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Planning and Management for the Prevention and Mitigation of Natural Disasters, Especially in a Metropolitan Context: Initial Questions and Issues Which Need to be Addressed*

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Almost all the discussions and recommendations on the subject matter of the topic of our paper are plagued by ambiguities, inconsistencies and uncertainties in the central concepts involved. Good policies and implementation measures for planning and managing the prevention and mitigation of natural disasters cannot follow from such a confused, unclear and problematical starting point. We need to be clear first about what we are talking of before anyone can seriously advance conclusions and suggest means and ends which ought to be pursued.

As we see it, there are at least seven major questions and issues which initially need to be addressed. Thus, the rest of this paper is organized around what we shall call seven basic themes. Obviously we shall present our own point of view. But whether it is our ideas or those of others that are used, these are the central matters on which some degree of consensus will be necessary if intelligent recommendations are to be made.

We draw our observations primarily from the extensive work of the Disaster Research Center (DRC) which, since 1963, has conducted field studies of social aspects of over 475 different mass emergencies. Since its inception, DRC has sent teams to earthquakes in Mexico, Japan, Yugoslavia, Iran, Italy, El Salvador, Greece, Chile, California and Alaska; hurricanes in the southern and eastern United States, as well as in Japan; floods in Italy, Canada and more than a dozen states in America; massive brush fires in Australia and the western United States; and tornadoes and hazardous chemical incidents in Mexico, Canada and the United States. ¹ However, we also make some use of the empirical and theoretical research undertaken by other social scientists not only in the United States, but also in such countries as India, Canada, Belgium, Australia, Sweden, Japan, Italy, Mexico, Great Britain, Yugoslavia and West Germany.²

1. The Concept of "Natural" Disaster

The first of the seven major themes we want to develop is that we badly need to clarify the concept of "natural disaster." In the way in which the term is most frequently, but unthinkingly, used, our view is that there is no such phenomena as a natural disaster. The term is also very misleading in its surface implication as to where solutions for the source of the problems of natural disasters ought to be sought. In short, we need to rethink what we mean by natural disaster. Our position is that if we rethink and clarify what we mean by natural disaster, we will also be forced to rethink how we can go about preventing and mitigating such kinds of disasters.
We should note how the attributed source of disasters has changed over time. For most of history it has been traditional, at least in the West, to call certain sudden and extraordinary physical disturbances "Acts of God." Whether volcanic eruptions, earthquakes, floods, or tsunamis, the source of the disaster agent was seen as in the supernatural domain. In more recent times, and with the spread of more secular and non-religious ideologies, we have shifted to the term "natural" disaster, substituting nature for the supernatural. So earthquakes are the result of plate dynamics or floods the consequences of rainfall and drainage capabilities. But in either case, the imagery is that something external and beyond the realm of the human victims was responsible for whatever happened. In more recent decades, it has become progressively impossible to attribute all responsibility to God or nature, so the notion of human created disasters has increasingly been applied, especially in the area of technological accidents. So, to Acts of God (or Nature) have been added Acts of Men and Women.

We would not deny that it is possible to draw valid distinctions for certain limited scientific research goals between disasters involving different disaster agents. The physical factors which generate earthquakes are different from those involved in creating hurricanes. But we would say that for most purposes, including that of prevention and mitigation, the distinction often drawn between so-called Acts of God (or Nature) and Acts of Men and Women is both a useless and false one. It implies not only dubious notions of causality, but more important, the equally questionable idea that as a whole certain kinds of disasters are fundamentally different in origin and consequences from other kinds of disasters. Thus, in one case, nature or God is blamed. In the other case, the responsibility for the happening is assigned to human beings as say in the case of a nuclear plant accident such as Chernobyl or a poison gas cloud spread as in Bhopal. There also lurks in the distinction a supposition that one kind of disaster is more directly controllable than the other.

In actual fact, all disasters are always primarily the results of human actions. A disaster is not a physical happening, it is a social event. Thus, it is a misnomer to talk about natural disasters as if they could exist outside of the actions and decisions of human beings and societies. For instance, floods, earthquakes, volcanic eruptions, tsunamis and other so-called natural disaster agents have social consequences only as a result of the pre-, trans-, and post-impact activities of individuals and communities. Allowing high density population concentrations in flood plains, having poor or unenforced earthquake building codes for structures, delaying evacuation from volcanic slopes, providing inadequate information or warnings about tsunamis, for example, are far more important than the disaster agent itself in creating the casualties, property and economic losses, psychological stresses, and disruptions of everyday routines that are the essence of disasters. In one sense, there never is a natural disaster; at most, there is a conjuncture of certain physical happenings and certain social happenings. Without the latter, the former has no social significance (in fact, the former can be totally absent and there can still be a disaster in the social sense as can be seen in the behavioral responses to threats or false alarms of tsunamis or floods). We should think of all disasters, natural agent based or otherwise, as social events.
Now there are at least four major implications of rethinking of "natural" disasters as social and not natural phenomena. For one, there is an implication that prevention and mitigation must stress social rather than physical solutions for the problem. If disasters are in one sense the manifestations of the social vulnerabilities of a social system, then prime attention should be given to doing something about such vulnerabilities. Thus, if a population lives in a flood plain or in unreinforced building structures, and these are always the consequences of human actions and social decisions, prevention and mitigation activities such as community relocation and building practices and codes become the measures which should be primarily considered. In other words, it is attitudes and behaviors which have to be changed in the main.

Furthermore, emphasis on the social rather than the physical nature of "natural" disasters implies a proactive rather than just a reactive stance. That is, instead of waiting for the disaster to occur, encouragement is given to the idea of taking relevant actions before occurrence. If the phenomena is thought of as natural and physical, it is sometimes very difficult to see what could be done to the disaster agent such as an earthquake or a flood before impact. On the other hand, if the point of view is that the phenomena is primarily a social happening, encouragement is given to taking preimpact measures. It may not be possible to prevent the land from shaking, but it is possible, through laws, not to allow chemical or nuclear plants to be built on, or very near to, earthquake faults or soil that will easily liquify.

Another value of thinking of disasters as social rather than physical happenings, is that emphasis comes to be on internal rather than external factors. A disaster in this view is not an outside force that impacts upon a social system, but a manifestation of internal flaws and problems in the society. Thus, the threat is not vaguely "out there," but concretely within the social system. As such, the problem ought to be visualized as easier to address.

Finally, the view of disasters as social phenomena should allow them to be more readily seen as something which can be reacted to as part of ongoing policies and programs of national or social developments, which could reduce societal vulnerabilities in the first place. Activities of a developmental nature then can be seen as an integral part of disaster prevention and mitigation. There is a tendency for the latter to be treated as a separate sphere of action and responsibility. But by stressing the social nature of disasters, it becomes much easier to plan simultaneously both for societal development and disasters. This link between the two activities is explicitly argued by those who say that disasters are indicators of the failure of development, then development can be part of the process of reducing vulnerabilities to disasters.

2. Differences Between Planning and Managing and Prevention and Mitigation

Our second theme is that a variety of different disaster relevant activities need to be clearly distinguished. We draw a major distinction between planning and management processes, essentially seeing the former as the strategical and the latter as the tactical approach to the problem. We also need to distinguish between the goals of disaster prevention and of
disaster mitigation. Here the difference is that the first is usually only ideally attainable, whereas the second is, at least in part, always practically possible. Combining the processes and goals leads us to see, by way of the following graphic design, that there are four major paths that we should pursue in thinking about the problem of dealing with disasters.

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<th>PREVENTION</th>
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Let us look at these distinctions in more detail. Our overall intent is to suggest that, unless we draw the finer distinctions indicated, we will, at best, frequently talk past one another and, at worst, simply misunderstand what each of us is saying. Although we will not be able in this paper to document in detail what we have just said, it would be easy enough to show that when some use the term prevention, others use mitigation; that what some mean by using the word planning, others call managing, etc. As the Tower of Babel story illustrates, this is not the proper way to build any structure, whether of a material or a non-material kind. We first have to communicate before we can see if there is or is not agreement on the what or the substance of what is said.

There are four possible courses of action available to us with respect to coping with disasters. We can try to prevent them in the first place. If they occur anyway, we can attempt to mitigate their effects, respond to their impacts, or recover from their consequences. Prevention, mitigation, response and recovery—these are the four major possibilities.4

It is generally assumed that prevention is the best course of action to pursue. There are several comments which can be made about such a view. In the first place, real prevention would mean the blocking of the potential disaster agent from appearing in the first place. Thus, cloud seeding, in principle, could prevent hurricanes or cyclones from initially forming, or at least developing fully from an embryonic state. But as we know from the area of nuclear or chemical hazards, it is impossible even in the more technological areas to completely eliminate risks. Although apparently some medical hazards such as smallpox have seemingly been eliminated as potential threats to the human race, there is almost no reason to think we are going to eliminate or prevent the appearance of standard disaster agents such as hurricanes, earthquakes, tornadoes, floods, volcanic eruptions and so on. (We may one day prevent famine and perhaps even droughts, but these are disasterous conditions for which there is not a concrete agent, as in the case of those disasters just enumerated. Furthermore, even in the case of famine there may be prevention in fact, but in principle the possibility will always exist.) Thus, contrary to what is sometimes occasionally voiced, it is our view that prevention at best for the disasters we are discussing is an ideal but unattainable goal in the foreseeable future.

Furthermore, even if we think of disasters in the social sense as discussed earlier, we can confidently assert that we have not been and will never be able to prevent all disasters. This is insured in the short run
by the greater vulnerabilities of ever larger populations in high risk areas, and more risks to communities from technologically related developments (e.g. we have now toxic chemical disasters which can be generated by earthquakes even if we ignore the area of technological accidents per se). In the long run, disasters are assured by human errors and group misjudgements.

Perhaps we should stop the misleading talk of preventing disasters. Certainly if by prevention is meant elimination of disaster agents, we would not appear to be on a particularly fruitful path. If on the other hand, by prevention we mean reducing the social impact of disasters, it would appear we are then talking of mitigation measures. Also, as we have noted, there is a difference in eliminating or preventing disasters in fact and in principle. We really should clarify what we mean by prevention of disasters.

As to mitigation, there are all sorts of measures, both of a structural and non-structural nature, which could be used to reduce the direct impact of a disaster. This is not the place to discuss the pluses and minuses of each separate mitigation measure possible. However, we would raise the question if mitigation as a whole or in terms of separate kinds of activities should always be viewed positively. For example, relocation of endangered communities to new, safer localities is a potential mitigation course of action. However, as we have suggested elsewhere, relocation is often not feasible, frequently is impractical, and usually the disadvantages of moving specific communities outweigh the advantages.5

We need to think through what we mean by mitigation. Having established that, we then need to put mitigation measures into an appropriate context of feasibility, practicality, and relative cost benefits among other things. If we do, our suspicion is that we shall become less sanguine than we presently are about disaster mitigation. We do not argue against mitigation measures as such, but do suggest they need to be assessed realistically and not advocated without qualification.

There is also a need to draw a distinction between planning and managing disaster related activities. Perhaps the best way of doing this is by drawing a parallel to thinking in the area of the military. Most military organizations anywhere draw a distinction between a strategical and a tactical approach to military problems. Strategy involves applying overall principles to the general situation such as winning the war or conducting a particular military campaign. In contrast, there is the matter of tactical principles—what a unit has to do to deal with the specific problems associated with capturing a particular hill, the details of which could not be encompassed in a strategical approach. Thus, to draw the parallel, disaster planning should be thought of as the overall approach to the general problems associated with disasters. Disaster managing involves the specific tactics which have to be used with the particular contingencies associated with a very concrete and actual case of disaster prevention, mitigation, response or recovery.

Planning is not managing and vice versa. Planning may be a factor in managing, but is not the only one or even necessarily the most important one. Studies in the disaster area, for example, of emergency responses at
the community level, tend to show that even where there has been good planning, it does not follow that there will be good managing of the disaster. The strategy does not automatically translate into tactics.

It follows from what we have just said, that there are four different paths, two of a strategical and two of a tactical nature, which need to be distinguished in thinking about the problems of dealing with the prevention and mitigation of disasters. We will only confuse ourselves and others if we do not see and maintain the distinctions. The tactics to capture a specific hill in a particular combat situation may have little to do with the general strategy to be pursued in winning the overall war. Similarly, what might be effective tactics to manage the prevention of specific disasters, may have little in common with the best strategy to use in planning the mitigation of disasters generally.

3. Problems and Principles of Planning

We now move on to our third theme, namely, that in disasters and development planning, emphasis must be on the planning process. The importance of planning is not in the production of a written document or plans per se. Rather what is crucial is the carrying out of a process. To illustrate this, we discuss some major general principles of planning. In some respects we are addressing some of the strategies which should be used in planning for disaster prevention and mitigation.

Improvement in the prevention and mitigation of disasters will not be brought about by the production of written plans. This may appear to be a strange statement to make. However, we state it deliberately in this way to emphasize that what is crucial is the planning process, not the production of documents. Too often, particularly in governmental bureaucracies, what are intended to be means to laudable ends—such as plans to improve disaster prevention and mitigation—become ends in themselves. Thus, the counting of plans or the meeting of deadlines in producing documents comes sometimes to be taken as the achievement of the goal.

To avoid this, therefore, what should be emphasized in the disaster area is the planning process. If we are to make progress in this area we should not set goals to produce plans, but instead we should develop mechanisms or means which will encourage or facilitate planning activities of various kinds. True planning involves, besides the writing of plans, developing techniques for training and information transfer, undertaking public educational activities, establishing informal links and ties between relevant groups, conducting disaster simulations and exercises, convening meetings for the purpose of sharing knowledge, thinking and communicating about future dangers and hazards, undertaking risk assessments, drawing up model laws and legislation, to mention but some of the more important activities.

Approaching disaster planning in this way also suggests that it is a never ending process. Disaster planning for prevention and mitigation is not something that should be approached as having a definite conclusion. Rather the planning instituted should assume a continual process of revising and updating.
In addition, there are some general principles of planning which should be kept in mind. Some are applicable to any kind of planning, others are more relevant to the disaster area. Among the strategical approaches that can be taken are:

A. Good planning must be based on systematic research knowledge.

Too much planning in the disaster area is based on common sense notions, popular suppositions, or anecdotal examples. Several decades ago perhaps that is all planners had available. But at the present time, there is a fair body of social science knowledge about various social aspects of disaster phenomena, including prevention and mitigation questions and problems. Disaster planning should be rooted in that research base.

B. Good planning is based on more likely rather than worst scenarios possible.

Some planners like to start with the worst possible case. While catastrophic possibilities cannot be ignored, extreme or unlikely scenarios will have little credibility or credence among citizens at large or important officials and decision makers. A believable case has to be made and that is not usually accomplished by stressing extreme possibilities. Furthermore, too much emphasis on the worst is at variance with many social and psychological studies which show human beings are far more motivated by hope than by fear.

C. Good planning is predicated on sharing information widely rather than restricting it.

There is an unfortunate tendency at times to organize planning around controlling information about a threat or a risk. The supposition is that certain kinds of information cannot be shared with the public at large, in part because it is thought citizens cannot comprehend the situation or that they will react negatively. People understand far more than many public or private bureaucrats give them credit for, so that instead of restricting information, disaster planning should aim at informing and involving the public as much as possible.

D. Good planning attempts to reduce the unknowns and increase the options in a problematical situation.

While in some instances planning can be oriented to prevention, most planning has to be directed towards altering or modifying what may or will happen. Therefore, planners should not only indicate the range of problems which may or will occur, but also the range of possible solutions to them. It is very rare for only one option to be available for dealing with a problem.
E. Good planning involves educating others as well as oneself.

If planning is to work, those persons and groups that are covered by the planning must know their designated roles. Put another way, disaster planning cannot only be from the perspective of the planner. If communities, organizations and people are an integral part of the planning, their perspectives have to be taken into account. At the very least, what and why is being asked of those affected by the planning must be explained.

4. Problems of Management

Our fourth theme is that, apart from planning questions, there are management issues which have to be considered in both the preventing and mitigating of disasters. These matters usually involve choices of what tactics might be used to deal with the social organizational problems involved. However, since the means used would vary with each situation, we give examples of four problem areas rather than the tactical management measures which might be employed.

Managing a disaster related matter almost always involves a question of the mobilization of the proper personnel and resources needed for the problem. This can become particularly complicated if, as indicated earlier, disaster prevention and mitigation measures are treated as part of ongoing development programs and policies. This would bring together planners and officials with rather different backgrounds, interests and goals. The particular combination of personnel and who would occupy the more important decision making positions would create a different situational contingency in every case, and would require a keen sense of appropriate tactics to avoid exacerbating the existing group differences.

Frequently, disaster relevant programs and policies require communicating to and within groups with rather different bureaucratic jargons. The processing of information through and across different vocabularies is not easy. To use the jargon of one group makes the information inaccessible to others. To reduce the language to popular discourse requires a sense of what can and cannot be used in a particular organizational context.

Managing disaster prevention and mitigation programs and policies is also usually handicapped by the fact that real acceptance often cannot be imposed by authority. Seldom are disaster measures advanced by very prestigious organizations or powerful agencies. Other government groups and officials generally have to be persuaded that the disaster measures are worthwhile supporting, or at least not to be opposed. Skill is required in deciding what tactics will work best in any given social situation.

Finally, the managing of disaster relevant programs and policies generally requires obtaining some interorganizational coordination. In societies where there is both a public and private sector, such coordination on disaster measures is typically very difficult to obtain. But even in societies that are totally state controlled, getting governmental bureaucracies to coordinate their disaster relevant activities is far from easy. All kinds of social factors may be at play in the
Picking the right tactics to obtain cooperation often necessitates the reading of very subtle cases.

Our discussion of problems of managing certain problems likely to arise in efforts to prevent or mitigate disasters has been necessarily somewhat abstract. This is because each specific situation in reality can manifest so many different behavioral possibilities. But as already indicated, it is the very purpose of tactics whether in this area or in the military, to deal with such situational contingencies.

5. Cross-Societal Differences

Our fifth theme is that societies are organized in different ways and this has to be taken into account in considering both the processes and goals of disaster prevention and mitigation. Thus, there are differences in the social structures of societies what countries include under disaster planning and development, whether an agent specific or a generic approach is taken to disaster planning, and differences in the social science capabilities and disaster knowledge base in different societies. These and other differences such as the degree of urbanization which exists, can affect all aspects of disaster policies and program implementation.

Let us consider how social structural aspects can affect both disaster studies and applications of research findings. As an example, the United States and Japan are socially similar in many respects. They are both subject to many common natural and technological disaster agents. They are both highly industrialized and urbanized countries. They both have a strong scientific base and a tradition of using research to solve practical problems. However, the U.S. and Japan are drastically different in their governmental-political structure—Japan is a very centralized society; the U.S. is a very decentralized society. This affects fundamentally the meaningful social science disaster research questions which can be asked in the two countries, what kind of disaster planning and managing can best be implemented, and what features of disaster planning and managing can be usefully borrowed from one society for use in another.

In terms of the illustration just given: Italy and Japan, as another example, are quite similar in that both are highly vulnerable to many similar disaster agents (e.g. major earthquakes), both are urbanized and industrialized societies, and both have centralized governmental systems. It follows that along some lines disaster research and disaster planning and managing could be quite similar in both countries, and that both could borrow and learn from one another. Of course, there are also socio-cultural differences and for certain purposes these would be important in planning for, managing, and researching disasters.

To have effective and efficient disaster planning requires drawing from an adequate research base. We have tried to suggest that this link between planning and managing, and research might vary somewhat because of the social structural differences between societies. As we will discuss later, this becomes even more complicated when we compare developed and developing countries.

There can also be societal differences in conceptions of disaster
planning and development. For example, in the United States, a variety of activities are researched under the label of disaster mitigation. In general, reference is to measures that will lessen the occurrence and/or impact of the disaster agent.

Almost all such measures can be classified as structural or non-structural. The former for floods, for example, includes such activities as dam construction, stream channel and floodwall construction, and reforestation. With regard to earthquakes, improvement in building construction would be an example. These elements involve research in engineering, geology, hydrology, physics and the natural sciences. In addition, there are non-structural measures which can be taken which involve legislation, management and enforcement issues. For example, laws which prohibit building and development in flood prone areas represent this type of activity. The production of building codes and the enforcement of such regulations could mitigate the impact of earthquakes. In general, social science research is more likely and useful with respect to the effectiveness of non-structural activities.

However, while such activities are frequently a part of disaster planning and managing for disaster mitigation in the United States, this is not necessarily true in other countries. For instance, such activities appear to be far more a function of regular community planning agencies in Japan than in the United States where to an extent some of them are also the partial concern of emergency operational groups, if anyone at all. Our point is that there is considerable variation in what disaster relevant activities are considered the province of emergency groups, planning agencies or developmental organizations in different societies.

A third way in which the disaster research, planning and managing might be influenced has to do with the position which is taken on whether—both for research and planning and management purposes—disasters are approached in generic or agent specific terms. That is, one position is that both research and planning and managing are best when it is assumed that there are common elements which cut across most, if not all, disaster agents. Thus, there is the view, for example, that there is little difference in how effective warnings should be issued—it does not matter if the agent is a flood, a toxic chemical cloud, a volcanic eruption, or a massive fire. Research indicates that warnings to be effective must indicate personal danger, relative certainty of impact of danger, and probable occurrence in a short time. This approach contrasts with one which assumes that planning, managing and research will have to vary depending on the specific disaster agent involved. Thus, an agent specific approach assumes that studies and planning for chemical disasters, for instance, will differ markedly from those for flood disasters.

In the United States, there has been an interesting historical development on this matter. Social science researchers, almost from the start of studies on disasters, took the generic approach to disaster. Physical science researchers, disaster planners and managing and operational personnel from emergency organizations tended to take a relatively agent specific approach. This made sense in terms of the physical sciences and engineering—a researcher interested in physical aspects of earthquakes will obviously be interested in and study rather different phenomena than a researcher interested in the physical aspects of
floods. But disaster planners and managers, and operational personnel in the U.S. slowly and eventually swung around to a generic rather than agent specific approach, especially with respect to emergency preparedness and emergency response management measures. Researchers point out that a generic approach is cost-effective (that is, it saves money), that it avoids duplication of personnel and resources, and that it simplifies disaster-oriented training and educational efforts.

A partial consequence of the position taken by American disaster researchers was that about five-six years ago, the federal government established at the national level an organization called the Federal Emergency Management Agency (FEMA). This organization with overall responsibility for the federal or national involvement in disaster planning and managing in American society, advocated and established as national policy a generic or what is called the Integrated Emergency Management System approach to disasters. Thus, what had been resisted 10 years earlier has now become institutionalized as national policy (an integrated or generic approach has also been instituted in Great Britain and some other countries).

Of course, even in the United States, the general or generic approach has been more strictly applied to preparedness and response activities than to prevention or mitigation measures. There certainly is a question of how well a generic disaster approach is applicable to all phases of disasters, namely prevention, mitigation, response and recovery. Nonetheless, at least in some societies, the generic approach has more or less superceded an agent specific approach.

This brings us to the way the planning and managing of disasters has been influenced, and that is the social science capability and disaster knowledge that exists in a given country. There are huge differences around the world with respect to this matter.

Twenty-five years ago, there was only the start of social science research in the disaster area. Thus, in only a few countries was it possible for researchers to contribute much to disaster planning and management. However, there has been a tremendous increase in the last decade in the number of disaster studies, of disaster researchers, of countries where disaster research is undertaken, and of societies where disaster research and planning has been linked. This increase is uneven around the world, but there are now about two dozen countries where social science disaster research is being systematically undertaken.

In some countries, such as Japan and the United States, there is both quantity and quality in the research studies. In others, while the research production so far has been relatively moderate, the quality of the work has been particularly high. Italy and Australia are two such countries about which this can be said. A start has been made in developing societies such as India and Mexico, but as a whole there is not even much quantity of research in those countries where natural disasters are frequent and often of major magnitude.

It is true that all researchers are slowly linking with one another. There is now a network of social science disaster researchers, an international disaster community. One positive outcome of this is that
new researchers in the area can have the guidance and advice of other groups elsewhere. In fact, the computerization of library and data resources in the more advanced disaster research groups will make it increasingly easier for researchers, planners and managers to quickly learn about what is being done elsewhere. However, for the time being, research users in different countries have radically varying social science research bases from which they can directly draw.

6. Developing and Developed Societies

Our sixth theme is that there are differences between developed and developing societies. These can, and do, affect the possibility of both organizational planning and managing for the prevention and mitigation of disasters. We will suggest some of what is involved after first noting there are some general conceptual problems with the notion of developed and developing societies.

The question of the applicability of the findings from social science disaster research, mostly done in developed countries, to developing countries is a very complicated matter. Even the way the issue is posed is a somewhat debatable one. As we have discussed elsewhere, there is tremendous variation in the societies generally called "developing." They exhibit considerable social and cultural heterogeneity. The cultural values, beliefs and norms, not to mention their political, economic and social organizational structures, class and intragroup relationships, and the bases of social integration involved, comprise most of the variation known to exist in the world. Equally as important as the heterogeneity itself, is that, along certain dimensions, some of the developing countries are almost certainly closer to developed societies than they are to other developing nations. For example, there is wide variation in the attitudes towards and the legitimacy accorded by elites and the public at large to their political institutions. This would not be an unimportant factor in the possibility of policy implementations regarding disaster prevention and mitigation measures.

Our general point is that anything learned from developed societies can probably be applied only selectively to developing countries. The general principle almost certainly is that the greater the social and cultural similarity of the developing country to developed countries, the easier it will be for the former to borrow elements of planning and managing of disaster prevention and mitigation from the latter. Actually, we should know this from the developmental area, where we have many unfortunate examples of unsuccessful efforts to impose Western style structures and functions on non-Western societies.

Leaving that general point aside, what are some of the general organizational differences between developed and developing societies which could affect the transfer of disaster technology from one type of society to another. We would mention these five:

1. Developing societies do not have as complex organizational structures as do developed systems. There is simply less of an infrastructure in such countries.

2. Most of the very top organizational personnel have obtained their
training and education outside of their own systems. Officials have been primarily socialized to Western professional ideals and contexts rather than local situations.

3. Such complex organizational structures as do exist tend to function from the top down. While almost all organizations anywhere are reactive rather than proactive, this is especially true in developing countries with a strong tendency for initiatives only at the very top.

4. In many organizations, emphasis is on structures or forms rather than functions or tasks. The means often become ends as seen in the proliferation of paperwork and plans.

5. Few distinctively separate disaster preparedness or responding organizations exist. The further away from the national level, the rarer the existence of disaster specific groups.

In the main, these observations suggest that, in most developing countries, the existing social organizational structure is not conducive to taking steps to prevent and mitigate disasters. Put another way, many of these societies do not have the kinds of groups and/or personnel which would be needed to initiate, institute and carry out relevant programs and policies regarding disaster prevention and mitigation. One implication is that perhaps priority ought to be given to building a social organizational structure before concerning oneself too much with the desired functions. It is unlikely, given the financial resources most developing countries have, that new structures could be created. This suggests, and is in line with what was said earlier, that disaster prevention and mitigation measures might best be added to existing programs and activities for societal development.

7. The Past and the Future

Our seventh theme basically is the idea that the future will not be the same as the past. For example, for a variety of reasons, more and worse even so-called "natural" disasters can be expected as we move into the twenty-first century. In addition, probable forthcoming changes, both in technology and social organization, are likely to compound the problem of dealing with disasters in the future. However, there are also some compensating trends. Disaster research, especially of a social and behavioral science nature has, and will, increasingly provide planners, managers and policy makers in the disaster area with the knowledge and understanding they will need to do a better job in the coming decades of this and the next century.

Too often officials involved with various aspects of disasters tend to look to the past, to disasters that have already happened. Clearly past experiences should be used, although this is easier said than done. "War stories" do not contribute very much to military strategy and tactics; similarly "war stories" of prior disaster related experiences are equally useless unless systematically analyzed and examined.

More important, looking at past disaster experiences may lead to the planning and thinking of managing a disaster in the future which will be similar to what has been experienced in the past. This can be a major
mistake. The future is what we will live in or die. The future will not necessarily be a repetition of the past. This will be true of disasters as well as much other phenomena.

Both from a quantitative and qualitative point of view there is reason to think that, as a whole, future disasters, even so called "natural" ones will be worse than those we have had in the past. Because of population increases, the land use patterns of contemporary societies, the greater interrelationship of social units in the modern world, etc., disasters of similar magnitude, as might have occurred in the past, will have far greater impact. In one sense, there is simply more available to be damaged or disrupted. For example, an earthquake in the area now occupied by Mexico City would have affected only a relatively small population, even just 25 years ago. Today it will impact the largest city in the world, with a population of perhaps 18 million and growing every day. Flood waters or tidal surges from cyclones which would have engulfed a few villages several decades ago now would sweep over a large number of residents in many cities in many developing Asian countries.

The greater dependence of the population on one another and on certain facilities also means that many future disasters will have qualitatively worse impacts than similar magnitude disasters of the past. To some extent, modern technologies are also more vulnerable to the disasters of the future. To the extent that computerization takes hold in different spheres of life, for instance, the more there can be kinds of social disruptions unthought of in the past. Even disaster responding organizations are more likely to be vulnerable than they were in the past. Modern bureaucracies can accomplish much more than could once be done, but they also are more susceptible from their very increasingly complex nature to disruptions occasioned by disasters.

Thus, to the extent that the past is taken as a guide to the future, we could be very badly misled. That which might well have served to adjust to or to cope with a disaster in a community a decade ago might well be rather inadequate a decade from now. Mitigation measures which were once adequate may now fall rather short in the light of the changing circumstances of the end of this century and the beginning of the next one.

We think that upcoming disasters in metropolitan areas are especially likely to be negatively affected by looking primarily at the past. At least as far as peacetime disasters are concerned, we have been fortunate in recent years that very few large metropolitan areas in modern societies anywhere have been hit by a natural disaster of major magnitude. But metropolitan areas have the potential for the greater quantitative and qualitative disaster impacts we have just noted. Most past experiences, even in relatively recent times, have not had those kinds of impacts. Thus, we need to realistically project into the future what potentially could be, more than trying to extrapolate from past historical incidents of considerable lower quantitative and qualitative impacts.

However, while we need to be concerned about the worst future which will befall us, there is at least one positive compensating factor. In the past, we had little systematic social science knowledge to guide us on what to anticipate or expect. Today that is no longer the case. Our knowledge base is far from complete or total, but we do know much more now about
planning and managing for disaster prevention and mitigation. The social and behavioral science research that is currently available can be very useful. Much of the research, unfortunately, is either unknown or not used by disaster planners, managers and policy makers. But the knowledge exists, and there is every reason to think that the research knowledge base will continue to increase in the future.

We simply will have to work out better social mechanisms for transforming the research findings into practical applications. This very conference is perhaps the kind of general research technology transfer mechanism that we need. We hope that this paper might also be seen as an example of how research findings and conclusions can be used to give some guidance to potential research users.
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1. Among the major publications of the Center which are directly available from DRC are:

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A free copy of the DRC Publication List which contains several hundred items produced by the Center can be obtained by writing the Publications Clerk, Disaster Research Center, University of Delaware, Newark, Delaware 19716, USA.


Outside of the United States, some worthwhile publications are by Ian Davis, Shelter After Disaster (Oxford: Oxford Polytechnic Press, 1979); Russell Dynes and Carlo Pelanda (eds.) Sociology of Disasters (Milan, Italy: Franco Angeli, 1986); Sandro Fabbro 1976-1986 La Ricostruzione del Friuli (Udine, Italy: Ires, 1986);


4. Some of the definitional problems involved are indicated by the fact that there is not complete consensus on how different disaster phases should be distinguished. Many formulations put prevention and mitigation together and have a separate category of preparedness before the response phase. For a description of some of the problems involved and a classification of mitigation, preparedness, response and recovery see Hilary Whittaker 1978 Emergency Preparedness Project Final Report Washington, D.C.: National Governor's Association, 1978.


7. This is considerably facilitated by the International Research Committee on Disasters whose secretariat is housed at Arizona State University, and which publishes the journal International Journal of Mass Emergencies and Disasters, and the Newsletter, Unscheduled Events. Further information can be obtained from the Committee's secretariat located at the Office of Hazardous Studies, Arizona State University, Tempe, Arizona 85287, USA.