such experiments could have on national policy could be as substantial as the effect the VERA experiment had on changing pre-sentencing report policy in the State of New York.

One basic constraint to the implementation of research findings, as stated by Fritz (1971), is that the ineffective utilization of existing knowledge is in part a problem of communication. A lack of communication between the scientific community, the user agencies, and the public hampers the amount of scientific information given to disaster management and administration. It is hoped that the few examples and suggestions stated here illustrate how this major constraint might be overcome.

Central Research Center

Confidence in payoff from the research opportunities which now exist can be increased through the coordination of research, and the translation of findings into action; both tasks can be achieved within the confines of a national center for hazard policy research.

Many alternative relief and rehabilitation policies exist in an atmosphere of continuous change; however, improvements in policy and subsequent action can come only when adequate data are available on their consequences. The major concern is with the consequences of the various policies--singly and in combinations. A program may have a desired outcome during the emergency and early restoration periods, but have a strong negative effect recognizable only during the later reconstruction period. An alternative program may work well in one part of the country, but poorly in remaining areas. Parts of certain programs may produce highly desired outcomes when used with lower social class clients, but not with persons of other socioeconomic levels, producing a high level of inequity. The true consequences of new or altered programs are often unknown for many years.

Improvements are not likely to occur when we do not know what is happening, when government policies are inconsistent and often in conflict, when the long-run effects of different programs are unknown, and when constraints to effectiveness are unknown. Although such knowledge is no guarantee for achieving improvements, it certainly is a prerequisite.

The question of what services should be made available is more easily stated than answered, and it serves as a pivotal point from which several research efforts were seen as required and necessary in order to provide an answer. But the question is more than an indication for needed research, *it is also a call for the establishment of some means to provide some order to all research on disaster*. Without such an arrangement, the many small and segmented research endeavors which go on in the study of

disaster cannot be assessed as a whole. The consequence of not having such an arrangement is the duplication of effort and gaps in essential knowledge; the identification of both cannot be made without the establishment of such a unit.

It should be the purpose of a central coordinating research center to initiate and coordinate research among interested researchers throughout the country, and to serve as a center through which research findings could be translated into policy and practical action. For example, current data indicate that relief recipients become hostile to large bureaucratic helping agencies. This may be unavoidable. However, workers in such agencies could be trained not to react defensively. That training, or at least the necessary information, could be dispersed to the numerous relevant agencies through the center.

As a center for coordinating hazard research and translating findings into action, the center could be established within an academic institution or some non-government association. The center, however, should be formally linked to Federal and state agencies to facilitate the implementation of research findings.

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