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## NATURAL HAZARD MITIGATION: PROFESSIONALIZATION OF THE POLICY MAKING PROCESS\*

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*Liability and increased federal involvement in issues of public safety has resulted in the development of a bewildering array of agencies and entities at all levels of government. In spite of this increased involvement, losses from catastrophic natural hazardous events are continuing to increase at an alarming rate. Although there is an increased federal involvement, primary responsibility and authority for dealing with the problems associated with natural hazard exposure rests with the states and local governments. However, the capacity of state and local governments to deal with these problems is significantly constrained by geophysical, ecological, and sociopolitical factors. The purpose of this paper is to discuss the context in which natural hazard problems are defined and policies adopted in the United States. Further we will examine the barriers to the adoption and implementation of natural hazard mitigation policies. Professionalization of the policy adoption and implementation process is presented as a basis for increased success in reducing societal risks to natural hazards.*

Throughout U.S. history, there has been a broad continuing shift in public opinion with respect to proper roles of the various

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levels of government in dealing with social ills. In the post-revolutionary period of U.S. history, the checks and balances, the pluralistic federal system of government, and the safeguards against governmental intrusion on personal choice built into the natural as well as state Constitutions, reflected deep-rooted philosophical, ethical, political, moral, and economic values of society at that time. It cannot be denied that a limited, but very important role for the national government was imagined by the framers of these documents, and those they represented.

Neither, however, can it be denied that events in U.S. history have continuously altered the public mood and buttressed arguments in favor of an increased federal role in major social problem areas. When states and local governments were either unable or unwilling to cope with many of our social problems, a general willingness to alter the federal role was expressed. Although the general social commitment to "grass-roots government," "pluralism," and "freedom of choice" remained intact, the role of the federal government was altered by an almost unbroken chain of developments, since the days of the Depression and the presidency of Franklin Delano Roosevelt.

As a result of this change, a substantial part of the direct financial losses sustained by private property owners and the occupants of properties exposed to natural hazards, as well as a portion of the reconstruction related borrowing costs, have been shifted to federal government. There is some evidence that this trend may be reversed. Specifically, the emphasis behind the current FEMA Integrated Emergency Management System is for local and state governments to build a greater capacity to mitigate, respond to and recover from disasters. Further, until recently 100 per cent of losses to public facilities (i.e., bridges, schools, hospitals) from presidentially declared natural disasters were paid for by the federal government in the form of reconstruction grants. Under the current administration, implementing regulations were revised to require a 75 per cent federal -- 25 per cent state/local sharing of these reconstruction costs. Although there has been considerable emphasis placed on reducing the economic scale and involvement of the federal government, three significant policies continue to contribute to the federal government carrying a significant share of natural disaster losses. They are the Internal Revenue Code, the Disaster Relief Act of 1974, and the Congressionally-authorized Small Business Administration Disaster Loan Program.

Currently, federal revenue losses (e.g., "tax expenditure") due to the tax deductibility of casualty losses totals U.S. \$590 million per year, or .25 per cent of all federal individual income tax collections (U.S. Bureau of the Census, 1980). Annual expected

losses from catastrophic hazardous occurrences can be expected to push that value to a substantially higher level. Considered as a whole, the current federal government liability due to annual expected natural hazard losses may reach a level approximately equal to six per cent of all federal individual income tax collections (Petak and Atkisson, 1982). This liability and increased federal involvement in issues of public safety has resulted in the development of a bewildering array of agencies and entities at all levels of government.

In spite of increased federal involvement, primary responsibility and authority for adopting and implementing policies to deal with the problems associated with natural hazard exposures is designed to the states, and through specific delegations of authority, to their component municipalities. In practice, most states have granted local units of government the power to pursue these activities, however the pattern of delegation is not uniform. In California, for example, both cities and counties are legally able to adopt and enforce regulatory policies concerning the use and subdivision of land, structural integrity of new and existing buildings and structures, and to engage in other similar functions. On the other hand, in Texas only incorporated cities are vested with such a broad array of power and other local units of government, such as counties, are dependent on regulatory activity by state entities or by cities, which bear some limited authority to regulate activities in their unincorporated, peripheral (extraterritorial) areas.

However large their authority, the capacity of state governments to deal with the problems posed by natural hazard exposures may nonetheless be constrained by geophysical, ecological, and sociopolitical factors. Historically, states and local units of governments have relied heavily on such federal entities as the U.S. Corps of Engineers, which engaged in massive construction projects necessary for the control of riverine and coastal flooding. For instance, the mapping of lands has long been viewed as a function of the U.S. Geological Survey. Responsibility for research and other related activities that can be conducted more economically at a level higher than the state have traditionally been viewed as a function of the federal government. Ecological and geophysical factors may also limit the capacity of state and local governments to cope with their problems. In terms of flooding, for example, upstream activity may alter traditional water runoff volumes or otherwise affect the expected annual streamflow may limit the real capacity of downstream state and local governments to deal with this problem. Similarly, economic factors may severely limit the ability of state and local governments to respond rapidly

and effectively to the problems created by major catastrophic occurrences. Thus, an understandable pattern of interdependence has developed between the several levels of government.

Finally, federal policies concerned with disaster relief, tax write-offs for casualty losses, and other related subjects, have resulted in a significant shift in natural hazard loss burdens to non-exposed populations remote from the sites where the risk of loss is incurred. This fact appears to be well understood by those interested in development and occupancy of high natural hazard zones while considerably lessening opposition of locals who might otherwise challenge traditional federal policies for more appropriate natural hazard mitigation policies (Petak and Atkisson, 1982).

It is within the context of these interacting factors that one must address the following questions: How can current and projected natural hazard losses be reduced through improvements in building and land use practices in designated hazard areas; How can the adoption and use of specific hazard mitigation approaches by state and local governments be accomplished? In a purely theoretical sense, it is important to recognize that neither answer depends much on dramatic expansions in the scope of our scientific knowledge, nor on much regulatory pioneering. The technical and regulatory solutions to natural hazard problems are reasonably well understood. Our failures in applying these solutions are therefore a function of other factors having to do with the dynamics of the American public policy development and implementation process.

This paper will discuss the context in which natural hazard problems are defined and policies adopted in the United States, as well as examine the barriers to the adoption and implementation of natural hazard mitigation policies. Professionalization of the policy adoption and implementation process is presented as a basis for increased success in reducing societal risks to natural hazards.

### The Policy Process in the Federal System

From the perspectives of Anderson (1975) and Jones (1977), the fuel which drives the American public policy system is the class of phenomena we refer to as public problems. However, these phenomena can be remarkably difficult to identify.

A set of impacts or effects may be viewed as a serious problem by one party, but as a trivial set of occurrences to another. What appears to be a problem to one group may be seen as a solution to a different problem by still another group. Therefore,

special interest groups tend to evaluate a set of impacts or effects and attempt to influence the nature of the perceived problems which they associated with a given situation. Policy-makers who do not recognize the intricacies of "natural hazard problems," as related to these special interest groups cannot adequately or effectively deal with public problem solutions.

For example, to individuals whose homes and businesses have just been destroyed by a major hazard occurrence, the "problem" presented by the occurrence seems quite clear. To an economist in the office of Management and Budget of the U.S. Government, the disaster relief expenditures engendered by the event may be viewed as the reason for continuing interstate tax transfers between cost-bearing and benefit-receiving groups. To the economist, the term "hazard problem" means something quite different than it does to the hazard-impacted party. Scholars and planners who are able to amass data concerning the long-term economic and ecological consequences of land development in flood-prone coastal/riverine plains and unstable hillsides, may define the problem in yet a different way. Their views are unlikely to match those of subdividers and builders whose decisions cater to the market-oriented tastes and preferences of amenity-seeking populations who view hillsides or water-adjacent lands, not as hazard zones, but as view lots, or as recreational sites. Without belaboring the point, it seems clear that specific groups will view hazard mitigation policies in quite different ways, which vary substantially from each other on the basis of differing interpretations of facts as well as values.

Typically, we all understand the rational approaches to policy development and comprehend that policy implementation requires that we have some firm set of objectives in mind. However, we frequently fail to recognize that the objectives we accept are based on the problems we are trying to solve, and that our problem perceptions may be quite different from those of other special interest groups involved in the situation. Accordingly, it is necessary that, in order to achieve the best possible set of hazard mitigation policies, we must address ourselves, in part, to answering the following questions:

- \* What public problem is the policy to address?
- \* Who are the policy makers and special interest groups with authority to determine the relative importance of these problems. Furthermore, these problems may become further complicated by side effects produced by policy implementing activities.
- \* Is political support and agreement possible for any defined set of problem-solving policy alternatives?
- \* Is adequate funding available to implement the several policy alternatives?

\* What social, economic and environmental impacts will result from the defined policy alternatives, and what "problems" will be defined by various special interest groups as being associated with those policy alternatives?

During the policy making process, these questions must be openly examined. Hard decisions must be made concerning which problems are to be solved and which are to be ignored, which parties are to receive benefits, and on which groups are costs to be imposed. If we do not know what problems we are trying to solve it is unlikely that the policies we adopt will be of much importance in reducing natural hazard losses.

The definition and solution of public problems requires much more than the intelligent use of technical data. Granted, numerous issues of fact confront even the most technically competent, but complex issues of value also confront the policy maker who is assigned the task of acting on the facts. Only after the delicate and socially sensitive process of dealing with these subjects is completed, can we consider the policy development process to have reached a point of decision. Only then can we rationally consider the attributes of the optimum policy implementation process.

Past experience seems to indicate that we have had difficulty with this process. After examining a variety of public programs, Pressman and Wildavsky (1973) concluded that numerous federal programs have produced consequences that had fallen significantly short of the expectations of the many special interest groups. It is conceivable that this low level of perceived effectiveness may be due to widely differing special interest perceptions concerning the targeted goals of programs designed to alleviate "public problems," and to policy design failures which occur at critical points in the policy development process. Unless "public problems" are clearly defined, it seems unlikely that appropriate design efforts can be built into the policy development process. Problems of this sort undoubtedly pervade the history of our federal, state, and local efforts to control land developments and to otherwise mitigate the effects of natural disasters.

Other factors continue to complicate the ability to define problems. For example, technical knowledge concerning the natural hazard phenomena has expanded rapidly, thereby providing a solid basis for use of building codes, zoning ordinances, and other similar enactments to deal with local hazard problems. On the surface these additional data would appear to be advantageous to all groups. However, local officials have either tended to be unaware of the degree to which their communities are at risk; or have elected to continue the search for more

facts in order to further reduce uncertainty, thus delaying action; or have tended to ignore the threat risk when the sensitive question of controlling building and developments is presented. The contents of building codes, zoning ordinances, and other hazard abatement regulations have appeared to respond much more sensitively to economic and political pressures than to objective standards of community safety and to the imperative to reduce the nation's total annual natural hazard losses (Petak and Atkisson, 1982). It seems clear, then, that the major obstacles to hazard mitigation in the United States have been far less those of a technical or legal character, and far more those of a social, political, economic, or administrative nature.

Regardless of the increasing dependency of local and state governments on the national government, it still remains the primary responsibility of local government to resolve issues and solve local public problems. These problems are difficult for policy makers to define, thus limiting the range of appropriate actions which can be taken. This is especially true if the effects or impacts of a situation defined as a problem by one group, is regarded as a solution by another group; or one person's cost may be another person's benefit; or a given action that solves one problem may result in a different problem. Public problems affect real people, in some real location, under some real condition. However, in the geotechnical world most problems are not well defined, but tend to be characterized by clusters of related phenomena. It is necessary therefore, that problems be carefully specified and operationalized. Specifically, problems must be defined so that the attributes of the situation and the importance of them to specific people in specific places is well understood. This will require a professionally capable and responsible local government staff. It is important to remember that a staff has a professional responsibility to provide the best possible analysis upon which the policy makers are expected to decide. They must understand the advocacy role of those who must propose on behalf of their client. Further, those responsible for performing analysis in support of the policy process must recognize their role as analyst, allowing the policy maker the option of deciding.

In addition to the geotechnical investigations and data gathering efforts it is important that the local government professional identify the concerns of special interest groups involved in situations where exposure, losses and/or mitigation costs can occur. These groups can be divided into three general classes: loss experiencing parties, mitigation involved parties, and mitigation constraining parties (Petak and Atkisson, 1982).

Loss experiencing parties are those who bear the losses arising

from exposures to natural hazards and/or the costs arising from efforts to mitigate the effect of such exposures, They can generally be defined as: residents of hazard zones, potential future residents of hazard zones, visitors or workers in the hazard zones, owners or users of second homes in the hazard zones, non-risk taking bearers of the costs of hazard mitigation programs or hazard included losses, and financial institutions and mortgage guarantors.

Mitigation involved parties are those who must make the basic decisions to mitigate natural hazards, or who must engage in the direct extension of mitigation producing services. This group of stakeholders generally consists of state and local policy makers, government planners and building officials, code writers, and insurers and reinsurers.

Finally, the mitigation constraining parties are distinguishable, not because of the losses they may sustain from some hazard event, but because of their role in generating constraints on the public policy process. They are generally categorized as land speculators and developers, opponents of government regulation, and advocates of governmental economy.

These three groups are active in the policy process largely as a result of knowledge about a given situation, and/or perceptions of potential losses or gains which may result from a policy decision. Their properly channeled inclusion and input into policy making decisions could conceivably bring about more effective program development and implementation. It is clear that government alone cannot resolve all the issues raised by these various groups. Thus, in addition to the stakeholder groups identified above, support from the professional technical community is a necessity in risk identification, assessment, and abatement or reduction. Specifically, attempts by policy making and regulatory bodies to resolve problems of the geotechnical hazard type requires data and information developed by the technically most qualified.

In this context it is important to recognize the tension that exists between two basic approaches to regulation, the need for factual accuracy versus a result orientation. The first approach, factual accuracy, requires the governmental decision making body to wait until sufficient geotechnical data have been accumulated before imposing any regulation; while the result orientation requires the immediate implementation of policies that are generally considered socially desirable. According to Ricci and Molton (1981:1096):

An agency may choose to endorse a particular result and acknowledge that factual accuracy is impossible, or it may regulate only where it can be accurate. To avoid this

choice, an agency faced with a risk of uncertain magnitude may choose to defer regulatory action until more studies are completed that will better define the risk. If the agency has underestimated the risk, delay will prove to have unnecessarily injured some; if it has overestimated it, delay will avert the imposition of excessive costs ...

The policy makers dilemma then is to determine how much regulation is necessary and acceptable to achieve the desired reduction in risk, and if there is sufficient technical understanding of the problem and certainty about the data to support a regulatory policy. Further, to what extent should economic costs be weighed against the benefit of reduction of risk of loss from natural hazard events? As part of the overall decision dilemma it is the local government policy makers function to determine whose interests are to be served, whose are to be ignored, who is to receive a benefit, who is to bear the cost, and if and when it is appropriate to act.

#### Barriers to Policy Adoption and Implementation

For the purpose of clarification, situations or conditions which contribute to the occurrence of disastrous events, or which impede the mitigation of natural hazards are referred to as barriers to policy adoption and implementation. Based upon the work of Drabek, Mushkatel and Kilijanek (1983), Erley and Kockelman (1981), Kusler (1982), and Petak and Atkisson (1982) the following list of ten candidate public problems appear to represent the major barriers to effective natural hazard policy adoption and implementation.

1. The past rate of progress in identifying, mapping, and classifying natural hazard zones (with the possible exception of riverine flood zones) has been inadequate; too few zones have been mapped; while inappropriate or incomplete information has been provided map users concerning the frequency and magnitude of hazard occurrences within such zones.

2. Inadequate procedures and data bases have been provided to assist technical and regulatory bodies in their establishment of empirically defensible statements concerning the cost/loss reduction ratios associated with the use of specific mitigations in specific types and sections of natural hazard zones.

3. With regard to natural hazard mitigations, significant differences can be noted in the content of the various "Model Building Codes," and too little empirically defensible information is available to support the numerous judgements that have entered into the specification of "Model Code" requirements.

4. Locally adopted building codes are generally of uncertain quality, too infrequently reviewed and revised, and sometimes based on motivations and purposes that may not clearly be in the public interest or compatible with the ends of rational natural hazard management.

5. Local planning and building regulation departments and professional staffs exhibit limited technical capacity to engage in effective natural hazard policy planning and implementation activities.

6. There is a comparatively low level of public and policy maker perception and understanding of the significance of natural hazard risks that exist within their communities and of the consequences associated with continuing exposure to those hazards.

7. There is no apparent "political constituency" large enough or effective enough, to argue on behalf of comprehensive and rationally conceived natural hazard management policies at any level of government; but limited constituencies have developed that argue against local government natural hazard management policies, or imposition of such policies on local governments by state and federal units of government.

8. The major public and policy maker demands in respect to natural hazard management policies favor (a) financial and other forms of assistance to disaster-impacted parties such as federally subsidized insurance and disaster relief, and (b) area protection works and other public works funded by the nation as a whole.

9. Inadequate coordination has been provided to hazard management programs conducted by the federal government, largely due to the many separate pieces of federal legislation, each focusing on specific hazard types or other legislative approaches.

10. The continual short term focus caused by contemporary resource allocation and individual evaluation policies has resulted in a high degree of suboptimal behavior by policy makers at the expense of total system optimization.

Illustratively, the perceptions of local governments that federally funded flood control projects (i.e., dams, levees, channels) will be provided to meet local needs has been a significant barrier to local development of nonstructural (i.e., flood-proofing) approaches to flood hazard mitigation. Elected officials are often reluctant to require private sector expenditures of funds for floodproofing when flood control might be achieved at federal taxpayer expense. In many cases nonstructural measures have been adopted only after federal structural approaches were demonstrated as inadequate.

Inaccurate mapping and general lack of data has been another persistent problem in many communities. As a result, a number of them have undertaken mapping programs to improve federal and state maps. Inflexible federal standards, the red tape that surrounds federal grants, and the reluctance of the federal system to adjust mapping criteria to local needs, have necessitated this independent action. Local and state officials consider this a major drawback. In the case of flood hazards, existing floodprone buildings are perceived as the number one problem in most communities. These nonconforming uses often prevent local officials from applying floodproofing or elevation requirements to an area. As a result floodplain regulations have not been effective in reducing risk for existing structures.

As previously mentioned, another significant barrier to effective policy implementation lies in local government staffing. Many communities simply lack the expertise required for hazard management planning and program implementation. Of particular concern is the lack of detailed, onsite hydrologic, geologic, and biologic data needed for evaluation of permits. This is true especially for small, rural communities. Excellent examples are the coastal and barrier island communities, where the availability of federally subsidized flood insurance and disaster relief encourages floodplain development and redevelopment after a disaster and discourages floodproofing, and relocation. The location of federal, state, and local public works projects (such as roads, bridges, airports, and sewage treatment plants) within floodplains is frequently inconsistent with floodplain management standards and guidelines and tends to undercut community efforts to reduce losses through mitigation implementation. Federal agencies tend to operate independently, and often pursue or encourage policies in conflict with other agencies. These conflicting policies discourage local communities from aggressively pursuing the implementation of alternative strategies.

Similar impediments as those encountered in flood plain management can also be identified in the implementation of landslide mitigation policies. Specifically, the most persistent barriers to local government implementation of landslide mitigation has been the absence, inadequacy or unreliability of earth science information regarding the character of landslides; the adverse impacts of protective structures which often encourage further development; pressure from land developers to develop landslide prone areas; the lack of constituencies and the high costs of structural mitigations.

A glaring example of the lack of reliability or inadequacy of earth science data and information and pressure for

development was graphically illustrated in a disaster in Northern California during the January 1981 storm. The disaster resulted from failure of numerous developed hillside areas. Specifically an engineered hillside section of the residential community of Park Pacifica, California withstood the rage of nature while a natural slope became a mass of moving mud. Park Pacifica was developed in conformance with the requirements set down by local rules, ordinances and current practice. Grading and home construction were in compliance with soil preparation and engineering requirements. All safety requirements had been met, but the tragedy still occurred. Limited knowledge of the character of the soil, pressure for development, the public's lack of recognition of the significance of the problem all led to the ultimate tragic conclusion, the loss of three children's lives and millions of dollars in property damage. These statements condemn no one, they simply point out the complex issues facing any hazard mitigation policy setting and implementation process.

Earthquake hazard reduction mitigation policies follow much the same pattern. Recently the cities of Long Beach, Los Angeles, and Santa Ana, California established earthquake ordinances directly concerned with the identification and rehabilitation or abatement of hazardous, pre-1934 unreinforced brick masonry buildings. Their efforts focused on concern for public safety.

The history of these ordinances has been troubled with endless entanglements. Because of size and the particular constituency the cities of Long Beach and Los Angeles met considerable resistance during their efforts to formulate, pass and implement the earthquake rehabilitation ordinances. The issues surrounding the proposed actions were considerable. In general, the city governments were not easily able to arouse supportive constituency, owners of the affected buildings did not react favorably to costly renovations, tenants (many poor and/or elderly) did not want to lose low cost housing, tenants did not view building safety as a significant issue when compared to other social problems low cost financing was not readily available to the owners, realistic earthquake prediction was not feasible, the evaluation procedure to determine which buildings were hazardous was confusing, and the complexity of the ordinance made it difficult for most owners and occupants to readily understand what needed to be done. Lawsuits and appeals stifled the cities' efforts to aggressively implement their ordinances, thus continuing the substantial risk of earthquake caused injury and loss of life (Petak, 1982).

Such are some of the social, technical, administrative, political, legal and economic (STAPLE) constraints on the decision making process leading to the adoption and implementation of effective

local government hazard mitigation programs. Although it is not necessary that any one professional be expert in all the areas represented by STAPLE, it is important that the key actors in each area understand the need for achieving total system optimization; the potential linkages between their activities and those of other specialists; and the need to modify their communication mechanisms such that their output is compatible with the needs and understanding of others in the system.

### Professionalization of Policy

Rourke (1976) has suggested that local governments seek to achieve a "professionalization of policy." Specifically, he argues that local government could better meet its responsibilities if it more effectively incorporated the views of "experts" in its policy-making operations. He suggests that such governments

"... provide a setting in which experts in and out of government can get together to work on policy problems ... This is not, however, to suggest that political considerations are unimportant ... If policy decisions are to be effective, they must be informed by honest technical advice ... the framing of public policy in a bureaucratic setting can be seen to involve a constant interplay between two quite different sets of factors. It becomes in effect a mixed system of politics and professionalism" (Rourke, 1976:132-135).

Mechanisms for achieving "professionalization" of natural disaster mitigation policy-making operations clearly are essential to the development of policy alternatives which move toward achieving total system optimization. It is important to note that the general public continues to exhibit a distrust of both private and governmentally based technical experts; and all too frequently the technical expert appears to be disdainful of the views of the less well informed. Experts are often committed to use a communication style which effectively exclude the lay person from participating in technical-fact finding and policy development activities. Too little purposeful communication is now occurring between the separate worlds of the technical experts, the policy maker, and the lay public. Moreover, none of these groups appear to adequately understand the roles of the other in the development and implementation of hazard mitigation policies.

Effective policy making is unlikely to occur within an atmosphere of distrust and aloofness. Accordingly, natural hazard experts and administrators should accept as a first task the

need to become better educated regarding the causes and effects of, and solutions to many of the problems associated with natural hazards. Complex issues associated with these subjects must be presented in terms that are understandable to all participants in the system. The processes through which fact and value issues are identified and resolved should be open to the informed participation by all parties. The legitimate interests of each concerned stakeholder group in both fact and value questions must be fully recognized. The risks and benefits associated with alternative hazard mitigation approaches should be thoroughly aired in open hearings, while the technical findings contained in hazard assessment reports should be cast in terms that are fully understandable to policy makers and the general public. Typically, too much emphasis is now placed by the technical experts on limiting the range of alternatives which are exposed to public examination. Alternative interpretations of fact, alternative approaches to problem solution, and alternative definitions of guiding system objectives are all legitimate and proper items for inclusion on the agenda of public discussion.

What is sorely needed in the entire field of natural hazard management is the establishment of an environment in which cooperation between contestant parties is facilitated and in which full and honest exchanges of views are encouraged. Unless we seek to establish such an environment, the "professionalization of policy" at local levels in American society might well be considered to be an impossible dream.

The establishment of such an environment will require a number of improvements in our complex system. Specifically, a positive and creative approach must be developed which will capture the interest of local community leaders, citizens and government officials. Local elected officials, hazard specialists, and landowners must take the lead in educating the public about the risks and mitigation alternatives; developing management strategies that are well conceived; obtaining necessary federal and state support, and implementing the programs for hazard reduction. Public managers must stress the positive aspects of natural hazard mitigation, while emphasizing resource management and comprehensive planning. A high degree of involved participation by community leaders, landowners, and interest groups who can provide expertise is needed to insure improved natural hazard management. Finally, improved policy decisions will require a government staff capable of providing honest technical advice. They must be protected from reprisals due to presentation of findings that may be offensive to politically

important groups. Their role must be that of an analyst, not that of an advocate.

The early application of technical expertise in disaster proofing, hazard analysis, and similar topics is required to appropriately develop and implement hazard reduction programs. Since most natural occurring events do not respect political boundaries, formal memorandums of understanding, agreements and joint efforts to develop plans and guidelines, which transcend political boundaries must be developed. Pre-event planning to facilitate intelligent mitigation decisions following a major disaster, thereby preventing a repeat of the past, such as reconstruction in the same flood plain or landslide area without consideration of the consequences of future hazard events. This is critical to overall reductions in natural hazard risks.

In order to achieve these improvements and increase the professionalization of natural hazard policy, it will be necessary that federal, state and local governments, as well as the private sector and the technical community of hazard specialists, give full consideration to the following objectives:

1. Identify and address technical issues of fact. The time to candidly list and discuss the numerous technical issues of fact is before problem-solving proposals are submitted to legislative bodies. Position papers should be prepared by appropriate technical groups in preparation for legislative discussions. They must avoid the use of unnecessarily technical language and complex mathematical symbols; and they must present lucid and easy-to-understand discussions of technical disagreements and uncertainties, while offering a reasoned assessment of the policy importance of such disagreements. These papers are necessary preparation for legislator discussions of these same issues.

2. Formulate and develop model legislation and action. It should be recognized that the probability of policy maker adoption of hazard reduction regulations and standards is higher immediately following a disaster rather than during other periods of time. Thus, documents appropriate for use by local and state governing bodies should be prepared, and made ready for use and consideration before natural disasters occur. Preferred alternatives should be identified and embedded in model documents which can be readily transmitted to legislators in the immediate wake of such disasters.

3. Form and educate natural hazard mitigation constituent support groups. If future progress is to be made in coping with natural hazards, constituencies must be formed, educated, and prepared for effective political activity. Where possible the engineering and hazard specialist groups should be identified

as prime constituencies to serve as the nucleus around which political constituencies may form to support effective safety legislation, standards, and regulations.

4. Identify legislator interests and education needs. A legislator without a problem to solve or a constituency to serve is a legislator without a future. Therefore as natural hazard reduction political constituencies are formed, it is necessary that they identify with individual legislators at national, state, and local levels. These coalitions can then offer continuing and sustained support for hazard reduction legislation.

5. Increase professional status of staff at the local government level, and develop an appropriate recruitment, training, or regional cooperative program. The lack of sufficient qualified staff personnel in the building and safety and planning departments of local government has complicated the problem of achieving effective policy adoption and implementation. Since most elected policy makers look to their staff for technical information and counsel, it is important that the staff be capable of providing the highest quality support. It is the responsibility of the hired professional to provide the basis for integration of subsystem optimization.

There are no shortcuts to successful policy activity in this, or any other problem area. Those who choose to take shortcuts will soon be disappointed. Ultimately, an expanded partnership is required if the desired level of "professionalization of policy" is to be achieved. The partnership must include all levels of government, the professional community of hazard specialists (engineers, architects, planners), special interest groups (developers and real estate groups), and the general public who must ultimately pay, either in costs of construction or loss of property.

When this partnership is achieved we should see significant improvement through the effective implementation of appropriate policies and thereby a reduction of risk from natural hazards. In this context hazard mitigation management must become an integral part of the broader set of land use and regulatory policies. Such plans will include population, housing, employment, recreation, conservation, circulation elements as well as specific hazard concerns. A broader focus and larger framework for thinking which goes beyond the immediate threat is necessary if one is to view the problem in a total system context.

It seems appropriate, as John Gardner (1970) has suggested in another area, that future hazard mitigation policies will be framed and implemented in situations in which, "issues are confused, where you are never sure you are right, where good and bad are extricably fused with the partly good and the partly

bad, where often you can't do one worthy thing without endangering some other worthy thing" (Gardner, 1970:101). This is the challenge facing the concerned governmental official when considering natural hazard mitigation plans and programs.

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