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The Problem: Urgent Needs, Distant Sources and Complex Transactions in International Disaster Assistance

The distant rumble of an earthquake through Himalayan cities and towns sets in motion a complex chain of international disaster assistance. The disaster creates immediate, urgent needs for medical care, housing, basic supplies and tools to rebuild communities that have suddenly been shattered by natural forces. In the remote villages of Nepal and Bihar State, India, resources are scarce in a local economy that, for most of the population, is marginal at best. In other parts of the world, resources are mobilized to assist the residents of Nepal and Bihar, but the problem lies in determining what is needed, who needs it, where it is needed, how to get it there and how to establish a process that will utilize the assistance most effectively to meet the needs of the people in the damaged communities. The problem involves mobilizing multiple participants to act simultaneously in a long, but often tenuous chain of design, delivery, and development to meet the urgent human needs generated by the disaster. The obstacles include time, distance, resources and information as the basis for action in an uncertain, dynamic environment.

Providing international disaster assistance is a complex interorganizational process that operates across multiple jurisdictional levels and between multiple organizations within

jurisdictions. At least three networks of organizations are involved in virtually every disaster to facilitate the complex set of transactions that characterize the international disaster assistance process. These are: 1) the intergovernmental network in which foreign governments contribute money, materials and technical expertise to the afflicted nation; 2) the private-voluntary network of international charitable organizations that allows individuals in other nations to contribute money, supplies and time to the citizens of the afflicted nation; and 3) the local network of citizens, businesses, private organizations and public agencies that creates a common effort within the afflicted nation to regenerate the communities that have suffered damage in the disaster (Comfort, 1988a). Each network has an important role to play in the overall process of international disaster operations. The three networks are, in important respects, interdependent, as each relies upon the other for information, support, recognition, and cooperation in the achievement of their shared goal, protecting the life and property of the citizens of the damaged communities. Yet, the coordination between the three networks is informal at best, and often absent on critical matters involving the design and delivery of international disaster assistance.

The dynamics of interaction between the networks differ with each disaster, yet at least on the international level, the participating organizations are often the same. In disasters such as the recent earthquakes along the "Ring of Fire" --

Mexico City (1985), San Salvador (1986), Ecuador (1987), and
Bihar/Nepal (1988) -- similar sets of national governments,
international assistance organizations, charitable groups,
professional and business organizations contributed money,
materials and time to the disaster relief effort. The critical
question is whether these organizations, engaging in repeated
activities in international disaster assistance, learn from their
experiences and improve their capacity to act in coordinated
disaster operations.

The evidence on organizational learning in international
disaster assistance is mixed. While there is clear evidence of
some types of organizational learning with recurring experience
in disaster operations (Comfort, 1986, 1987), there is also
evidence that a significant proportion of participants perceive
the communication and coordination processes involved in interna-
tional disaster assistance to be fragmented and ineffective.

For example, twenty-three members from search and rescue
teams that participated in the Salvadorean (1986) and Mexican
(1985) disasters responded to a survey of field operations
personnel.[1] Questionnaires were sent to disaster assistance
offices and their sponsored search and rescue teams in fifteen
nations. Twelve nations replied, and twenty-three valid ques-
tionnaires from nine nations were returned. Italy, France,
Brazil and Japan each sent one questionnaire per team, reporting
a collective response for the team. Of the twenty-three valid
responses received, twelve, or 52.2%, reported coordination

between the international teams to be not very, or not at all effective.[2] These responses were from members of teams from Italy, Japan, the United Kingdom and the United States.

Not surprisingly, members of teams that shared a common language or who had bilingual skills perceived coordination more favorably. Six responses from members of teams from Guatemala, France, Mexico, the United Kingdom and the United States perceived coordination between the international teams to be at least "so-so." Four respondents, members of teams from Brazil, Mexico, the United Kingdom and the United States, found the coordination between international teams to be effective. No respondents rated coordination as very effective. Importantly, all ten respondents who rated the coordination between international teams at least "so-so" or effective had participated in previous international disaster operations, or had cross-national training experiences or had bilingual skills.

These findings suggest that opportunities for prior interaction and/or the development of common communication skills facilitates the development of a basic understanding between national teams that is necessary for effective coordination in international disaster assistance.

Structuring processes that foster and support organizational learning is critical to maintaining the credibility of international disaster assistance. Too many organizations have experienced the despair of watching massive quantities of unwanted goods being stockpiled or destroyed while genuine needs of

disaster victims remain unmet.[3] Without demonstrated improvement in the design and delivery of international disaster assistance, both recipient and donor nations risk losing opportunities for productive exchange and learning that are valuable to the developing international community. Establishing an orientation toward responsible action by both recipient and donor nations in the event of a major disaster is the basis on which further collaboration in international disaster assistance may be built.

The persistent problem is how to structure a set of organizational learning processes that link participating organizations in a flexible network which expands or contracts to fit the changing needs of international disaster assistance (Meltsner and Bellavita, 1983: 143-144.) This paper will analyze the problem in the context of the patterns of organizational interaction identified in the Ecuadorian earthquakes of March, 1987. The analysis will seek to determine the feasibility of, and requirements for, the development of an interactive information system to foster organizational learning processes in international disaster assistance.

Such a system would not duplicate any of the information networks currently being developed by the (International Red Cross, the Pan American Health Organization, the Organization of American States or the United Nations Disaster Relief Organization. Each of these information networks serves its own clientele and is designed for its own organizational purposes) Rather, an interactive information system, geared toward organ-

izational learning, is intended as a meta-network that would link the existing networks in a policy-oriented focus to serve specifically the functions of international disaster assistance.

Theoretical Assumptions

Two basic premises underly the design of organizational learning processes to serve the complex, dynamic environment of international disaster assistance. First, effective international disaster assistance requires establishing a basis for responsible action by both recipient and donor nations. This basis includes reaching substantive agreement among the participants on: 1) the shared goal of disaster assistance, protection of life and property; 2) the structure through which these actions will be taken; and 3) the process by which nations, organizations and individuals will match needs to services and materials. Included in this joint exploration of the disaster assistance process is a clear statement of professional standards in international disaster assistance. Without fundamental agreement on the purpose of disaster assistance and shared acceptance of professional standards for conducting disaster assistance operations, the complexity of the task and the harsh disaster environment are likely to compound error, distortion and misunderstanding, reducing the efficiency of disaster operations.

Further, agreement on basic issues and orientation in international disaster assistance is best reached through open discussions with the participants prior to the onset of a disaster. These agreements may change with experience, as

participants focus on the reflective redesign of their practices based on "what works" in actual disaster operations (Holland, 1975.) Agreements are least likely to be reached satisfactorily during the urgent period of actual disaster operations (Dror, 1985).

Second, achievement of this shared goal of protection of life and property depends upon adaptive performance from both individuals and organizations in the uncertain, dynamic, complex environment of disaster operations. This adaptive performance includes the ability of decision-makers to shift from inquiry to command to coordination and back again in a flexible manner in order to take action in disaster operations. Action is followed by review and reflection of results obtained, coupled with efforts to redesign action in order to obtain a closer approximation of the desired goal (Holland, 1975; Comfort, 1986.)

Given these premises, a major task in disaster operations is to increase adaptive performance by individuals and organizations to meet more effectively the sudden, destructive changes in their environment created by the disaster. This task becomes even more complex in international disaster operations. Since the ability to act adaptively depends critically upon the information available to the decision-makers, the following propositions are stated in reference to increasing the efficiency of disaster operations.

1. Individual decision-makers are capable of increased adaptive performance in an environment of substantial complexity when acting within organizations appropriately structured for information exchange.

2. These organizations, in turn, are capable of increased adaptive performance in an environment of substantial complexity when acting within sets of organizations appropriately structured for information exchange.

3. Adaptive performance depends upon the content, form and degree of information exchange within and between organizations. Information exchange is facilitated by the use of an interactive, computerized information system.

4. Inadequate information flow decreases organizational performance in actual disaster environments and, further, inhibits organizational learning in complex environments (Cohen, 1984).

These propositions will inform the analysis of the networks of organizational interaction in disaster assistance that were identified in the Ecuadordian earthquake disaster of March 5, 1987.

The 1987 Ecuadorian Earthquakes: Turning Disaster into Development

If there is a benefit from disaster, it would be the opportunity to transform the experience into a learning process that would enable individuals, organizations and nations to minimize the risk to their social and economic environment and to act more effectively in the event of the next threat posed by natural hazards. This opportunity comes repeatedly in nations that lie along the "Ring of Fire," the system of earthquake faults that runs along the western coasts of the Americas, through the Pacific to New Zealand and up through the the Asian nations of the Pacific Rim in full circle to the Aleutian Islands. The threat of earthquakes is particularly challenging for international disaster assistance organizations, because it is now possible to map the earthquake faults and to anticipate the likely consequences of major earthquakes upon human settlements. As both the calculation of risk from earthquake events and the technology of disaster operations improves, it becomes possible to consider action in mitigation, rescue and recovery operations for events that had previously been dismissed as tragic acts of fate.

The small improvement in science and technology, however, is off-set by the large task of engaging the existing social, economic, political and cultural organizations in the collaborative tasks of reducing hazards and increasing capacity for coordinated action in the event of disaster. To accomplish these

tasks, we need to design and maintain organizations that are capable of learning from past events as well as to anticipate future events in a continual process of adaptation to the known threat that characterizes the physical environment of these nations.

The record of disaster operations in the 1987 Ecuadorian earthquakes illustrates both the potential and the likely difficulties of structuring learning processes through information technology with the existing networks of organizations. The concept of a meta-network of networks of organizations, each with its own disaster operations functions and learning systems, but all committed to the same goal and interconnected through communications systems, is a product of the "information society" (Bell, 1973; Naisbitt, 1981.) Such a meta-network would have many of the characteristics of a "policy organization" as described by Meltsner and Bellavita (Sage, 1983.) The levels of such an organization increase in complexity in the environment of international disaster assistance, and a primary function of the interactive communications system is to maintain the flow of information, feedback, learning and action that inhibits the "bureaucratic gridlock" so common to human organizations. Without the corrective mechanisms of feedback and learning, organizations and sets of organizations tend to grind inevitably toward stasis, victims of their own attempts to control their operating environments (Argyris, 1984.) Both the potential for creating such a meta-network, and the problems that arise when

one is not in place are illustrated by brief characterizations of patterns of organizational action that developed in the disaster assistance efforts following the 1987 Ecuadorian earthquakes.

Organizational Networks In Disaster Response and Recovery Operations

Reviewing the extent, form and outcomes of organizational action in disaster response and recovery operations following the Ecuadorian earthquakes of March 5, 1987, a pattern emerges of interacting networks operating simultaneously in reference to particular problems. The degree of communication and coordination within and between these networks varied, with direct effects upon the outcomes of actions taken in the disaster operations process.

In some instances, especially in the rural parishes, communication and coordination between the local, national and international networks of organizations appeared almost absent.[4] In other instances, as in the emergency housing construction projects undertaken by individual relief organizations in affected communities of the Sierra, the Andean Highlands, communication and coordination functioned very well between the local, national and international levels of operation for a particular project, but failed between projects and between other types of organizations -- public, private or voluntary.[5] In still other cases, communication and coordination between types of organizations and levels of operation developed around

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problems addressed in common, but failed between sets of problems.[6] In each set of cases, the organizations involved were encountering the limits of time, facilities and preparedness training essential to achieve effective communication and coordination in the complex, dynamic disaster environment.

The resulting pattern of organizational network performance, at times overlapping, at times operating independently, appeared to be a function of at least four factors: 1) the overall complexity of the disaster environment; 2) the differing requirements of technology and resources for the problems addressed; 3) the number and diversity of participating organizations; and 4) the limited facilities, staff and training for communication/coordination in disaster management, not surprising in a developing country.

Networks of organizational action centered on the three zones of the disaster, differing in geographic location, physical and climatic conditions and type of impact upon national, communal and family life. From the immediate families and communities that suffered physical, personal and property losses, networks of assistance extended to the parrochial and cantonal jurisdictions of public or governmental organizations, but included religious, charitable and voluntary organizations within the distinct communities. This network of community organizations, in turn, nested within a set of provincial organizations. The provincial organizations served as the linkage between the set of national organizations -- public, private and voluntary--

that mobilized resources on the national level and directed them to the problems, communities and families in the three disaster zones. The network of national organizations responding to the needs generated by the disaster, in turn, functioned within the set of international organizations that contributed financial, technical, material and organizational assistance to the disaster operations. This overlapping set of networks that characterized the disaster response and recovery operations is represented in the organizational `map' shown in Figure 1.

The patterns of organizational action and interaction both overlapped and needed coordination in at least three directions: 1) between local, national and international levels of jurisdiction and/or disaster operations; 2) between public, private and voluntary sources of funding and direction at each operational level; and 3) between technical, social and economic functions served by differing sets of organizations at differing levels of disaster operations. Although breakdowns occurred within categories of organizational operation, performance was reported to be significantly better within a given network than between networks.[7]

A national framework for disaster management was established by President Leon Febres Cordero to meet the needs generated by the March 5, 1987 earthquakes. Although the mission responsibility for disaster management lies, by law, with the National Civil Defense Authority[8], the impact of this earthquake upon the

Figure 1

Networks of Organizational Action in Disaster Operations:
The March 5, 1987 Ecuadorian Earthquakes
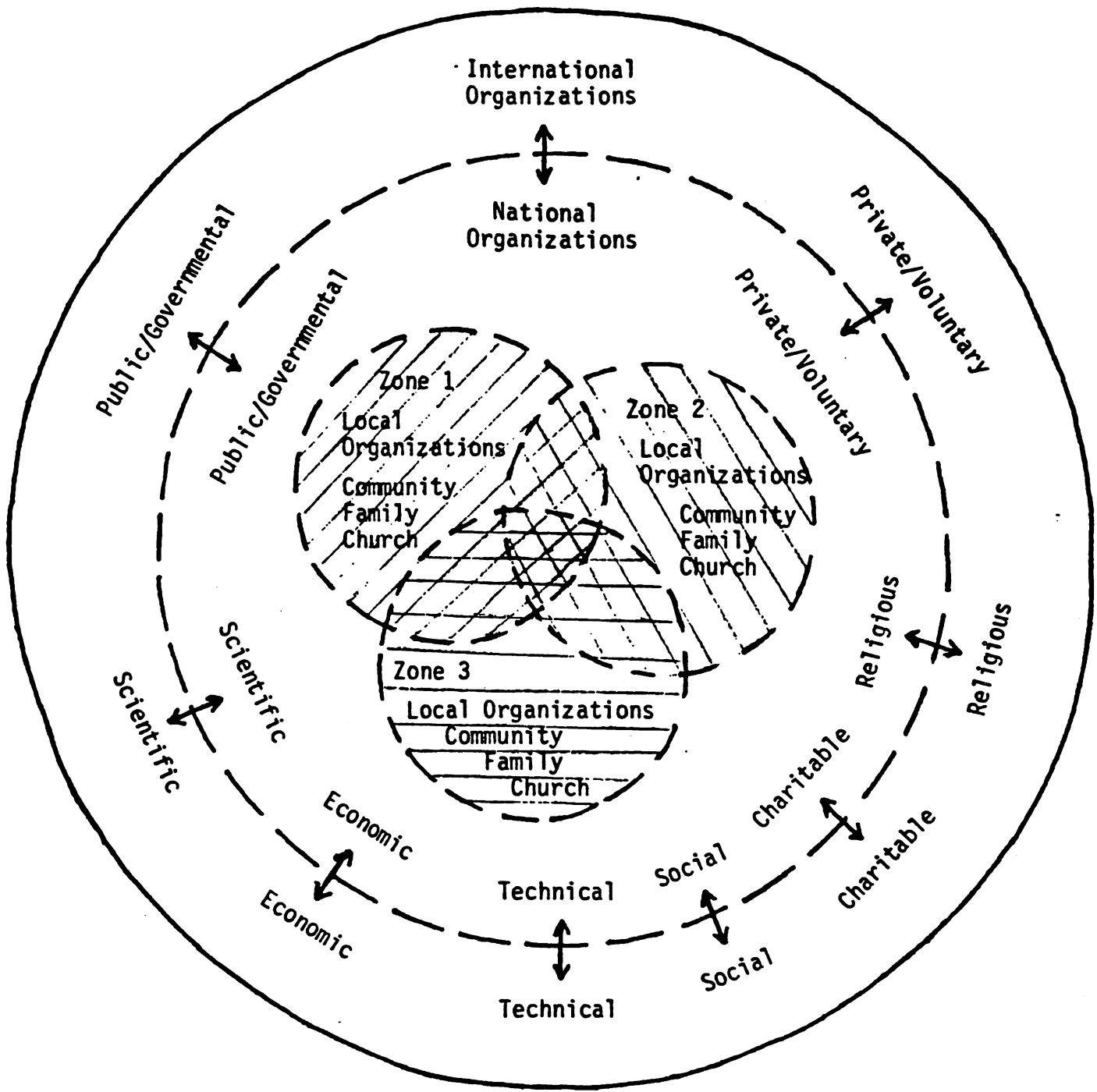
International,
= Scientific, Technical,
Economic Organizations

= Technical, Governmental Organizations

= Religious, Charitable,
Social Organizations

International, Governmental,
= Technical, Economic, Religious,
Charitable, Social Organizations

Zone 1: Western Napo Province
Zone 2: Carchi, Imbabura and
Pichincha Provinces, Highlands
Zone 3: Eastern Napo Provinces

The Legend indicates the dominant
pattern of organizational action
within and between the three disaster
zones. See Appendix A for a listing
of Major Organizations Participating
in Disaster Operations.

nation was so enormous that virtually all ministries of the state needed to be involved in fashioning and implementing appropriate policies. Consequently, President Cordero established an Emergency Committee that involved the major ministries of the nation. Eleven ministries and ten national institutes or administrative units were included in this committee. Key public officials were also invited to participate in the Emergency Committee, including the President of the National Congress and the president of the Supreme Court.[9]

In constituting this Emergency Committee and establishing a National Center of Emergency Operations, President Cordero was, in effect, signaling to the nation that the extraordinary needs generated by the disaster could only be met by a nationwide response and required the cooperation and contribution of all organizations and citizens to do so. By involving all elements of the nation's political and economic leadership in the directing body for the disaster operations, he took steps to give credibility to the concept of a nationwide network of emergency response.

How effective this network mechanism of emergency operations was in serving the needs for organizational coordination generated by the disaster is a question for further study. There is evidence of both success and failure of this system, assembled under stress of disaster, to achieve coordination in response and recovery activities.[10] The question is whether this set of networks of organizations can be transformed into a continuing

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framework for organizational learning, both within Ecuador and within the wider context of international disaster assistance.

Towards a Policy Network in International Disaster Assistance

Reviewing the inventiveness, courage and persistence that individuals and organizations demonstrated in the disaster assistance processes following the 1987 Ecuadorian earthquakes, there is much to be learned from the experience of this disaster. Five conditions, in particular, characterized the interactions within and between organizations in the Ecuadorian event and inform our understanding of organizational interaction in future disasters.

First, the three networks of disaster assistance organizations constituted a set of organizations, all directing their attention and efforts to diverse but interrelated tasks of disaster assistance. This set of organizations functioned as a "full-time organization of part-time participants" (Meltsner and Bellavita, 1983: 111-112) during the period of disaster operations. That is, most of the participants, both organizations and individuals, had other responsibilities and commitments, but set their primary responsibilities aside during the period of disaster operations to address the urgent needs of the disaster. The larger, `umbrella' organization created to provide disaster assistance functioned full-time, with separate organizations-- local, national and international -- as well as individuals entering and leaving the umbrella as both needs and resources allowed.

Managing such an umbrella organization, or network of networks, is a formidable task, as the opportunities for choice, error, distortion and entropy are myriad. Yet, the fact that such a meta-network existed demonstrates the powerful force of disaster in mobilizing resources, empathy, energy and organizational action toward a common goal on a scale unprecedented in the nation of Ecuador or other disaster-stricken nations. The principal means of holding a functioning meta-network together is through communications and shared information.

Second, performance in disaster operations is most effective when the tasks are related to those performed in daily work or life. Learning entirely new skills during the disaster operations is difficult for most people, when the stressful demands of the disaster causes learning rates to drop (Mitchell, 1988). When tasks were related to daily skills, however, people and organizations could adapt more readily, if provided with clear and sufficient information.

Third, the multiple needs generated by the disaster require an interdisciplinary "knowledge base" that supports simultaneous action in multiple locations. No one discipline can respond to all of the demands. No single organization has access to all of the knowledge that is needed for effective disaster operations. Assembling an interdisciplinary knowledge base proved essential for effective disaster operations. Without adequate knowledge of the area, conditions or resources available, disaster assistance actions, although well-intended, failed to achieve the desired

results.

Fourth, the primary means of mobilizing and maintaining the meta-network is through communications. The advantage of developing an interactive information system to facilitate two-way communication between all of the participants in the meta-network would likely mean a geometric increase in the learning capacity of the participants, resulting in improved performance.

Fifth, the obstacles to learning must also be acknowledged. Because this metanetwork is composed of organizations with previous histories, commitments, beliefs and traditions, each is likely to approach the problem within its own context of experience and action. In order for the set of organizations to function together effectively, however, they need to accept a common goal and set of operating premises. A major obstacle to learning is created when in which each organization must back away from its more intensely held separate beliefs to accept the shared goal of disaster assistance. Further, the degree of regression required to support common action among the set of organizations will likely vary with the particular organizations. Calculating the "criterion of regret", or regression to the mean set of beliefs that serve to mobilize the meta-network of disaster assistance organizations for every organization becomes an important function for any public executive who is coordinating the disaster assistance process.

Finally, designing processes of feedback and review of performance become the means of ensuring continued learning in

the set of organizations. Indeed, feedback tends to generate a synergistic effect within a meta-network of organizations, as learning communicated from one organization initiates learning in a second, which in turn stimulates learning in a third. The process continues, and the effect is to raise the level of performance within the set of organizations.

In each of the conditions stated above, the "active ingredient" is information. While it is not a sufficient cause for action, it is necessary. Investment in computerized, interactive information systems provide a remarkable advantage to decision-making in international disaster assistance. The information technology allows decision-makers involved in international disaster assistance to compress time, distance and energy into virtually simultaneous action across the globe. Maximizing the timeliness, accuracy and reliability of information to multiple decision-makers simultaneously is likely to increase their capacity for organizational learning, leading to more efficient action in disaster operations. In turn, this enhanced capacity for both learning and action in complex environments is likely to alter significantly the concepts, policies and procedures of international disaster assistance.

Notes

I acknowledge, with thanks and appreciation, the several research centers that have supported my continuing research in interorganizational coordination in international disaster assistance. The National Research Council, the Heinz Foundation of Pittsburgh, Pennsylvania, and the University of Pittsburgh's Office of Research, Center for Latin American Studies, University Center for International Studies and Graduate School of Public and International Affairs have contributed financial and administrative support to the conduct of this research. I also acknowledge the Institute of Governmental Studies, University of California, Berkeley for providing me with safe haven in which to think and write.

1. This research was part of a larger study of decision-making in international disaster assistance following the 10 October 1986 Earthquake in San Salvador. I gratefully acknowledge the Heinz Foundation of Pittsburgh, Pennsylvania and the University Center of International Studies, University of Pittsburgh for this portion of the research.

2. This informal survey was conducted in April - June, 1987. Questionnaires were sent to Disaster Assistance Offices and sponsored search and rescue teams in fifteen nations that participated in disaster operations following the San Salvador earthquake. These nations were: Belgium, Brazil, Canada, Columbia, France, Germany, Guatemala, Israel, Italy, Japan, Mexico, Spain, Switzerland, United Kingdom and the United States. Twenty-three responses came from 12 of the 15 nations. Italy, France and Japan returned single questionnaires representing the collective responses of their respective nationally-sponsored search and rescue teams. A full analysis of the findings will be presented in my book, Shared Risk: Disaster Management in the Americas, (forthcoming, 1989).

3. Statement, President, Colombian Red Cross, International Conference of the American Red Cross, Quito, Ecuador, July 2, 1987.

4. Interview, director, emergency assistance project in Napo Province, Baeza, Ecuador, July 8, 1987; interview, president, Municipal Council, Baeza, Ecuador, July 8, 1987.

5. Interview, president, Municipal Council, Cayambe, Ecuador, July 2, 1987.

6. This observation was made separately by several informed observers/participants in the disaster response and recovery process. Assurances of professional confidentiality prevents me from citing the sources directly. The same observations, however, are documented in news articles published in Hoy, Quito, Ecuador, March 7 - 31, 1987.

7. Interviews with directors of local and provincial Civil Defense councils and directors of disaster assistance projects, Quito, Olmedo, Cayambe, Baeza, Borja, Lago Agrio, Ecuador, June 19 - July 14, 1987.

8. Ley de Seguridad Nacional de Ecuador, 1979, p.1.

9. A complete list of the ministries, institutes and officials participating in this Committee is included in the Appendix of the full report, Robert Schuster, ed., The 5 March Ecuadorian Earthquakes.

10. Pages 10 - 15 are excerpted from my chapter, "Organizational Interaction in Response and Recovery" in Robert Schuster, ed., The 5 March 1987 Ecuador Earthquakes: Mass Wasting and Socioeconomic Effects, Washington, D.C.: National Research Council, forthcoming, 1988.