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URBAN VULNERABILITY TO DISASTERS
IN DEVEOLPING SOCIETIES

E. L Quarantelli

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URBAN VULNERABILITY TO DISASTERS IN DEVELOPING SOCIETIES

THE NEED FOR NEW STRATEGIES AND FOR BETTER APPLICATIONS OF VALID PLANNING AND MANAGING PRINCIPLES

DRC Miscellaneous Report # 51

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PREFACE

This volume has a double focus. One is on the vulnerability of urban areas in developing countries to disasters, especially those associated with natural and technological factors. The other is on the new strategies and on the better application of valid planning and managing principles that ought to be used to cope with disasters. As such, those officials active in disaster planning and managing are visualized as prime users of this work. However, readers also in research aspects might also be interested. The latter in particular might want to look at a paper developed at the same time as the initial draft of this volume, which focuses on conceptual and statistical problems involved in study disaster phenomena (Quarantelli 2001a).

This volume does build upon an earlier one written about a decade ago (Quarantelli 1992). In that volume we discussed the more delimited problem of urban vulnerability to technological risks in developing societies. While building upon what was said in that earlier report, this volume differs both quantitatively and qualitatively from that earlier publication. As can be seen from the considerably augmented Bibliography this volume is much more detailed and documented and examines a number of new topics (as discussed under new themes below).

Five new major themes are interwoven in this volume. All revolve around questions that could be seen as challenging traditional or current views about disaster planning and managing. Our intent is less to provide conclusive answers to the questions asked, but more to force a conscious thinking about the implications of different answers that might be given.

1. In contrast to our earlier publication where the focus was mostly on hazards, the greatest emphasis in this report is on disasters. Hazards are not disasters and sometime are not the most important aspects of those crises. This is not simply a semantic or conceptual distinction that can be made between sometime related phenomena, but has significant implications. Hazards are far more numerous than disasters. However, the vast majority of hazards never turn into disasters. In fact, hazardous factors are sometime not the most important aspects in those crises even when they are present. As we will discuss later, this raises questions about the strategy of prevention or mitigation and, preparedness that ought to be used. Should the major focus be on disasters? To what extent can hazards be ignored? Might there be some kind of selective targeting for attention? Perhaps more important, what difference would a difference in emphasis make and for whom?

2. The description and analysis in this volume now cover natural as well as technological disasters. The former kinds of disasters are very likely to increase and get qualitatively worse in the future. But there also seemingly is a difference between natural and technological risks and the probability of ensuing disasters. In terms of sheer frequency of existence, natural risks appear to considerably outnumber technological risks. That also seems to raise strategic questions with respect to prevention, mitigation and preparedness. Should the focus be primarily on natural disasters? Or should there be an equivalent focus on natural and technological disasters? Or is a distinction between the two a not very worthwhile distinction for planning and managing disasters?

3. There has been a recent burgeoning of the literature on urban areas and especially about megacities in developing societies. We incorporate such material in this report. But we pose some important questions that are not always asked. For example, is an urban focus an overstatement of the problem, given that developing societies still have much of their total populations living in rural areas? Similarly, does a focus on the largest metropolises ignore the fact that more disasters in developing countries still occur in small towns and villages? And, do national, community and organizational planning and managing necessarily differ in such urbanized place? If so, how does coping with such crises differ from what is generally required in any kind of disaster? In some respects, these questions are asking: what if anything is new with respect to the urbanized areas in the early 21st Century in developing countries? If so, what is the implication for dealing with disasters?

4. In contrast to our earlier publication, far more explicit and extended attention is paid in this volume to the larger contexts or social settings in which disasters occur. These range from the fact that in some societies, other kinds of social crises like ethnic conflicts and the widespread existence of public health problems such as AIDS are an ever present part of what is going on, to the new larger response framework created by the information/knowledge revolution that has appeared in the last decade from the innovations in computer and related technologies. Does it

make much sense to focus on disasters, when a case can be made that the larger social context is always more important? But to what extent is the larger social setting which generally reflects fundamental social characteristics and trends, open to being influenced by community or even national level disaster planning?

5. Our last chapter on recommendations for disaster policy and disaster planning and managing has been reworked to reflect much thinking and some activities on these topics especially in the last decade. In particular there have been developments which cut across national boundaries that need to be considered. There has been the development of the Internet and related new computer technologies that operate on a global scale, to the lesser importance of the nation state and the growing internationalization of the world. There is also the fact that negative effects of disasters increasingly are affecting societies distant from the initial source of the problem. How do these and other relevant social changes affect what can be planned and managed with respect to disasters? Is it possible to plan and manage disasters that might have their origin half way around the world?

Although a major audience for this report is visualized as disaster planners, emergency mangers and crisis policy and decision makers, the substantive content of this volume is heavily research based. That is, we examined the social science research work on disasters produced in the last half century. The particular literature sources used are listed in the Bibliography of about 400 items. Particularly drawn on were the most recent inventories and general summaries such as provided in Kreps (1991); Cutter (1994); Dynes and Tierney (1994): Alexander (1995, 2000); Oliver-Smith (1996); Hewitt (1997); Mileti (1999); Quarantelli (1999a); Waugh (2000); Cutter (2001); Rosenthal, Comfort and Boin (2001); Tierney, Lindell and Perry (2001); Quarantelli (2000); Waugh (2000); Alexander (2002); Nigg and Mileti (2002); and Stallings (2002). For this report, the specific examples and statistics presented were obtained from the various cited sources. Unpublished items discussed are all in the Disaster Research Center (DRC) library. Most of the unreferenced illustrations and figures are drawn from our past publications (see Quarantelli 1991a, 1992, 1998a, 1999a, 1999b, 1999c), and also from the work of the DRC which alone has done more than 600 different field studies of disasters, crises and mass emergencies.

Finally, some of what is written here, is partly based on a draft of a report that was produced as a result of a contract between the World Bank and the author, but which was never published in that form (for the version that was highly edited by other see Quarantelli 2003 in Kreimer, Arnold and Carlin 2003). However, all statements and opinions expressed are those of the author. They do not necessarily reflect in whole or in part the views of any organization or of any other person. We particularly want to stress this, given that we recognize that at least some of what we write in this report is highly controversial, and much could be disputed on various grounds. Nevertheless, this volume does represent our professional judgment on what the relevant social science research literature shows or implies, and we take full responsibility for that evaluation.

Readers of this publication, especially crisis policy makers, emergency managers and disaster planners are invited to contact the author of this report, with their reaction to it. In particular, we would be interested if their work experiences are consistent or not with what is set forth in this volume. Do the new strategies suggested as well as the advocated better implementation of valid principles of disaster planning and managing, make sense in practice?

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CHAPTER 1.

INTRODUCTION AND OVERVIEW

This chapter includes both an introduction to and an overview of the topics we discuss in the rest of this volume. The introduction sets forth the general ideas that have informed our approach to the problem of urban vulnerability to future disasters in developing countries. The overview also briefly outlines what we recommend as to what can be done by way of planning for and the managing of that problem. Since there is considerable documentation of many specific points in later chapters, references are added starting only in the second chapter.

Introduction

Our starting point is that the world is in the middle of unprecedented social changes, especially in term of the speed of the transformations that are occurring. Major alterations and modifications are occurring in how people and groups live and behave. These range from basic changes in the position of women in most social systems, to a world wide movement towards a market type economy, to at least the nominal acceptance of democratic kinds of governmental structures almost everywhere. These as well as other related trends that could be mentioned are affecting disaster planning and managing as well as the very nature of disasters

With respect to the last, more disasters is only part of what the future will bring. Equally as important, the negative effects of many of them will be more widespread and intensive as a whole, than the human race and society have suffered up to now. In short, the worst is yet to come.

Why? This highly probable outcome will result from certain of the massive and widespread social changes that the world is currently undergoing. While there are many changes going on, two in particular are of particular importance for our purposes. These are the world wide industrialization and urbanization processes that are occurring. They will negatively affect the characteristics of all future disasters.

However, this negative outcome will not manifest itself equally everywhere. As we will document later, the effects will be more severe in urban areas in developing countries. As such, our focus in this volume is primarily on these kinds of relatively more localized social systems, namely urbanized communities outside of developed societies

The developing countries in the 21st Century will be faced with daunting problems. High on the list will be many and very damaging disasters in their urban areas. This will occur as the result of two fundamental ongoing social trends---industrialization and urbanization---inherent in the very structure of social life in those kinds of societies. For one, disaster agents will increase because of the continuing effort to industrialize. In addition, current urban processes will have unfavorable effects by increasing the risks and vulnerabilities of impacted populations and organizations in metropolitan areas in developing societies. While along some lines, these same social trend factors were operative in the evolution of the present day developed nations, there are differences in the processes in the current developing world that make the social outcomes more negative for their societies. In addition there are poorer preparations for and managing of the ensuing disasters in currently developing countries.

The increasing vulnerability of their urban areas to natural and technological disasters will be reinforced by the ever larger number of megacities that are emerging as well as the newer and different types of disasters that are likely to occur. To the extent such disasters happen, they will be costly in lives lost and injuries suffered, in economic costs, in social disruptions and psychological stresses, as well as slowing the development process, plus creating other long

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lasting negative social effects. While it can be anticipated that the more and worst disasters that we project for the future will be a world wide phenomena, the negative effects just indicated will be more acute in developing societies.

Besides depicting what is likely to happen, we should also note that we have an interest in setting forth what might be done to deal with possible and future urban disasters in developing societies. As we see it, this will require major adjustments in the current disaster planning and managing that exists. Minor tinkering will not be enough,

To cope with the more and worst disasters that are projected, requires creating new strategies to be used in the planning for and the managing of such kinds of social crises. In addition to developing new strategies, there is also a need to better apply already validated principles of disaster planning and managing. Nearly a half century of social science research has established what could be done better. But such potentially useful knowledge needs to be actually implemented in practices and policies.

Overview

To recognize the increase in disasters and their more severe impacts in the urban areas of developing societies is not to argue that nothing can be done. In fact, our view is just the opposite. In later chapters, we suggest the need for either new or modified strategies, as well as better application and implementation of valid planning and managing principles. Thus, our recommendations have a dual focus, one on needed changes in strategies, and the other on better implementation of valid principles

As to strategic changes, there are a half dozen we briefly note below, but which will be later discussed in far more detail. However, they are set forth here so a reader of this volume will have an early overview of where we think improvements can be made in disaster planning and managing. Knowing where we are going to end up, should make clear why the conditions we discuss in the next two chapters are important in the recommendations we set forth in even later chapters.

1. Our view is that there must be a much stronger and very explicit emphasis on disasters rather than hazards, so as to highlight the social nature of the phenomena.

Disasters are social happenings. Hazards, for the most part, are not. Thus, to focus, for example, on earthquakes, floods or toxic chemicals implies that such potential threats, almost always of a physical nature, are what should be given priority and attention in the planning for and the managing of disasters. But hazards do not kill people, destroy property, or significantly disrupt community life. Rather such negative outcomes are the result of failures in the involved social systems. It is those failures that need to be focused on since what negatively happens in relevant social dimensions, is what constitutes a disaster. If disasters are to be prevented, lessened in terms of their impact, or better handled if they occur, improvements have to be made in social systems. A focus on hazards calls attention to physical aspects; a focus on disasters calls attention to social features. It is the latter where adaptive changes have to be made.

If so, there is a major implication for the planning strategy and managing tactics that ought to be in place. Those responsible for planning and managing must concentrate on the full range of disaster phenomena and pay less attention to hazards as such. The prime objective must be to do something about disasters, be it to prevent or mitigate, prepare for, respond to and/or recover from them. For this to be done, the focus has to be on the social, not the physical.

2. The focus should be on generic disaster problems and principles rather than on agent specific ones.

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Even in the early history of the human race, there was a strong tendency to distinguish disasters in terms of specific hazardous agents such as hurricanes or tornadoes, or more recently, nuclear radiation or chemical poisonings. This tendency was reinforced in the last century by the development of agent specific scientific orientations and agent specific professional groups (e.g., seismologists) and laws (e.g. regarding earthquakes or floods). However, social science research indicates that the crisis behavior of individuals and the actions of groups are mostly independent of specific agents. In fact, most problems in and solutions to disasters tend to cut across agent lines. Or let us put it in another way: There are generic problems in all disasters. For example, search and rescue and evacuation are necessary in almost all such situations. Likewise, after impact it is typically found that mitigatory building codes and land use standards have not been fully enforced. In a similar way, the principles of human and group behavior are common in all disasters. For instance, looting and antisocial behavior is very rare at times of non-conflict kinds of crises, making police deployment to deal with such criminal actions generally unnecessary (at least in developed societies). Organizations, except for emergency oriented ones, typically do not preplan for disasters, but the recovery period does sometime provide communities good opportunities to institute preventive measures for future disasters.

If these and similar research based observations and findings are valid, it follows that disaster planning and managing should incorporate the implied strategies and tactics. There is no particular value to try to distinguishing among and between natural and technological disasters insofar as personal and organizational behavior in such crises is concerned. Likewise, most mitigation and recovery measures require very few agent specific activities. It is the common and shared elements in all disasters that ought to be the major focus of planning and managing.

3. Certain important local implications of globalization need to be taken into account.

The process of globalization, that is the ever increasing establishment of social links and the interlocking of behaviors across national boundaries, is one of the dominant features of the current world. Among the important consequences is that it makes local communities subject to ever more influences from outside their own nation-state. Up to the present, effective disaster planning and managing has been thought of as best rooted in local decision making and practices. However, globalization is changing this, especially in developing countries. The mega and world cities that have and are emerging in such societies are increasingly being influenced by non-local decision making. This creates considerable difficulty for good disaster planning and managing in such localities. The problem is compounded by the ever increasing number of international and transnational organizations of both a public and private nature. They are often immune to local and even national control and pressures, and in some senses, are sometimes formally responsible to no one. These effects of globalization being new, require a new strategy.

Community level organizations involved in disaster planning and managing will have to take into account in a realistic way the just indicated consequences of globalization. If they do not, the local urban operations can not be very efficient and/or effective. From a strategic viewpoint, it is now necessary to incorporate how global influences are increasingly affecting the local community, even in the disaster relevant area. It will not be easy but local planners and managers will have to cope with distant social influences.

4. Crucial also is a strategic need to take the larger social context of disasters into account.

Disasters do not happen in a social vacuum. They are always embedded in a much larger social context. This context is reflective of what is historically and socially happening. At the present time, it is our view that some of these larger social features are especially important in developing societies. Among the more important are the widespread existence of ethnic conflicts and the AIDS epidemic. Also having a major impact on potential and actual disasters is the recent development of the Internet and related computer technologies. Finally there has been the decline of the nation state but not of politics. There are of course other aspects in the larger

social context, but these are among the most currently significant for disasters in many developing societies.

Again, if these research based observations and findings are valid, there are important implications for the strategies to be employed in trying to cope with disasters. The framework that has to be used must incorporate more than just the disaster itself. Disaster planning and managing must take into account whatever are the relevant and significant larger historical and social contexts that are present. Again this will be difficult, but a good assessment of how the context will influence disasters has to be made an explicit part of even local planning and managing processes.

5.   There has to be an acceptance of the idea that risk is a social construction and is strongly influenced by cultural factors, and does not exist independent of those two elements.

Risks to human beings and societies have always existed. However, the extent to which threats are seen as risky is a matter of perception. Contrary to many scientific views that risks have an objective existence, our view is that all risks are a matter of social construction, varying among and between so-called experts and laypersons. At present, those interested in disaster planning and managing tend to accept the perspective of risk experts with their supposed objective view of the phenomena. However, a different approach is implied if one accepts that all risk perception is always a matter of social construction, whether it be done by scientists or laypersons. In this approach, the problem is to identify how and what social risk is constructed.

Furthermore, all these social constructs are influenced by different cultural factors. That is different societies make different assumptions about the nature of danger, what can or can not be done about such threats, and what is valued in them. It should not be assumed that Western rooted and based conceptions of risk are necessarily acceptable or even valid elsewhere in the world. Risk is culturally influence as well as socially constructed.

To get better, in fact realistic, disaster planning and managing requires accepting the idea that risk does not exist independent of these two elements. The new strategy suggested is that perhaps the best way to approach risk for planning and managing purposes, would be to start with the perception of the potential individual and group victims of disasters (who might be better called "survivors"). Insisting on using only scientific views of risk is to insure a failure in communication, if not loss of legitimacy. Likewise, it is necessary to recognize major cross-cultural differences in perception of risk and therefore what might be acceptable to citizens and governments as to the disaster planning and managing that ought to be undertaken.

6.   Underemphasized institutions in disaster planning and managing need to be brought to the forefront in such activities and practices.

In the great majority of disasters and in all catastrophes, almost all the social institutions of a community inevitably get involved. However, current disaster planning and managing typically focuses only on a limited number of emergency oriented organizations (such as police, hospitals and the public utilities), and limited segments of social institutions. This is unfortunate because there are others that do play a great role in coping with crises. We have in mind such institutions as business and industry, the military, the mass communication system, local educational and scientific research centers and religion. Whether planned for or not, most inevitably are important in disasters.

An important implication of this general observation is that it is time that these relatively neglected social institutions be incorporated more formally into the planning and managing processes. The ability to do so is facilitated by the fact that there exists substantial research based knowledge about how these groups and institutional sectors do participate in disasters, not only at the crisis time but in all phases of the disaster cycle. That some of them might be thought to have beliefs and values that may be at odds with humanitarian and helping norms typically of those helping in

crises, is not a valid reason for continuing to exclude them from the process of disaster planning and managing.

There may be some places where some of the indicated new strategies have already been initiated or started. However, our view is that this is very rare and at times only lip service is paid to the supposed new strategy. And it will not be easy to institute many of the strategies. Some of those advocated will clearly meet resistance and objections from different vested interests, including from persons and groups in the area of science as well as governmental bureaucracies. In addition, acceptance and implementation of new strategies will be difficult because most of them are not the currently traditional ways of approaching disasters. Few officials and even fewer organizations are open to quickly and radically changing their usual behaviors

However, even changes in strategies will not be enough to improve disaster planning and managing as much as possible. There is much that is already known from social science research that could and should be better applied. If there were better applications of currently valid disaster planning and managing principles, the world would be much better off, even without many changes in strategies.

There are many well-established disaster planning and managing principles. These need to be correctly understood and better applied than they often are. These include viewing disasters as quantitatively and qualitatively different from accidents and minor community emergencies, including all time phases of the planning process rather than focusing on just one time period, and insisting on a continuing process rather than an end product such as a written disaster plan. The appropriate applicability of the principles to some extent depends on the fact that there are some relevant social structural differences between developed and developing countries. Since most of the principles have been drawn from studies in developed societies, implementation of the principles have to be sometime modified when developing social systems are involved. There is also the fact that generally the disaster planning and managing that is in place in current developing systems is not too good, as least as measured by social science research. Major changes towards the better, even in those developing societies where something is happening, are atypical rather than common or across the board.

Finally, some recommendations are made by us with respect to disaster policies and planning. The basic theme underlying all of them is that disasters are, in a fundamental sense, social phenomena. Certain suggestions are advanced with respect to what developing countries might do at the policy level. Recommendations are also advanced for the World Bank and other international organizations which more or less reflect what has been previously discussed.

There are also certain changes that are not necessarily the obvious province of any particular group or organization. For example, there is a need to standardize terms and concepts used in the disaster arena as well as improving disaster statistics. For the most part, the latter are very unreliable and highly dubious. As we discuss later, it would also be helpful if a distinction in planning and practice were made between disasters and catastrophes. They are simply not two different names for the same social happenings. They are different social phenomena with implications for dealing with disasters as well as studying them. All crises have common elements, but it is necessary to recognize that there are subtype differences relevant to planning and managing of them.

These three future needs just noted, to some extent are clearly the responsibility of researchers. However, groups that financially support disaster programs or organizations that set disaster policies could help by setting standards and requiring recipients of their help or activity to move towards these desired changes.

From whence have we derived all these recommendations and suggestions? They come out of our description and analysis of the short and long-run problems of urban areas in developing countries in dealing with natural and technological disasters.

Outline of Rest of the Report

Given what just said, in the next or second chapter of this volume, we discuss the socially generated increases in natural and technological disaster occasions that certainly can be expected in the future, some that are already occurring, and others that are yet to appear in full form. There simply will be more risks some of which will eventually become disasters as a result of the industrialization process that is going on. A half dozen trends affecting this outcome will be noted. These range from the increase in risk from the chemical and nuclear areas, to the development of new risks stemming from computer technology and biotechnology, to augmentations in risks from multiple or interacting sources resulting in synergistic types of disasters.

In the third chapter of this volume, some of the more distinctive social characteristics of urban life in developing countries are described. It will be indicated that the vulnerabilities that stem from the urbanization process will generally magnify the negative impacts that will manifest themselves in future natural and technological disasters. We discuss a half dozen aspects of the process. These range from the fact that future disasters will have more and concentrated urbanized areas to hit, to the certainty that the everyday problems of cities will magnify negative effects when they are impacted by crises. Also, the social organization of metropolitan areas, especially their bureaucracies, is not particularly well suited for dealing with disasters which almost always feature unexpected contingencies. Certain urban lifestyles too leave them especially vulnerable to disasters. Finally, because of the complex social links in and between cities which often extend around the world, disasters can have catastrophic potentials even when they create no casualties or induce physical damage.

Chapter four of this report discusses possible new strategic aspects of disaster planning and managing. The six we focus on were briefly outlined earlier. Some of what we advocate is deliberately provocative, and much in varying degrees is controversial. To the extent this forces readers to make explicit their implicit assumptions or to articulate better their old positions, we are accomplishing what we want to do. Thus, as already noted, we emphasize the need to focus on disasters more than hazards, although there are powerful social and structural forces that work against that change in emphasis. This last problem is also true of the strategic need to set aside for purposes of disaster planning and managing the supposed distinction between natural and technological disasters. We note also that while focusing on megacities makes sense, there are some aspects of globalization that should force us to make distinctions that otherwise might not be made. Perhaps even more crucial is a need to take into account the importance of the larger social context. But where does one draw the line? It is not just a happenstance that typically only a limited number of social institutions are incorporated into disaster planning and managing. What accounts for the lesser attention to the neglected institutions, and what can be done to accelerate the process of involving them?

In the next or fifth chapter, we note that many old principles of disaster planning and managing are still valid. However, many of them are not applied or incorrectly implemented especially in developing countries. Therefore, we recommend that certain selective principles be implemented for disaster mitigation planning, preparedness planning, crisis time managing, and the managing of recovery in such societies. As examples we suggest the following. With respect to mitigation, non structural measures should be given priority over structural measures. As to preparedness, the major organizations likely to be involved in responding to disasters need to be identified by some key group and their roles and responsibilities have to be spelled out long ahead of time of impact. In planning for responses in the crisis time period, a balance has to be achieved between organizations undertaking traditional tasks and those engaging in new activities. Finally, management of recovery activities after disasters needs to be preplanned as part of overall developmental policy both at the community and the national level.

In our sixth and concluding chapter, we advance some policy and program recommendations for developing countries and those national and international organizations (such as the World Bank and aid groups) as are directly and indirectly involved in disaster planning and managing. Among other things, we stress that it is the social rather than the technological arenas where the greatest effort to improve planning is most needed. Essentially our focus is on the appropriate setting forth of relevant policies, and the implementation of good disaster programs.

As to the World Bank, a key organization on the global scene, while it has already done much good work, we make a number of recommendations. Of the ten we advance, among the most important are the following two. For one, there is the necessity of follow-up assessments, several years after the disaster policies, programs and plans have been put in place with respect to risks and disasters. Even better would be a field examination of later situations where actual disasters have impacted localities where disaster planning and other risk reducing activities have been undertaken under World Bank guidance or funding. A second important matter is that the World Bank (and many other international type organizations) ought to consider the implication of the fact that the image of natural and technological disasters is mostly provided by mass media or journalistic accounts. The public image of many major disasters and all catastrophes are primarily constructed by the mass communication system (parallel to how risk is also a social construction). If so, an examination ought to be made of what and how the picture World Bank officials and national disaster planners in developing countries have of disasters is influenced by this social construction of the phenomena by reporters and journalists.

We end our report by stressing that our overall observations should be taken as a source of hope for a better 21st Century since they anchor any proposed changes in disaster planning and managing efforts in the operative social reality as uncovered in research by social scientists. That negative aspects and features dominate our report reflects our effort to indicate the problems that exist and what needs to be the focus of attention. However, we do go beyond simply noting the problems. We do suggest what can be done about them and sometime advance ideas that are not very traditional. What has been done up to now has not worked that well. There is now, as we say in the title of this report, the need for new strategies and for the better application of valid disaster planning and managing principles.

CHAPTER 2.

INCREASES IN NATURAL AND TECHNOLOGICAL DISASTERS

Have disasters been increasing in the world? Have they become worst than those that preceded them? Our answer is yes. We say this although as we have already said elsewhere (Quarantelli, 2001a) but will not do so again after this statement, that many of the statistics used to support such a contention are very dubious. They are usually unreliable both in absolute terms and for comparative purposes. But until the better statistics which we advocate can be produced, we have no choice but to use current figures to augment observations and qualitative research studies.

Threats of all kinds are increasing everywhere (Lichteerman 1999). It does seem probable that most, if not all, of the increases in risks result from technological that is social developments, rather than physical and biological evolution (Giddens 2000). Although a strong case can be made that natural hazards do fluctuate (e.g., the number of hurricanes in the Atlantic Ocean can vary rather widely from year to year or from decade to decade, see Revkin 2001), there is little evidence that since the human race has come into existence, there has been any continuous upward trend in so-called natural agents. However, in the next section we will note that there also can be human actions that may actually increase the frequency of seeming natural disasters.

Almost all developing countries are attempting to build domestic industries, particularly building manufacturing plants in cities. This effort primarily involves borrowing and using the various technologies that have transformed Western societies in the last 150 years, essentially introducing in the productive activities of the society a variety of machines powered by newer inanimate sources of energy such as coal, electricity, petroleum and natural gas (Lenski, Lenski and Nolan 1991:225). That there has been a measure of success in the effort at industrialization is partly indicated by the fact that in the last 40 years, the combined gross domestic products of developing societies have increased more than 500 per cent compared with 300 percent for developed countries (Lenski, Lenski and Nolan 1991:236).

But even in the West the:

> activities associated with industrialisation –the discovery and invention of new energy sources together with large-scale production and storage requirements; the establishment of transportation modes, haulage routes and depots; the need for disposal of unwanted or unintended wastes; increasing amounts and danger of atmospheric pollutants; the development of mass passenger transit sources, networks and stations-- . . . produced conditions which, albeit inadvertent by-products of the push for 'progress', jeopardised public safety and increased community vulnerability to a range of hazards. (Britton 1991b: 1)

While this statement was made of developed societies, it can be equally applied, if not more so, to developing countries as we will later discuss.

A. Five Propositions About Industrialization.

1. Industrialization brings with it new technologies that can set the stage for disasters. The accelerating increases of technological accidents and mishaps, particularly in the chemical and nuclear areas, will contribute to more and worse disasters.

The effort of developing countries to industrialize by adopting modern technology, whatever the genuine gains in living that are obtained, will be at a price. The history of the West strongly indicates what is likely to occur. To the category of natural disasters has been added a relatively newer category of technological accidents and mishaps. These are the disasters (a term used since the late 16th Century) resulting from human errors and collective mistakes of groups in the technological area (see Lagadec 1982; Perrow 1984; Herring 1989), which did not occur on any significant scale prior to World War II. To the "Acts of God (the history of the term is discussed in Loimer and Guarnieri 1996), the human race has now added the "Acts of Men and Women." The advent of this change has been described in various ways. An Australian disaster researcher has written:

> In many respects, technological hazards are a relatively new
> class of danger to which contemporary society is only just
> beginning to face up. Disaster wrought by the unintended
> consequences of technology has largely been a product of the
> large-scale industrial developments instigated by the eighteenth
> century 'industrial revolution'. Mishaps associated with
> technology have occurred ever since the first implement was
> developed by a human. However, the scale of consequences, in
> terms of social disruption and the threatening of the social
> infrastructure, did not reach conspicuous proportions until the
> development and concentration of large industrial complexes to
> mass produce a myriad of goods.

He concludes by noting that even in Western type societies:

> As pre-conditions for disaster, however, their significance has
> not penetrated the collective consciousness to the point where
> they have sufficiently influenced specific thinking and
> subsequent practices of relevant public sectors such as
> emergency services agencies, land-use and planning
> departments, environmental protection bureaus, or occupational
> health and safety branches (Britton 1991b: 1-2).

The above observation was written about developed societies. However, if there is only limited sensitivity to the probability of technologically generated disasters in such social systems, it is clear there is even less in developing countries. It could be argued that this is because in many such societies, there has not yet been the massive technological growth and associated risks Britton mentions. But actually there is little reason to believe that as developing social systems move increasingly toward urbanized and industrialized patterns, they will show much greater awareness of the risks that technologies bring. In fact, as will be discussed later, even if there is awareness of the risks involved, implementation of relevant disaster planning policies would be rather difficult.

We will now note that the major recently emergent technological threats are currently in the chemical and in the nuclear area. The manufacture, processing, transportation or distribution, storage, and the application or uses of many products of these two areas are inherently risky. While the great majority of such risks never manifest themselves in disasters, nonetheless, their existence almost insures quantitatively more and qualitative worse future disasters.

        a. The chemical area.

The whole chemical enterprise is a massive one. In the United States alone, the chemical industry is more than a 200 billion dollars a year enterprise which manufactures tens of thousands of different chemical annually, with more than 20,000 of them produced in amounts

exceeding 1,000 000 pounds every year. Thousands of new chemicals are created every year adding to the more than four and half million types registered at the start of the 21st Century, by Chemical Abstracts. These created substances have truly transformed the world and modern societies are impossible without them; their use reflects a widespread desire to have higher standards of living and desirable lifestyles which otherwise could not be achieved. The technology of chemistry has not imposed itself on the human race; it has been consciously developed and applied because of the perceived and actual substantial benefits involved. Modern lifestyles are impossible without a chemical industry. Thus, it is not surprising that in a country like India, even more than a decade ago, it had become a 20 billion dollars a year industry that accounted for 10 percent of the Gross National Product and 40 percent of the nation's gross industrial output. (Ramasubramanian, Mitra and Bandopadhyay 1987:180)

But this is not a totally benign enterprise. There are multiple risks associated with the production, transportation, storage and use, and disposal of dangerous chemicals (US law identifies over 1,400 of them as hazardous, see US General Accounting Office 2000: 4). The heterogeneity of the threats is not always recognized. In the instance of chemicals we have references to substances that can be liquid, gas or solid. We are talking of material that can explode, burn, asphyxiate, poison, corrode, and otherwise damage and destroy property, lives or the environment. Or put another way, there are multiple ways in which human and other organisms, plant life and fauna, and physical material objects can be destroyed, damaged or other directly negatively affected by a dangerous chemical. In short, a chemical emergency or disaster can involve myriad perilous happenings unlike a typical earthquake or a volcanic eruption. The referents of the term "chemical hazard" are multiple (Grey and Quarantelli 1981).

Even in the developed world, it has taken time for recognition by disaster researchers of the existence of such threats. Systematic and continuing social science studies did not occur until 1978 when **DRC** launched a three-year research effort which looked at local preparedness for sudden chemical emergencies in 19 communities, and studied 20 actual chemical disasters in the United States and Canada (Gray and Quarantelli 1981). Since those studies such statistics as do exist show that the incidents of chemical emergencies and disasters have continued to increase around the world. One examination of this, using 20 deaths as the cutoff point, found that while there have been only 59 such disasters in the whole world between 1917-1984, but 20 of them occurred between 1980 and 1984 (Freitas, Porto and Machardo 2000: 21). For our purpose, there are several interesting aspects of their more recent appearance and the socially problematical issues that are involved.

It is said, and correctly, that "geophysical hazards are neither uniformly distributed in space nor in time" (Wallis 1989: 295). In one sense, this is relatively less true of technological threats. Thus, even localities, that in the past had none or few risks from natural disaster agents, are *now* vulnerable if they have any roads, railways or navigable waterways near toxic chemical spills, explosions, or fires. To some extent, the growth of major transportation infrastructures has partly reduced the geographic selectivity of possible disaster impacts. Almost any inhabited areas of societies have now become vulnerable to disasters from dangerous chemicals even though there are no manufacturing, storage or use facilities in the vicinity. Not all developing societies or communities within them are subject to major natural disasters. But now many more are likely to be increasingly subject to risk as dangerous chemicals are more and more moved around.

Furthermore, the threat of greater disasters of this kind is increasing because of the greater amounts of dangerous material involved. For instance, from 1960 to 1980, not only did the number of seagoing tankers carrying petrochemicals double, but their shipping tonnage expanded sevenfold! Economic considerations are leading to the use of ever larger tankers. So, increasingly, there is something bigger to spill, explode, or burn on waterways as illustrated by the *Amoco-Cadiz* oil spill off the Brittany coast and even more dramatically the *Exxon Valdez* oil spill near Alaska, as well as the *Aegean Sea* tanker oil spill and fire in December 1992 at the harbor of La Courna, Spain, a city of about 250,000 people. In the summer of 2002 there were still major effects a year later from the sinking of the tanker, The Prestige off the Spanish coast.

The clean up alone may have cost than two billion dollars along with the pollution of the richest shellfish beds in the country, the killing of more than 250,000 sea birds and the loss of more than 30,000 jobs in the fishing industry (Fuchs 2003).   Port cities in developing countries are going to have similar risks. And it is high risk, for a large tanker carrying liquefied natural gas has the equivalent of the energy content of 55 Hiroshima type atomic bombs (Lovins and Price 1981: 64).

Moreover, there are more trucks on the roads then ever before. For example, 413,000 tank trucks regularly transport potentially dangerous materials in bulk in the United States (along with 263,000 daily shipments by trains, Hazardous Materials Training 2000). About 12 percent of more than 3.5 billion tons of cargo transported in contemporary Russia consist of potentially dangerous materials (see Vorobliev 1998: 33). In addition, such cargo transport is increasingly larger. There as been the advent of double and triple length trucks (Mead 1994). Furthermore, at any given time around five to fifteen percent of all trucks on roads will be carrying some materials that are potentially dangerous. So, "with the large number of trucks on the roadway system, an accident involving the release of dangerous substances is inevitable" (Kozub and Stone 1990: 1).

While many of the just cited statistics refer to the United States, there is every reason to think that the riskiness of truck transportation in developing societies is almost certainly higher, given the training of drivers, road construction, safety measures in loading, etc. In fact, a recent US AID analysis of seven road projects they had supported overseas found that both routine maintenance and preventive periodic maintenance were recurrent problems (Wunsch1991: 6). While this was said mostly about rural roads, as will be noted later, city streets are not necessarily better treated. In any case, even as early as 1958, seven trucks loaded with dynamite exploded in a slum and squatter area in the center of Cali, Columbia, demolishing around 2,000 buildings and killing about 1,200 people, the second largest total after Bhopal of dead in developing countries from a non-ammunition explosion (Cutter 1991: 276). Even when there are no casualties, a great number of people may be at risk; for example, a toxic sulfur trioxide release in New Delhi, India forced around 100,000 residents to evacuate (Cutter 1991: 280).

It might be argued that there has been only one Bhopal scale type disaster so far in developing countries (and only one Seveso scale type in developed societies). But it will be astounding if we do not have others eventually. Now the safety and accident prevention programs of the chemical industry in many developed societies are elaborate and impressive (see Quarantelli 1984). Moreover, according to the National Safety Council, for example, in the United States the chemical industry yearly has the lowest serious accident rate--deaths and days away from work among 42 reporting manufacturing industries.

However, analyses of accidents in petrochemical plants, gas processing plants, terminals and related facilities in the United States are not reassuring. For example, the number of plant emergencies has:

> [been] increasing at a high linear rate over the last thirty years.
> In fact, the number of these accidents has almost quadrupled
> during this time period . . . the cost of these same plant
> emergencies [adjusted for inflation] has been escalating
> apparently at an exponential rate over this thirty year time frame
> . . . this means that every day, the problem is getting worse at a
> faster and faster rate. This is a very frightening trend which
> appears to indicate that our technology is getting out of control
> (Sullivan 1993:1).

Another more recent report notes that "some 60,500 accidents with hazardous materials occur nationwide annually" (Smithson and Levy 2000: xv), with about half of them happening in fixed facilities and the other half during transportation (Smithson and Levy 2000: 312).

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If this is the case in the United States, it is not surprising that those who have looked at the problem report that the safety programs and the accident picture are far less positive in developing countries (see Haines 1991; Shrivastava 1992). Furthermore, the indiscriminate or inappropriate deployment of chemical technology as well as the mismanagement of complex technologies creates numerous risks in such social systems (Bowonder and Kasperson 1988: 104). As an example, a series of explosions in 1993 shook the city of Shenzhen, China. The first explosion was set off by a leak of nitric acid from a warehouse that stored dangerous materials. The fire from that blast then ignited a nearby natural gas plant and in the next several hours eight more warehouses in the area exploded. The disaster killed at least 70 persons and injured hundreds of others (Kristof 1993: A3).

In addition, the multiplicity and range of what can go wrong in the chemical area has so increased, that statistically there is increasing vulnerability in all societies. (A very detailed description of the multiple things that went wrong at Bhopal is given in Bowonder, Kasperson and Kasperson 1985). In view of all this, it is not surprising that some scenarios for an LPG explosion in or near a major port area in Southern California have projected a possible 70,000 dead and 325 million dollars of property damage (Bahme 1978: 189). A similar risk analysis around even more densely populated seaport urban areas in many developing countries would undoubtedly project even higher figures.

Additionally, to the in-plant and transportation kinds of *acute* chemical types of disasters, have been added the more slowly developing and diffuse types associated with hazardous waste sites, which do sometime necessitate relatively quick crisis responses. In the former Soviet Union one estimate is that more than a million residents live in contaminated areas, especially the 300 or so towns and cities where chemical weapons were once produced, stored, tested or destroyed (Shargorodsky 1993). The actual crisis situations that developed in Love Canal and Times Beach in the United States are examples of what may be expected more in the future.

Again it might be argued that little of such a nature has so far appeared in developing countries. To some extent it is probable that the presence of hazardous waste sites is either unknown or ignored in many localities in those societies. As such, there is always the threat that they might eventually require a quick emergency if not a disaster response. But apart from the wastes that will be produced from domestic industries, such societies are increasingly the recipients of potentially dangerous urban and industrial wastes from developed nations as the latter seek to rid themselves of unwanted byproducts of a modern system. Many of the observations on this happening are anecdotal and geared to producing striking headlines such as "Latin Nations Getting Others Waste" (Nash 1991:1) or "The Global Poison Trade: How Toxic Waste is Dumped on the Third World" (Anderson 1988: 66). Nevertheless, although systematic statistics are lacking, impressionistic news stories such as the following imply the nature of the growing problem:

> Off the coasts of Turkey, Haiti, Africa, the Philippines--an armada
> of toxic ships is circling the world. Some of the shipments are
> legitimate and closely supervised, bearing the poisonous waste
> of the industrial to treatment facilities well equipped to handle
> them. Others are more marginal, involving dumping permits
> from countries whose waste-disposal facilities consist mainly of
> shovels. And much of the activity is plainly illegal. Waste so
> dangerous that it can cost thousands of dollars a ton to dispose
> of in the West has washed up on Third World beaches or been
> left to poison the water and soil in distant corners of the globe
> (Anderson 1988: 66)

In another report by Nash on Latin America it is noted that:

About a year ago, officials of Argentina's customs office became
alarmed about . . . the applications that were crossing their
desks. One businessman wanted to import 5,000 tons of highly
toxic industrial solvents for recovery. Another wanted to bring in
soil with low levels of radioactivity. There were other requests to
bring in tons of toxic waste from PVC plants and proposals to
import hundreds of thousands of tons of waste plastics. The
origin of almost all of this was Europe and the United States . . .
Argentina had become the latest example of what many say is a
growing trend: Industrialized countries, finding it excessively
costly to dispose of much of the dangerous . . . waste at home,
are looking more and more to Latin America as their dumping
ground (1991: 10).

Overall, the general picture is those developing countries will not only have the chemical risk
problems that have appeared in developed countries, but additional ones. They are not likely to
be able to create as effective safety and accident prevention programs for their own industries as
has been done in the West, and they also are recipients of hazardous industrial wastes from
developed societies. As such, it must be anticipated that they will have future chemical disasters,
and considerably more than the 11 major ones that occurred between 1967 and 1993 in Latin
America (Freitas, Porto and Machado 2000). Furthermore, while chemical risks are more
randomly distributed than natural disaster agents, they are nonetheless more likely than not to be
in urban areas because of the location of plants, storage depots, and user industries.

We find it of interest that in a 1996 article by Brazilian authors, written after our early report of
1992 but not alluding to it, concludes that:

Using figures from some of the worst chemical accidents in the
last decades, data on the Bhopal disaster, and Brazil's social
and institutional characteristics, we put forward the hypothesis
that present social, political and economic structures in
industrializing countries make these countries much more
vulnerable to such accidents and create the type of setting
where–if and when these accidents occur–they will have even
more catastrophic consequences (Porto and Freitas 1996: 19).

Independent convergence of ideas and observations certainly strengthens our belief that our
earlier projection of more and worse chemical disasters in the future has some validity.

b. The nuclear area.

The nuclear power industry was developed because it initially seemed to offer a relatively
dependable and inexpensive source of energy especially for industrial expansion. Certainly it
seemed so compared with other energy sources such as oil which is eventually depletable and
increasingly costly to extract. Unlike the chemical area, the nuclear area has a much shorter
history, having about a half century existence.

However, there are inherent major risks associated with nuclear power. Particularly with the
accidents at Three Mile Island and at Chernobyl, it has increasingly come to be seen as a source
of danger. In fact, many see the future as having more negative possibilities than the past. As an
illustration the nuclear power plant in Mihama, Japan, one of forty in the country, in February
1991 after tons of mildly radioactive water poured into the steam generator, "an emergency
system flooded the reactor to prevent a meltdown" (Sanger 1991). It should be noted that such a
happening would probably have paled the negative effects from Chernobyl, which contrary to
much popular and even official thinking was far from a worst case scenario. And in September of
2000, two linked nuclear power plants in Russia came close, according the Center for Ecological

Problems in Russia, to being another Chernobyl but worst when the electric power to both of them failed (Gentleman 2000: A5). Actually of course there have been a number of significant accidents in nuclear plants that have never been publicly reported. Porfiriev noted there were at least 23 such incidents in the former Soviet Union in a 40-year period starting in 1951 (1998:134). There have been of course many earlier predictions about the development of nuclear power. In our earlier report we quoted the following from a 1991 report:

> An increasing number of developing countries are embracing
> nuclear power to gain greater economic independence and to
> achieve a permanent relief to their worrisome balance of
> payment and foreign debt burden, which is aggravated by their
> continuously increasing need for imported energy. Attesting to
> this is Cuba's aggressive nuclear program--two nuclear power
> plants under construction and two planning . . . nuclear power
> will reduce Cuba's heavy need of imported energy and her
> dependence on Soviet oil and economic aid . . . India, another
> developing country, has recently announced that 32 new nuclear
> reactors will be operating by the year 2000.

Clearly these predictions were not correct with respect to specific countries despite efforts to promote a nuclear power industry in developing countries. There would also seem to be a question if even the general trend indicated is in being. The prediction was:

> This emerging phenomenon among the developing countries
> prompted the IAEA [International Atomic Energy Agency], in
> 1986, to establish the Senior Expert Group to assist developing
> countries in the promotion and financing of nuclear power
> programs . . . Also, according to a study . . . of the IAEA,
> developing countries' present share of the world's installed
> nuclear power plants is 7.1%. A total of 21 developing countries
> either have nuclear power plant(s) in operation, or have plants in
> the construction or planning stage . . . This number will certainly
> increase at a "modest rate" in the future.

Given what has happened, it seems unlikely another prediction will be correct, namely:

> Based on a recent estimate by the IAEA, nuclear energy
> production will grow an average of 2.8 to 3.9% per year,
> worldwide from 1989-2005 . . . The estimated average range of
> annual growth rates of nuclear power production for developing
> countries in the Middle East and South Asia (combined), and
> Latin American are 19.5-24.2 and 12.8-16.5%, respectively
> (Meshkati 1991: 134-135).

Larger world happenings and trends may continue to affect what will occur. For example, the disintegration of the Soviet Union and the Eastern European bloc with its accompanying elimination of aid and oil to certain developing countries, could work both ways with respect to their establishment of a nuclear power industry. The loss could undermine efforts to set up nuclear plants, or it could spur attempts to create national independence on outsiders.

This leaves aside that there are also other social pressures to develop nuclear power, such as for military purposes or to counterbalance the accomplishments of neighborhood countries with which there is an adversarial or competitive relationship as can be seen in North Korea, Iran, Libya, pre 2003 Iraq, Israel or Pakistan. A resulting consequence here is that the weapons' factories involved will have very long lasting radiation problems. An US National Research Council report released in August 2000 is reported to have said:

> More than 100 nuclear weapons development sites in the United
> States never will be free enough of radioactive debris to allow
> unrestricted public use, and the government has failed to
> develop adequate plans for their long term management . . . Of
> 144 facilities that played a role in the U.S. nuclear weapons
> programs, the Energy Department has concluded that 109 never
> will be clean enough to permit unrestricted use by the public
> (Kempster 2000: A5)

If this is true of the United States, which almost certainly has more knowledge of nuclear matters than any other society, it certainly suggests that developing societies that are into the production of nuclear weapons will have even more long run decontamination problems.

It should also be noted that there may be a highly problematical area that has been almost ignored everywhere. There are at least several dozen nuclear power and weapons facilities in existence at present and likely to be increased by efforts to build them by some developing countries as noted earlier. These operations, often close to urban areas, have been characterized as being plagued in the United States by a series of technical and process failures that: "make some of the errors in the civilian nuclear reactor program appear benign" (Hohenemser, Goble and Slovic 1990: 196). That this is not purely an academic possibility is indicated by the recent disclosure of a not widely known disaster in the former Soviet Union. In 1957 a tank of radioactive waste exploded at a weapons plant near Chelyabinsk, spewing 70-89 tones of waste. At least 270,000 persons were estimated to have been exposed to the cloud. While even now few of the negative consequences are known, it has been reported that because of the ensuring contamination, 23 villages were razed, over 10, 000 residents were permanently resettled, and 17,000 acres of polluted farm land were turned into a nature preserve (Monroe1992: 535-536).

In addition, there are potential problems in many places where no risk has so far manifested itself. In the United States, while the outcomes of nuclear testing experimentations have been more benign than in the Soviet Union, nevertheless there has been considerable contamination of the environment especially in the Southwest (Kuletz 1998). In fact, the US Energy Department very recently concluded that the amount of plutonium and other man-made radioactive elements released into soil or buried in containers in the first four decades of nuclear weapons manufacture was 10 times larger than had been estimated (Wald 2000). And in Russia there are many potential disaster area possibilities such as In Kyrgyzstan. In that country there:

> stands a Soviet-era uranium processing plant whose estimated
> 2.5 million cubic yards of radioactive waste represents a
> potential environmental disaster. It could wipe out the way of life
> . . . and threaten the lives and livelihoods of 10 million people in
> three Central Asian countries . . . The contamination could
> destroy the agriculture base, force the immediate evacuation of
> 500,000 people and damage the economies and stability of all
> three countries (Frantz 2000).

Apart from in-plant nuclear plant problems there are the risks associated with the transport of nuclear wastes over long distances, including the increasing byproducts of the deactivation of nuclear plants. In the United States, at the start of the 21st Century there will be about 47,900 metric tons of spent fuel to be shipped to some deposit somewhere compared to 12,900 tons in 1985 (for some later statistics see Schmalz 1992). In addition, there will be hundreds of shipments of military generated radioactive material. Even as long ago as 1979 it was known that there were 1,904 separate shipments totaling around 25 tons. Finally, there will be the hazardous wastes that will be associated with the closing or deactivation of nuclear plants, some of whom are now starting to reach the end of their lifetimes (Schlager and Petroski 1994: 361-366). In

2001 the Turkish government objected strongly to the transport of Russian nuclear waste material through the Bosporus which runs through Istanbul (Frantz 2001). Our point is that such by product material is going to have to be transported from many places to some chosen sites, and naturally that raises the probability of some accident in all countries undertaking or subject to such transportation. As developing countries increasingly adopt the technology of nuclear power, and to the extent they become the recipient of nuclear wastes (and some nations, including European ones do ship their nuclear wastes overseas), risk in the transport of such waste will increase, and it will primarily be in urban areas.

With 435 commercial nuclear plants in existence at the end of the last decade and with nearly 100 more under construction (Meshkati 1991), none of the problems are going to go away by themselves. Because nuclear power is so politically controversial, there has been a slow down in its use around the world. But it is difficult to believe that this energy source, which does have a number of significant advantages compared with other sources, will not continue to be enticing to some developing societies (and even for developed ones, see Openshaw 1995; Evans 2002). This is partly illustrated by the fact that in August 2000 a nuclear plant finally became operational in southeastern, Brazil that had been under construction for more than 20 years (Rich 2000), with a third of the electricity it generated being used by the city of Rio de Janeiro. Additionally, a plant was opened in 2001 in the Czech Republic (Bauerova 2000: 7), and another one in Russia in February 2001, with still another being built in Iran. As of 2001, South Korea said it was planning to build ten more nuclear plants (in addition to the 14 it already has) with the last scheduled for 2011 that would allow the country to meet 40 percent of its electricity needs (S. Korea plans 10 more nuclear plants, 2001).

2. The very processes of industrialization directly or indirectly reduce some risks but add others or make old threats more complex.

Without doubt modern technology can and is used to try to eliminate or reduce some risks. The medical health area is marked by any number of such successful efforts. Unfortunately, sometime the positive consequences are accompanied by negative effects of a different kind. There are two aspects to this: (1) preventive or protective measures which unintentionally lead to other kinds of possible disastrous occasions, and, (2) the scale of chain reactions possible in modern societies which as a result of network linkages can turn a minor emergency into a major disaster.

a. Unintended consequences.

No one would question the proposition that whatever the number of natural hazards around in the world, that only a very small fraction of them eventuates in disasters. Also, no one would seriously suggest that natural disaster agents in themselves have been increasing at least in terms of the life span of the human race. However, there is reason to think that human actions have actually been increasing the probability that certain disaster agents are more likely to appear now than before. Oddly, while this is mostly the unintended result of the industrialization process, the greater appearances of such agents are sometime the result of conscious societal attempts to mitigate or reduce natural disasters

Recent floods in central Europe and the Midwest United States are good examples of these phenomena. Thus, it has been reported that in the last 100 years, more than 80 percent of the Danube River basin's wetlands and flood plains have been destroyed. It is not only that there is more to impact. It is also that the very process of industrialization in itself increases the physical vulnerabilities of all built up localities, and adds additional risks. They do so in that natural drainage areas are reduced or eliminated, in that dams and levees are built that lead to vast pools of water accumulating far beyond that which would normally occur. Geipel in discussing the background of the 1988 flooding of the Rhine River notes that

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The severity of flooding . . . has been strongly influenced by
many changes occurring to its floodplain since the beginning of
the 19th Century. Moors and bogs have been drained, cultivated
and settled . . . Since steamship navigation began in 1836, the
meandering stream has been straightened. Artificial cut-offs
through meander bends reduce the length of the Danube and
caused it to incise its bed, thus increasing its fall and decreasing
its width. The construction of levees began in 1884, with the aim
of confining floodwaters to a narrower path . . . the construction
of a ship canal . . . These modifications led to a loss of
floodwater retention space, as stagnant waters have been cut off
and drained and the land filled. Riverine forests have been
eliminated, wetlands drained and the infiltration capacity of both
soils diminished by field clearance (1993: 112)

This researcher then goes on to note:

The use of heavy agricultural machinery compresses soils and
increases surface runoff. Crops like corn, sugar beet and turnips,
which are planted in rows, increase the potential for soil erosion,
especially during the spring floods where once scarce vegetation
covers the fields. In recent decades the area planted with these
crops has increased . . . The sectors where the levees were
breached in 1988 contained hand-built dikes . . . constructed to
reclaim land for pasture and cultivation (1993: 113)

Similarly in the 1993 floods in the Midwest United States and those in northwest Europe in
Germany, the Netherlands and France—which were the worse in more than a half a century—partly
resulted form flood protection mitigation measures that had been put in place, and partly from the
elimination of natural drainage areas and wetlands. Thus, in Germany the flooding was attributed
to too many dikes, concrete embankments and artificial channels build along the Rhine River and
its tributaries. The floods in 1997 were even worst especially in Poland and the Czech Republic,
leaving large parts of the latter under water and affecting 30,000 business and residential
properties. In Poland the floods affected 1,360 towns and villages with some smaller cities being
inundated, with about 160,000 people having to be evacuated (World Disasters Report 1998:
123-124). These floods were attributed to vulnerable dikes, deforestation, as well as human
encroachment on flood plains.

To the extent that developing countries industrialize and concentrate much of that process in
urban localities, the more also a target they will present for all kinds of threats. And some of the
very mitigation measures that are introduced to reduce the impact of disasters may along other
lines actually create areas that could be impacted. This is partly illustrated by a report regarding
Greater Buenos Aires in Argentina which notes that the paving of the natural drainage areas has
partly resulted in increasing the frequency and level of floods in that locality (Sejenovich and
Mendoza 2000: 29). Likewise, although the point is hotly disputed, the building of the Farakka
Barrage which India constructed in 1974 in order to expropriate water for irrigation and navigation
channels (Alexander 1995), has been to the detriment of Bangladesh which supposedly suffers
unnecessary flooding because of that structure.

b. Chain reactions.

Some of the potential for disasters may be on a much smaller scale than those just discussed. An
example is that fires in high rise buildings, in combination with the highly combustible and toxic
construction and furnishing materials presently used, have brought an additional threat dimension
to that kind of situation. People are prevented from being burned by raising the probability of their
being asphyxiated. The MGM hotel fire in Las Vegas several years ago which killed 85 and

injured more than 600 is an example of what is more likely to occur in the future (Best 1982). Apart from that, just the increasing heights of buildings can create protective and response problems. Some spectacular fires in high rise buildings in Brazil and South Korea a few years ago indicate that this is starting to emerge as a possibility in developing countries as they build ever taller structures in their urban areas. The 1974 fire in Sao Paulo in a 25-story building killed 189 persons.

Still somewhat in the same vein, Lee Thomas, a former Federal Emergency Management Agency official and later the head of the US Environmental Protection Agency in May 1986 said:

> It is entirely possible that somewhere in the country toxic metals are being removed from the air, transferred to a waste water stream, removed again by water pollution controls, converted to a sludge, shipped to an incinerator and returned to the air (New York Times, May 11, 1986).

He is pointing to the fact that many technologies that reduce or prevent the development of certain kinds of risk or environmental threats do so by solutions that often generate their own dangers or threats.

In fact, at times the hazard is merely redirected elsewhere. For example, laws have been passed in developed countries to prevent industries from discharging any bad constituents into surface waters. Businesses have frequently met this requirement by building large surface impoundment containers to hold wastes. But the impounded material often results in air discharges through evaporation and groundwater discharges through leaching. Thus, the initial problem is primarily deflected elsewhere (Williams 1991: 73). In meeting the Clean Water Act of 1972 in the United States, it has been found that the waste water treatment of sewage can lead to the production of sludge which will contain viruses, toxic substances and heavy metal. The sludge can be treated, but this will frequently produce methane gas and carbon dioxide. The latter in turn probably contribute to the greenhouse effect which is warming the earth, which can lead to changing climatic and agricultural patterns, and may contribute to the melting of the polar ice caps and the subsequent rise of ocean levels (Saunders 1998). This last point is a controversial one (De Freitas 2002), but if accepted, it indicates the possible flooding of seaport cities such as Bombay, Rio, Manila, and Shanghai (Cohen 1991: 93) and Recife, Jakarta, Lagos, and Tianjin (Nicholls 1995). So an initial good measure may set off a chain reaction of bad effects. To the extent that developing countries apply such kinds of Western technologies to reducing risks, they will have the same ultimate negative balance of dangers.

Even plane crashes are interesting along this line. Research has shown that the ensuing fire often kill more passengers than the crash itself. Eighty percent of those that do die of the fire actually succumb to the gas and smoke from the lightweight burning cabin material! (FAA, Airline Industry 1987: 7). It is more economical to use less heavy material which however is not fire proof. But the airlines of developing countries buy almost all their planes from developed countries. In addition, for various reasons ranging from control tower problems to poor maintenance, plane crashes are proportionately more likely to occur in airports in such societies. Major airports also tend to be in or very near urban areas. But given the overall advantages of air travel and transport, especially for an industrial type society, it seems unlikely that the developing world will not increasingly use this form of modern transportation. So while most plane crashes are not disasters, in our sense of the term as we discussed elsewhere (Quarantelli, forthcoming), some can negatively affect everyday community life.

Now the linkages between happenings which may have ultimate negative effects can be even more indirect. This is because as technologies are elaborated and enlarged to meet the economics of scale, a small mishap at one point can bring down the total network or system. It has sometimes been noted that small scale failure can be produced very rapidly, but that large scale ones can only be produced if large amounts of time and resources are involved.

For example, there have always been accidents and failures in electric power systems. In fact, outages occur on a small scale almost every day even in developed societies. They are recognized as such, and coped with as normal emergencies by the public utilities. However, the 1965 blackout in the northeastern United States which had its origin in Canada suggests how in the modern world, large areas of a country are vulnerable to electric grid system malfunctions. New York City had major power blackouts in 1977 and 1989, Seattle in 1988, and Chicago in 2000, and so have certain other cities and places elsewhere, including London in 1987 and 2003, all of France in 1978, and Brittany in 1987 (Lagadec 1990:107). These have been relatively minor compared to what could happen given the extensive grids and networks that are involved. Not only can something in a far distant place have local effects, but the complicated linkages almost insure that sooner or later there will be large scale disasters.

The last possibility has been illustrated by two recent major large scale power outages. One occurred in Auckland, New Zealand in 1998. As has been written: "The central business district...the governmental hub of the city and commercial/financial heart of the country was deprived of reliable access to electricity for over two months" (Newlover, Stern and Svedin 2003: 1). Researchers concluded that this was a major instance of an urban crisis management failure that has serious consequences for the rest of the country also. Then there was the August 2003 blackout affecting the northeastern United States and Canada.

Even at the present time many developing countries have serious trouble with their urban telephone and electric power systems. Outages and "brownouts" are everyday common happenings in many cities in such countries. As an example, in March of 1999, three states and the federal district of Brazil were plunged into darkness because the electric grid system became overloaded (Rich 2000). Earlier in 1992, eight of the eleven states in Malaysia and a third of Singapore concurrently lost electricity in an interrelated massive power failure in two of the most advanced Asian countries. As in the West, in a partial and reasonable effort to reduce such almost normal problems, developing countries are linking these systems into larger grids and networks. These will probably somewhat reduce routine emergencies, but almost insure a large scale disaster because of the chain reaction possibilities inherent in the use of ever larger scale linked technologies (Growing Vulnerability 1989). In fact, projection that in about two decades the whole world will be sharing electricity though only one grid, is very disturbing Di Justo 2003).

Perhaps many of the potential problems are summarized in a statement by an expert on telecommunications networks, the core of which is located in cities. He stated:

> My basic message . . . is quite direct. First: Our public switched networks are becoming more vulnerable to disruption because of the introduction of new technologies. Second, because of economic incentives to cut the costs of normal commercial operations today's networks are being designed without sufficient attention to emergency preparedness. Third: Accidents, disasters and attack threaten tomorrow's networks with more extensive damage than they did yesterday's integrated network. Fourth: Our Information Society relies absolutely on smoothly functioning communication networks and thus the consequences of network failure are more severe (McDonald 1989:4-5).

This is more than a possibility. In 1991, eleven major phone system outages affecting major metropolitan areas occurred just in the United States alone. In the report accompanying those figures, it is noted that: "modern fiber optics carry 10,000 times more calls than the old copper cables they replaced. An accidental cut of a single fiber optics can cut off entire metropolitan areas" (Lee 1992: 8).

There are many positive consequences of almost all technological advances, including the fact that they can be used to reduce risks and the impact of disasters. But they may also otherwise create conditions for disastrous occurrences. To the extent that developing societies move to use modern technology to reduce risks along certain lines, they will increase them along other lines.

3. New versions have developed of old or past dangers.

Certain dangers that take particular forms have been around for centuries. However in modern societies, the risks involved have taken new forms especially as large cities have come into being. Inevitably these kinds of communities require elaborate lifeline systems that literally are the physical or mechanical infrastructures on which they rest. For a small village, a well or two can provide the necessary water; for metropolitan areas on the other hand, distant reservoirs, dams, pumping stations, pipelines and gauges, monitoring points, and other technological apparatus linked together in complicated ways are needed to generate and distribute the water. This can create new versions of old or past dangers.

For example, increasing chronic water shortages are affecting many societies including developing ones. This is partly related to the great need for water to support the industrialization process. A report of the Worldwatch Institute noted that besides parts of the western United States:

> Many areas could enter a period of chronic shortage during the
> '90s, including northern China, virtually all of northern Africa,
> pockets of India, Mexico, much of the Middle East . . . Where
> scarcities loom, cites and farms are beginning to compete for
> available water (Postel 1989: 1)

This prediction of more than a decade ago seems to have been confirmed. For example, in October 2000, it was reported that "more than 100 cities in northern China are rationing dwindling water supplies" (Smith 2000b:4).

Droughts used to be thought of as mostly a rural problem. This is no longer the case (Glantz and Mason 1994; Vogt and Somma 2000). Increasingly in different parts of the world, urban and metropolitan localities are finding themselves faced with shortages or reduced water supplies. In June 2000, the residents of Sao Paulo, Brazil were told that their water would be rationed for five months, with about three million of them being required to follow the two and one plan: two days with water, one day without (Water rationing...2000: A15). Sometime droughts affect hydroelectric dams, which results in other kinds of shortages. This is the case in Kenya where in the middle of the year 2000, strict power rationing had been imposed with most homes having electricity only three or four nights a week and with factories getting power every other day (Fisher 2000). In part this lack of supply is because populations and manufacturing activities in cities require larger per capita quantities of water than in rural areas (Barclay Jones 1991:19).

In particular:

> freshwater resources are being used up at such rapid rates that
> groundwater supplies are dwindling and surface waters are
> fouled with pollutants from industries, municipalities and
> agriculture. In much of sub-Saharan Africa, the Middle East and
> parts of Asia, water consumption will reach 30-100 per cent of
> available reserves in 10-15 years--a result of population growth
> and inefficiencies in use (<u>Population and the Environment</u>, 1991:
> 5)

In addition, such countries as Brazil which are very dependent (97 percent of the country's electricity) on hydroelectric power find such sources undependable when the nation is affected by

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droughts. Thus, in the summer of 2001 Brazil had to begin six months of obligatory electricity rationing for most of t he country (Rohter 2001).

Also in the Western world there are the risks associated with a deteriorating physical and public work's infrastructure of lifeline systems in a large number of older cities. The prevalence of decaying bridge and tunnel structures, crumbling highways, obsolete and overloaded waste water and sewerage treatment plants, worn out sewer and water mains, aging subway systems and stations, and outdated pipeline networks, suggest a variety of many potential disastrous possibilities beyond the isolated and occasional accidents of the past (for the existing risks of this nature in New York City, see Sims 1991:6E; see also Pipeline Safety 2000). Sometime there is a convergence of different structural problems. This happened in Chicago in 1992. According to newspaper reports, there was the collapse of deteriorating canal walls, flooding of a 100-year-old underground freight tunnel, and electrical power failures that forced a shutting down of the Board of Trade with a resulting loss of 25 million dollars in trading as well as the evacuation of department stores and hotels and the disruption for weeks of retail and services stores in the central business district. Bridge collapses in 1983, 1987, and in 1989, as well as major water main breaks in several American cities, and the Kings Cross underground station fire, the Cannon Street train crash, and the flooding of about 30 underground train stations in London in 1994--all happenings in the last few years--are forerunners of far more such disasters in the future. Put another way, these problems are starting to appear because much of the physical infrastructure involved is reaching the end of its normal lifetime.

One can project that this also will become a problem for urban areas in developing countries compounded by the fact that there is reason to believe there is even less maintenance on the urban lifelines in them than exist in developed societies. In Kenya: "the phones and roads are barely passable" (Fisher 2000:10). Ghafoor (2000) who examined the electric power and telecommunications sectors in Pakistan found that there were many problems and difficulties with respect to efficiency and provision of services. That disasters can result is illustrated by the recent major failure of a Soviet gas pipeline (1991a), as well as the explosion of a natural gas pipeline in Gahri Ohoda, Pakistan in 1984 which killed 60 people, and a gas pipeline fracture in 1978 in Huimanquilla, Mexico which resulted in at least 58 deaths.

None of the actual or potential disasters we have mentioned above are totally new, at least in the geophysical or physical sense, but they represent new versions of old threats, either because of where they could occur or the large number of them which can occur as industrialization proceeds (see the socio-political problems that are associated with such happenings, Jehl 2002). And industrialization will continue because of the advantages of a society to have more and more industry (Hedley 2000).

4. There is the emergence of new kinds of technological accidents and mishaps that can and will lead to disasters.

Let us note that there are several major new risks that have just started to appear.

        a. Developments in computer technology.

A major new threat that is being created is associated with all the disastrous consequences that will come from the computer revolution that human society is presently undergoing. Use of computers undoubtedly has improved disaster planning and managing, as well making life easier for most of us in very many ways. But, and it is an important but, our increasing dependence on computer technology will magnify future disasters and turn some minor events into major ones. When the technology fails, and it will fail at times, what will those who have come to depend on them do? **DRC** studied one chemical disaster where because the computer monitoring system failed, it took hours before the population in the communities surrounding the plant was warned/ In pre-computer days, the warning would almost certainly have been issued hours earlier (Quarantelli, Phillips and Hutchinson 1983).

More important, many sectors of government and business are increasingly computer based for the data and information they need to function, sometimes literally from minute to minute. Thus, even a decade ago it was written:

> It is presently estimated that more than 85% of the largest firms
> in the US are totally or heavily dependent on computer
> technology and that, on average, a business would lose 25% of
> its daily revenue after the sixth day of its system breakdown,
> while this figure is close to 40% for the financial, banking and
> public utility industries (Pauchant, Mitroff, Weldon and Ventolo
> 1990: 254).

These figures presented are for American society but it is probable comparable figures could be found for countries in Western Europe as well as Canada. To the extent that developing countries move to computerize their businesses and industries, and there are many advantages to doing so, they will increasingly become vulnerable to the failures of computers.

It can be predicted with certainty that computer systems and their networks will, for various reasons, cease to function, or function incorrectly (even leaving aside the deliberate injections of computer viruses such as Melissa, the Love Bug and others which in1999 cost businesses around the world an estimated one trillion, six hundred billion dollars). In 2003, one of every 17 email in one day around the world was generated by the Sobig F virus, Taylor 2003). The unintended failures of such systems means we have created a *new* kind of disaster--a computer system disaster, with currently incalculable negative chain reactions. This is partly related to the large scale of operations, mentioned earlier, within which it makes sense to use this technology. As a recent report noted:

> Failures that once would have been minor in nature now induce
> widespread disruptions of services. The computerization of
> telephone switching centers means that where five years ago an
> AT & T switching center handled about 180,000 calls per hour,
> new computerized switches handle 700,000 calls an hour. The
> loss of a single switch (AT & T has 114 around the country) now
> means a much wider disruption of service (Lee 1992: 8).

In fact, there has already been several computer linked disasters in the United States (as well as Japan), that have had negative chain reactions. For example, one of the first was when on May 8, 1988 a fire disabled a major Bell Telephone switching center in the Chicago area, at Hinsdale, Illinois. This telephone outage as a result of its links to computers affected both voice and data communications for more than a half million residents and business customers in six metropolitan suburbs for periods ranging between two days to three weeks. In addition, local and long distance communications for both telephones and computer networks were also severely affected since the Hinsdale center was an aggregation point for major telecommunication links. The outage:

> affected the normal operations of dozens of banks, hundreds of
> restaurants dependent on reservations, three large catalogue
> sales companies headquartered in the Chicago area, about 150
> travel agencies, most of the paging systems and cellular
> telephones in the affected area, and hundreds of businesses
> located in the area or others not located in the affected area but
> conducting business with those that were . . . At present, a
> conservative estimate of the business losses and the repair
> costs of the accident are set at $200-300 million (Pauchant,
> Mitroff, Weldon, and Ventolo 1990: 244).

More recently, when the Galaxy IV communication satellite failed on May 20, 1998, there were large and immediate effects. It drastically affected 120 companies in the paging industry. A consequence was that nearly 90 percent of the paging units in the United States were rendered inoperative, and there were serious interruptions of several television networks as well as the Reuters News Service. Equally as important there were second order effects. For example, a great majority of hospitals had replaced their traditional loudspeaker systems with pagers. So when the satellite failed, they lost their paging services leading to almost total loss of internal communications within many hospitals (Rochlin forthcoming). As another example, a fire in a train tunnel under Baltimore, Maryland ended up disrupting Internet traffic because fiber-optic cables running through the tunnel was damaged by the fire (Fire in Baltimore 2001). As a last example, on August 2, 2001 about half of the banks in Norway had to cease operations when a vendor installing 288 new disks in its storage system, by mistake initialized 288 existing discs, leading to a crash of the system. The result was that many banks lost their card services, ATMs, Internet banking and automatic telephone banking for three days (Hodge 2002).

Computers, like chemicals and nuclear power, undoubtedly contribute to the welfare of the human race. It cannot be expected that developing countries will forego their beneficial effects. In fact, a failure to move in such a direction will put developing societies even further behind those in the West. But as for almost anything created by human beings, there are both functional and dysfunctional consequences from their use. To emphasize as do some advocates of new technologies only the good that result, is to be unrealistic and brings into question at times the use of the whole technology as can be witnessed in the nuclear area in most places in the world.

    b. Biotechnological advances.

There are also going to be disasters that will be produced by biotechnology, especially genetic engineering. Basically, this technology involves altering the blueprint of living organisms--plant, animal or human--and creating new characteristics, some of which are very useful (e.g., various kinds of oil and chemical waste eating bacteria have been created that can be used to help clean up spills!). In fact, the favorable and positive uses of biotechnology are just beginning to be noted.

However, there clearly are all kinds of potential disaster possibilities in this kind of technology. There can be and will be the creation of, or the escape from control of, some altered organism that cannot be checked by presently known means. For instance, some variants of the oil-chomping organisms that have been created for cleanup purposes could go ahead and attack lubricants on all machinery. Our ability to custom design living organisms almost insures that one day there will be some almost Frankenstein-like bacteria, plant or animal let loose on a relatively defenseless world. This is not science fiction, although some believe that phrased in that way the problem has overtones of popular culture to it more than genetics (see Turney 1998). However, we think that a case can be made that the risks in genetic engineering in principle are more dangerous than risks from nuclear power. Of course we get constant and continuing statements about the safety of the whole process. Thus, a National Science Foundation report stated that:

> there is a broad consensus among biologists that R-DNA
> techniques are safe . . . basic and applied scientists generally
> agree that many contemplated introductions are either virtually
> risk free or have risk-to-benefit rations well within acceptable
> bounds . . . no hazard particular to genetic engineering has yet
> surfaced (quoted in Schmeck 1987: 7)

The term R-DNA is the scientific shorthand label for recombinant DNA, the technical name for the process of rearranging genetic material--DNA--or combining genes from diverse sources.

But as someone wrote in a letter that same year:

> The advocates of recombinant DNA technology claim that it is
> safe because they cannot see how a disaster would occur and
> because no disaster has ever happened yet. That amounts to
> saying that the technology is as safe as the Titanic, the
> Chernobyl nuclear reactor or the space shuttle. (Letter of Robert
> J. Yaes in 1987 <u>New York Times</u>).

We remember giving a talk in Chicago about 15 years before Three Mile Island and saying that sooner or later it was certain that there would be an accident and a disaster in some nuclear plant. Our remarks were strongly attacked by some of those in attendance who said we did not understand all the redundant safety systems in place, and anyhow nothing had happened anywhere up to that time (the latter was not factually correct, but few of the problems had then received much public attention). Our reply was that if the technology was created by human beings and developed by social groups, it was inevitable that there would be serious accidents and disasters. In a similar fashion, the same can be said about biotechnology. Although no major crisis has so far occurred, there recently have been several disturbing happenings. This is apparently an increasing tendency for questionable biotechnological products very useful for certain purposes to be inappropriately although accidentally injected into the human food chain. For example, in the last part of the year 2000, there was considerable discussion of how an insect-killing trait in genetically altered corn (intended only for animal feed or industrial use) migrated into a variety of corn used in taco shells and other food products that were not supposed to be genetically modified (Feder 2000). Such already occurring slippages suggest the kind of more serious problems that may appear in the not too distant future. See Giddens (2000: 50-51), who happens to use the example of genetically modified foods to illustrate the complexity of the problem and some of the risk management issued involved).

Actually a forerunner of what could occur in the biotechnological area is suggested by a related although slightly different kind of disaster in 1979. In that instance, biological toxins were accidentally released at a Soviet research center. Probably 1,000 workers were killed and a 20 square mile area around the city of Svardlovsk was contaminated by the accidental release of very toxic anthrax spores (Thompson 1987: 11A; see also Oberg 1988). To the extent that any country anywhere in the world sets up manufacturing facilities for biotechnological purposes (and for risks in agriculture where developing countries are using the technology, see Dommelen 1999), there will be created some risks in the production, storage, transportation, distribution and use of the products involved (the spread of biotechnology in developing countries is discussed in Acharya 1999).

In fact, it can be confidently asserted that biotechnology will bring us a major disaster sooner or later. It might even be said that just as the 1970s was the time when the world became aware of nuclear power threats, the 1980s of the chemical risks, perhaps the start of the 21st Century could very well be when we have a Chernobyl or Bhopal-scale like biotechnological disaster. For a variety of reasons, such a major disaster is likely to be outside of highly-developed societies. It is more likely to occur in some developing country that has imported this new technology without instituting (or importing) the safeguards that have tended to have evolved in the West for such matters. Or it may be generated as a result of an attempt to jump ahead even of developed societies. A news story in October 2000 reported that:

> China's rush to genetic crops is part of a broader effort to co-opt
> the new science as China's own before it is dominated by the
> West, as has occurred with other technologies . . . China was the
> first in the world to grow genetically engineered crops
> commercially. Since 1997 Beijing has approved the release of
> more than 100 genetically altered crops, double the number
> released in the United States . . . Enthusiasm for the new

science abounds. There is no public debate to stir up opposition
that has brought the development of genetically modified crops
to a standstill in India. Chinese scientists are derisive about
Europe's resistance (Smith 2000a)

It should also not be forgotten that both with respects to computers and biotechnology, we are far from the end of major innovations. There is, for example, the probable development of robotics which has both major possibilities for positive and negative consequences for individuals and groups (see Joy 2000, for a very interesting discussion of this likelihood). Then others worry about nanotechnology, which is the manipulation of matter at the scale of atoms to create novel forms of common materials (Feder 2003). Our point is that it would be a mistake to take what is currently in place as what will also exist even in the near future. Planning and managing should take into account existing trends and likely new developments.

There are ideological and political values around the world which expound very strong anti-nuclear, anti-chemical and anti-genetic engineering views (Adam, Beck and Loon 2000). These positions are often incorporated in social movements of different kinds. However, our views should not be confused with the polemic ones. We believe that the industries and activities involved have and will continue to substantially improve human and social life. But the reality is that they also bring with them certain risks that at times will produce major disasters and perhaps even catastrophes.

5. There will be an increase in multiple or synergistic type disasters resulting in more severe impact consequences, sometime from rather distant sources.

Because of the globalization of the world, which is closely associated with industrialization as we discuss later, and the increased inter linkages of people that creates, disasters are increasingly having some of their negative effects at a distance from both original source and initial impact. More than before, the origins of disasters are ever more distant. Similarly, the consequences of disasters are also ever more distant.

Thus to cite examples, when the 1999 earthquake destroyed a number of Turkish factories (see Erdik and Durukal 2002), cotton production in sub Saharan Africa was affected. The market for cotton was markedly reduced and unemployment increased in some African countries. Similarly when an earthquake impacted Taiwan also in 1999, American government economic records indicated that this had major effects in the sales of computers in the United States. When the Nisshin chemical plant in Japan blew up, since it was the world's main source of hypdroylamine free base, which is vital to photo resist stripping, problems were created for suppliers and the semiconductor industry worldwide (Kallender 2000).

There has been very little recognition given to the fact that natural disaster agents will increasingly generate or magnify concurrent technological disasters (and even possibly in the other direction). This is increasingly so because of the increased production, transportation and storage of dangerous substances of all kinds, agents which in the past would have simply produced natural disasters can now create technological disasters (for examples see Showalter and Myers 1994). For instance, a flood could inundate a chemical plant complex. The convergence of a tornado and a radiologically contaminated cloud could pose a very threatening situation. That the general possibility is not an idle threat is indicated by the fact that increasingly disaster planning is taking into account possible dangerous chemical releases and spills after earthquake shocks (Tierney 1990). In Edmonton, Canada, a single tornado with a wide scope created 14 different toxic chemical sites. In Egypt, torrential rains collapsed a bridge over pipelines at an oil storage depot setting off explosions and fires that killed 147 people in a nearby town of 22,000 people (Blast 1994) Researchers on the Northridge earthquake noted that in that disaster, a train derailment spilled sulfuric acid and diesel fuel, and there were nine pipelines ruptures and 35 breaks in natural gas transmission lines and 717 breaks in distribution lines, as well as 15,201 natural gas leaks at customer facilities. The latter leaks resulted in three street

fires, 51 structural fires and the destruction of 172 mobile homes (Lindell and Perry 1995: 8, 11; see also Lindell and Perry 1998: 287).

The link between two threats may not be an immediate temporal one. As a concrete example, we might cite an incident in Russia. In 1961, windstorms spreading radioactive material (plutonium and strontium) in the Lake Karachay region in the Southern Urals increased by about 30 to 50 percent the land area previously contaminated by an earlier nuclear disaster (see Porfiriev1991). The earlier technological disaster was magnified by a later natural disaster agent.

Not often noticed is that this process can also go in the other direction. Several examples can be cited. Over 25 years ago, it was suggested that the pollution by automobiles exacerbated the incidence of tornadoes in cities (Isaacs et al, 1975). Moreover, it has long been known, for instance, that the injection of fluids into the ground for purposes of recovering oil and disposing of waste can trigger surface land faulting (see Cypser 1996 for a bibliography). In one case, in 1963, this led to the collapse of a dam, the emptying of the Baldwin Hills Reservoir and some deaths and property loss in metropolitan Los Angeles (Hamilton and Meechan 1971: 333). Or just the building of dams for the purpose of creating reservoirs to impound water for residential or industrial use may also trigger earth tremors. In one of the least seismic areas of the world, a reservoir behind Koyna Dam apparently set off a series of shocks that devastated the village of Koyna Naga in India on December 10, 1967 which killed 177 persons, injured around 2,300 and damaged or destroyed most of the buildings in the community (Earthquake, 1972).

On a larger scale is another possibility. Recent studies suggest that continuing pollution may result in stronger hurricanes. Continued air pollution that increases carbon dioxide levels, according to this line of research which is not universally accepted, could make some hurricanes up to 60 percent stronger in the next century. If the atmosphere's carbon dioxide content doubles the maximum possible intensity for hurricanes could rise to 40 to 50 percent generally and 60 percent in the Gulf of Mexico. Projections of when the atmosphere's carbon dioxide content will double range from about the year 2035 to 2080, according to the National Center for Atmospheric Research.

What this also suggests is that increasingly, localities will have disastrous conditions from originating sources which may be quite distant. Sometime the problem is within a relatively limited geographic area, although still threatening localities away from the original point of impact. For example, in Crestview, Florida, a chlorine gas cloud drifted 28 miles from where the train accident occurred (Tierney 1980); if the same derailment had occurred in a metropolitan area rail yard anywhere, millions of people could have been put at risk. As another example, the pollution of the Po River in Italy extended over 60 miles in 1980 and affected almost all of the cities on that stretch.

But more important are when disastrous conditions go over important jurisdictional boundaries, sometimes of nation-states, affecting both rural and urban areas. For instance, significant radiation fallout from Chernobyl fell on certain European countries. The later example of pollution in the Rhine River which starting near Basel, Switzerland, affected about six different nations and polluted upriver for almost 800 miles, or the Ohio River pollution which had severe consequences for several states (Comfort, Abrams, Camillus and Ricci 1989), are again harbingers of what we might expect more in the future. In fact, West Europeans have recently expressed considerable concern for future risks to themselves, not over their own domestic nuclear plants, but about deteriorating complexes of such plants in Eastern Europe, especially at the six Kozlodui nuclear plants in Bulgaria (Nuclear safety 2000). And in February of 2000, the dike of a gold-extraction operations in northwest Romania broke, spilling millions of gallons of cyanide-polluted water into the Tisza River, that eventually brought the pollution hundreds of miles into Hungary and Yugoslavia (Savic 2000: 2).

And these distant consequences can be the result of human actions to increase production totally apart from any technological accident. For example:

Perhaps few could have foreseen the full panoply of
consequences arising from Indonesian plantation owners' efforts
to expand their palm-oil crops. More land was needed to plant
more palms and that land would come from burning hitherto
untouched forests. By 24 September 1997, however, the World
Health Organization warned of a major increase in respiratory
and heart ailments along a wide swathe of South East Asia due
to the smog created by the plantation owners' slash and burn
technique. Soon after, two ships in the Straits of Malacca
collided, an incident directly attributed to that smog (Ingleton
1999: 295)

Apart from that report, another notes that for the last 20 years farmers and landowners had been illegally burning trees as an inexpensive technique for clearing land areas for industrial and commercial development. A combination of different factors helped ignite coal and peat deposits in some locations. This generated massive smoke pollution that affected other islands in Indonesia as well as Malaysia, Brunei, the Phillippines and other southeastern Asian countries (Khandekar, Murty, Scott and Baird 2000). Still another account noted that tourism, a 26 billion-dollar industry in southeast Asia (Mydans: 1997:3) was seriously affected by the fires in Borneo and Sumatra with the British-based travel agency, Thomas Cook, refusing to make new bookings for holidays in affected areas particularly because plane flights were curtailed, delayed or canceled because of the poor visibility created by the smog (Tourism 1997).

Apart from that kind of threat, developing countries are at risk from the byproducts of some technological disasters. For example, no nations outside of Europe were threatened by the radiation fallout from Chernobyl. However, after that disaster several European countries exported food products, which were contaminated from that disaster, to developing countries. As a result, contaminated milk ended up in Malaysia, Nepal and Ghana (Adams 1998:206). Brazil had to ban the sales of powdered milk imported from Western Europe because it was found to be contaminated with radioactive residues, in the instance of that from Austria at a level more than twice the country's own permitted level (Simons 1987: 10).

In addition, certain kinds of technological type disasters can reach far away in both time and space. This occurred in a PBB contamination poisoning of dairy cows in Michigan in the early 1970s (Chen 1979; Egginton 1980) which worked it way through part of the ecological life chain in Canada and the United States, and got into the second generation, the children of the original victims later living thousands of miles away from the original pollution source. We might anticipate the more slowly moving and diffuse kinds of disaster threats to cut across such space and time dimensions, and we can expect them to increase in the future.

These last examples suggest that not only are disaster agents and occasions increasing as a result of industrialization, but that because of human and group behavior, there will be an enlargement of social risks and vulnerabilities in the future, a matter to which we will next turn after the briefly noting the implications of the five propositions.

B. Implications of These Observations.

If the five propositions under which we have organized our observations have any validity, there are important implications for disaster planning and managing in urban areas. In essence, the observations generally make the overall point that there are going to be more and worst disaster agents and occasions in the future. From our perspective they suggest the need for both new strategies and for the better implementation of valid principles of disaster planning and managing. These will be discussed in later chapters.

A legitimate question to ask is whether there are any counter trends? No, not on any scale that matters (e.g., there has been the generation of social movements opposed to industrialization, but they have had little effect so far). However, there are features associated with the industrialization process that could be seen as contributing to improvements in ways for coping with disasters. For example, industrialization and the associated technologies have generated technical improvements that allow through such mechanisms such as Geographic Information Systems (**GIS**), the better monitoring and analysis of possible and actual disaster sites. Again such matters will be discussed later. But on balance, the trends we have discussed in this chapter, are mostly negative. They will contribute to more and worse disasters in the 21st Century. Unfortunately, the industrialization process is not the only negative contributor to this future. We now turn to the discussing the industrialization process, which will also help generate quantitatively more and qualitatively worst disasters.

CHAPTER 3.

THE URBANIZATION PROCESS AND INCREASES IN URBAN VULNERABILITY

By urbanization we mean the continual social process practically everywhere in the current world that is leading people to adopt an urban way of life. An urban way of life, in contrast to a rural way of life, is typically characterized by different kinds of family life, different kinds of social relationships, different values and norms about expected and accepted behaviors and different access to services and products. In a rural way of life the family and kinship ties are all important. Similarly there tends to be more primary rather than secondary relationships. In an urban way of life there is the greater acceptance of different life styles and tolerance for differences. Similarly an urban way of life typically provides far more direct access to new services and things which themselves are often products of urban activities. The sociological and anthropological literature abounds with documentations of these kinds of differences, which have been recognized for at least half a century. Of course everyone recognizes that the depiction is in ideal type form, that is, if these phenomena exist in pure form. The real world is not as clear cut.

Furthermore, and more important for our discussion, while the differences were much more stark for centuries since cities have existed for more than 6,000 years (Eric Jones 1991; Van Arsdol 2000), as a recent analysis notes:

> Although the statistical concepts of urban and rural are adopted
> universally, urban/rural differences actually range along a
> continuum. The distinctions between urban and rural are tending
> to become increasingly blurred, as a result of developments in
> transport and communications and other technological changes
> which bring within the reach of rural populations, not only goods
> an services normally thought of as the preserve of urban
> residents, but also goods and services not available even to
> urban dwellers only a short time ago. The percentage of Indian
> villages with access to electricity grew from less than 5 percent
> in the 1940s to 84 percent in 1992. Developments in
> communications break down isolation of rural areas, widen the
> knowledge base and facilitate the rapid dissemination of new
> ideas (Jones and Visaria 1997:13).

Also, as implied in the first sentence of the quotation, there is a very strong tendency to identify rural and urban in terms of whether or not the population is within or outside of formal boundaries of cities and towns. Thus, in the descriptions and discussions that follow in this section of the report, it should be kept in mind that almost always urban is thought of as residing within cities and not as a way of life. Along some lines this means an underestimation of the spread of urbanization in the world, both as to extent and as to the time when it occurred. Thus, statements to the effect that "a majority of the global population will soon be urban" (Mitchell 1995: 304) are probably only correct if the narrow definition of being urban is used.

While the population of the world continues to increase, 96 per cent of this massive growth is in developing countries (Population and the Environment 1991: 3). Concurrent with this is the multiplication and runaway expansion of cities of huge sizes, fueled in part by massive migration from rural to urban areas. In an important way:

> Mankind's future will unfold largely in urban settings. As the
> world moves into the twenty-first century, it will also mark a
> demographic divide, passing from an age when most of its

population resided in rural areas to one in which most will be urban residents. This is essentially due to the rapid urban growth occurring in developing countries, which, over the next 20 years, must absorb nearly one billion *additional* urban residents, as many as they had *in total* in 1990 (Fuchs 1994: 1)

Or as Gugler has noted:

The urban transformation of the globe may come to be seen as the lasting legacy of the twentieth century. Already close to half the world's population lives in urban settlements. Now the last phase of this profound human transformation is playing itself out in the less developed countries of Asia, Oceania, Africa, and Latin America and the Caribbean: we are witnessing the urbanization of the globe. At this time, nearly two-thirds of the world's urban population, more than one and a half billion people, live in the cities of the South. Within little more than a generation their number will triple (1996: vii).

This view is supported by UN projections. They indicate that there will be 511 metropolises exceeding a million inhabitants by the year 2010, when supposedly for the first time the world population will be predominantly urban, 51.8 percent (Barclay Jones 1991:5). In addition, 40 more such large cities will be added every five years so that 15 years later, there will be 639 metropolises with more than a million residents, with 486 of these in developing countries. In fact, of huge urban agglomerations exceeding four million inhabitants in size, 114 of 135 will be in the developing world. Of interest, for our purpose, is that the metropolitan explosion will be greatest in Africa and Latin America (for most of the statistics just cited, see Dogan and Kasarda 1988a, 1988b). By the year 2000, 77 percent of the population in Latin America, 41 per cent of that in Africa, and 35 per cent of Asia's will live in urban areas (Population and the Environment, 1991: 10).

Other writers have already analyzed in depth the social forces behind this growth of urban areas and giant cities (e.g., Barclay Jones, 1991). As such, we will not discuss the matter except to note very briefly some of the themes from the numerous studies undertaken that are relevant to our later discussion of disaster planning and managing. Thus, most researchers seem to agree that the urban population growth, which is about double the general rate (Environment and the Population, 1991: 3), can be accounted for by:

natural population increase in rural areas, limited rural economic development, and the decision-making calculus of urban migrants. Demographic forces are now well known: declining mortality rates in rural areas of most developing nations have not been matched with corresponding fertility declines. The resulting increase of population cannot be sustained by stagnating rural economics which leads to growing demographic-employment opportunity imbalances in the countryside. Migration becomes the only mechanism to relieve this imbalance. Rural migrants pour into the cities, exacerbating already overcrowded conditions in urban subareas. The age selectivity of rural migrants (largely teenagers and young adults) further contributes to city growth through new family formation and natural increase (Dogan and Kasarda 1988b: 19).

Any kind of disaster planning and managing in developing countries has to take place within this general but basic context. The urbanization process is deeply rooted in the very structure of such societies.

In addition, for our purposes, important is that parallel to the increase or negative changes in the disaster agents we enumerated earlier, there will also be certain transformation in the urban populations and communities which can be impacted. The end result of these associated features of urbanization is an enlargement of social risks and vulnerabilities in metropolitan areas in developing societies. Actually, even if there were absolutely *no* change at all in dangerous or risky agents or occasions for developing societies, we could still expect more and worse disasters just from the changes that have and are occurring in the individuals and groups living in cities that are potential candidates for impact in the future.

A. Five Propositions About Urbanization.

1. Technological and natural disaster agents will simply have more to impact in built up urban concentrations which along some lines can also create especially difficult response and recovery problems.

It is easy to overlook that disaster agents have consequences only if there is the possibility of some kind of social vulnerability. Thus, a potential dangerous agent which is present only in an uninhabited area will usually not create a disaster (e.g., the several sunken Soviet and American nuclear-powered submarines that rest on the bottom of ocean floors far from inhabited areas, which at worst, might result in some long run ecological problems; see Solomon 1988; Russia Sub 2000). A disaster is a social occasion involving some vulnerable entity, not merely the presence of some risk or hazard.

However, the urbanization process everywhere is increasing vulnerabilities by providing more to be hit by either natural or technological disasters (Anderson 1992). Building pressures for both living quarters and working places have and will accelerate this possibility. Where in the past there were marshy or swampy areas, there will be more housing complexes and industrial parks. Where very sparsely populated space might have been hit in the past, in the future many people and building structures will be affected. Such increases in density and concentration of course are distinctive of the urban communities in developing social systems.

Particularly in the developing world there is practically nothing of the reverse process, that is, abandonment or withdrawal of human activity from potentially dangerous areas or risky locations. Can a single case on any scale be cited? A way to document the probable greater future impact is to ask the following: If the last major disaster to hit an area more than 10 years ago was to hit exactly in the same way in the future, would there be more or less of an impact? We think that "more" would have to be the answer in almost all instances. A recent case in point was the 1999 mud slides and floods near Caracas, Venezuela that may have killed thousands. Many of the victims had illegally built their homes by clearing out empty forest lands within the boundaries of the Avila National Park which overlooks the valley of Caracas. However, a similarly heavy rainstorm in 1952 did not result in a disaster since the area at that time was almost uninhabited as well as by the fact that the park's slopes were amply forested.

In particular, it would be difficult to find desertion of or retirement from any inhabitable area in developing societies. While it is possible to cite some cities in developed countries which now have less population and sometime even fewer manufacturing facilities than in the past (e.g., a number of cities in the northeastern United States), it is almost impossible to give examples from elsewhere. Efforts to remove people from specific endangered localities either by government fiat or other inducements have not been very successful and in any case have involved only very minute number of people (Anderson: 1992: 86)

Now increasingly the locale for disasters will be densely packed and highly urbanized locations. As a result of certain facilitating social conditions, some alluded to and illustrated earlier, the build up will be concentrated in relatively little space. As Barclay Jones points out, present projections

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indicate that the total urban population will soon occupy less than four percent of the earth land area. He notes that the concentration of more than four billion people in less than two million square miles is a staggering prospect given that in the same area there will be most of the manufacturing production and other urban economic activities (1991:19). This means that more than ever before there are greater number of people and greater amounts of property vulnerable to the risks of different disaster agents. While density does not necessarily sharply differentiate cities in developed and developing countries, urban communities in the latter kind of social systems tend to have very high rates, such as the 55,000 persons per square mile in the central city of Madras, India (Dogan and Kasarda 1988b: 13).

The threats will be both natural and technological ones. Thus, even a decade ago one analysis of the world's 100 most populous cities found that 78 percent of them were potentially exposed to one of four major kinds of natural risks—earthquake, tsunami, volcano or windstorm (note that floods were not included, but see Parker 2000). If a distinction is made between large cities in developed and developing societies, 86 percent of the largest urban areas in developing countries were exposed to at least one threat (Degg 1992: 203-204)

Then there are the ever increasing technological ones. As Eric Jones has noted, although he was not specifically discussing technological threats:

> for many very good reasons, hazardous sites are frequently the ones with the greatest locational advantages for situating human activities (1991: 22).

Most of the newer technological changes discussed earlier require or necessitate an urban setting. As some Indian writers have written about the expanding chemical industry in India:

> Due to availability of infrastructural facilities, most of the industries are located in urban areas only. Concentration of potentially hazardous industries in some areas is alarmingly high. Conglomeration of industries leads to the possibility of domino effect in case of emergency in one plant (Ramasubramanian, Mitra and Bandopadhyay (1987: 180).

To the extent that developing countries industrialize and concentrate much of that process in urban localities, the more a target they will present for technological disasters, such as the hydrocarbons explosions which occurred in Tacso, Venezuela in 1982 which killed 145 people (Cutter 1991: 277).

In fact, in a number of such systems, the megacity or cities in the society have a large part of the industrial production of the country. For instance, Mexico City generates one third of Mexico's gross national product, while Sao Paulo with ten percent of the population of Brazil, contributes over 40 of industrial value-added and 25 percent of net national product, and Bangkok with only ten percent of Thailand's population contributes 86 percent of the nation's gross national product in producer services and 74 percent in manufacturing (Kasarda and Crenshaw 1991:473). Because such kinds of communities contribute disproportionately to the national economy, any major disaster in those localities would not only have serious local but consequences for the society as a whole.

In addition to the higher quantitative losses, there also may be some qualitatively difficult responses and recoveries from technological disasters impacting urban areas. For example, chemical poisonings and radiation contaminations often require complex, sophisticated and labor intensive kinds of medical treatment. They can and do put much more of a strain on emergency medical services than the "ordinary" disaster, as was the case in Bhopal, India where the local system was overwhelmed both by the numbers and by the kinds of medical problems faced. The

city's biggest hospital, the 760 bed Hamidia, admitted 1,900 seriously ill patients the first day and eventually treated more than 70,000 victims (Bowonder, Kasperson and Kasperson 1985: 32).

Often too in these kinds of disasters, material things, equipment, land, can be polluted, soiled and contaminated on a massive scale which in natural disasters might be found only in volcanic eruptions or certain kinds of floods. The cleanup often requires specialized knowledge and typically is very costly. Also, in some instances, there are second order effects; for example, health consequences can surface years later, a major concern in Russia and the Ukraine following the Chernobyl disaster. In Belarus, the incidence of thyroid cancer among the children living in contaminated localities in 1999 was 24 times higher than in other parts of the country (World Report 2000: 94). There seems to be cancer cases which would not be the kind of long-run medical consequence of most natural disaster agents (although some students of negative mental health consequences would dispute this). So, qualitatively, these kinds of disasters can be rather different, and there will be more of them.

However, when all is said and done, it is possible through appropriate disaster planning and managing to deal with greater density of populations. For example, in Florida in the United States, the number of residents in the counties along the ocean shore has in the six past decades gone from about a half million to six million people. But while there has been this great increase in numbers and density, the loss of life in hurricanes has steadily declined probably because of better warning systems and effective evacuation plans (Ingelton 1999: 30), as well as better construction of the housing in the area. This is not to ignore the fact the potential for greater disasters is present (Revkin 2001); but it is to emphasize that societies can do much to protect themselves.

2. Cities in developing countries have many everyday problems which not only magnify the impact of disasters when they occur, but that probably will get worst before they get better.

It should be noted that some observers tend to take the position that even in developed societies, planning for cities do not always produce the best results when a disaster occurs. Sylves and Waugh (1990) note this for North American cities. Mitchell (1995) alludes to the fact the earthquake disaster related problems faced by Kobe were somewhat surprising given that the existing hazard-management policies and programs in Japan had been regarded as among the most effective and best in the world.

However, few would dispute that any disaster will be worse in cities in developing societies than elsewhere, because they will impact localities already burdened by numerous, everyday problems.

> Almost any account of Third World urbanization of cities reads like a litany of seemingly intractable problems. What is more, by interchanging a few names and adjusting some figures slightly, the litany is depressingly similar throughout much of Asia, Africa, and Latin America (Dogan and Kasarda 1998b: 24 quoting an unreferenced McNulty writing).

Whether they make reference to particular cities or generalize to urban communities in developing societies, almost all commentators draw a rather bleak picture. For example, although the specific reference is to a large African metropolis, the following could be said of many other large cities elsewhere in the developing world:

> [it] teem3s with inadequate services, uncollected garbage, unmoving traffic, inefficient institutions, and unbridled corruption in the public and private sector (Dogan and Kasarda 1988b: 24 quoting an unreferenced report by McNulty and Adalemo)

More generally, Oberai states that:

> Rapid urbanisation, and particularly the growth of large cities,
> and the associated problems of urban slums, environmental
> degradation, inadequate health services, unemployment and
> poverty have emerged as major socio-economic issues with
> potentially important political implications in many developing
> countries (1993: 1)

In more general terms, there is considerable agreement that large cities have the following negative characteristics (see Dogan and Kasarda 1988a, 1988b; Bartone 1991; Eric Jones 1991; Oberai 1993). Many have very high unemployment and underemployment rates because industry cannot absorb all rural migrants. There is insufficient, inadequate, overcrowded and poor quality residential housing as well as work places. For example, 72 per cent of families in Lagos live in a single room with the average family size being eight members (Dogan and Kasarda 1988b: 14). There usually are very poor, at times almost nonexistent, health and medical facilities and social services. Often there are inadequate water supplies, sanitation and sewerage disposal services for the existing housing and industrial users. For instance, in some large cities, such as Jakarta, Kabul, Mogadishu and Rangoon, fewer than 10 percent of the dwellings have inside running water. The city of Cairo has a water and sanitation system devised for a population of two million while it actually has over eleven million inhabitants (Davis 1987: 6). Only about 20,000 of the four million residents of Luanda, Angola have running water or modern toilets (Harden 2000: 3). Similarly, only a third of urban households in Karachi have a piped water connection (LaQuian 1994: 198). The typical metropolis too has overloaded and congested transportation systems. Municipal and state transport companies regularly operate at substantial losses and with marginal effectiveness (Wunsch 1991a: 445). In almost all cases there is air, water and noise pollution from cooking, traffic and manufacturing activities.

In particular, cities in developing societies typically have huge slums and squatter areas. In fact, from two-thirds to three quarters of the population of such very large cities as Calcutta and Dacca is made up of squatter settlements (Davis 1987: 6; see also Costello 1987). As other researchers have noted:

> Through a process of organized and unorganized invasions of
> urban real estate and illegal subdivision and sale of land, many
> cities in the developing world are dotted with non-standard, poor-
> quality housing units interspersed with sanctioned land use . . .
> these settlements rest on land typically unserviced by public
> utilities and infrastructure . . . it is estimated that between one-
> fifth and one-half of all urban residents . . . live in informal
> shelters, and this figure increases to over 70 percent for some
> cities such as Casa Blanca, Ibadan, and Addis Ababa. (Kasarda
> and Crenshaw 1991: 479-480)

Similarly Oberai (1993: 2) cites the following figures for the proportion of the population living in slums and informal settlements: 60 percent for Dar es Salaam, 58 percent for Lagos, 57 percent for Bombay, 40 percent for Mexico City, 40 percent for Calcutta, 34 percent for Nairobi, and 32 percent for Sao Paulo.

In some instances, when technological and natural disasters occur, the impact is much greater than would otherwise be the case because of squatter settlements. For example, the gasoline leaks from a pipeline which exploded in Cubatao, near Sao Paulo in Brazil in 1984 set off fires in a nearby shanty-town that resulted in 508 deaths (Cutter 1991: 276). Similarly the many squatter settlements make Hong Kong much more vulnerable to cyclones than would otherwise be the case. The 1992 earthquake in Cairo, Egypt killed 541 people, injured over 6,000 and left about

20,000 homeless. Most of these negative effects occurred in the poorer neighborhoods of the city where there was lack of quality in building construction resulting from the use of brittle construction materials, inadequate design and detailing standards, deficient craftsmanship and lack of maintenance (Khater 1992; Degg 1993). The same seems to have occurred in the Algerian earthquake of 2003 (Smith 2003).

A related problem not much noted up to now at least in the disaster literature is that in many large African, Asian and Latin American cities, there are significant number of workers whose places of work are the streets and plazas of those areas. Bromley (1997) in a study found that a minimum of about 8.4 percent (amounting to roughly 30,000 people) of the workers in Cali, Colombia were in low income service occupations or "street occupations." Since much of this work, if not illegal, is at least very informal, it is a part of the urban population that it would appear to be very difficult to reach for any kind of any planning, much less anything to do with disasters. There is also a question to what extent losses in a disaster that affects this part of an urban population, is ever counted in any way.

All of the noted problems above are important for our purposes in several ways. A "bad" social setting cannot be other than bad for any disaster impact. Equally as important, it means that very little priority will be given to low probability although high effects incidents such as disasters. This will be true both of individuals and officials. Thus, with respect to the latter, that is governmental and organizational personnel, it has been observed that:

> Any risk assessment of disaster prone cities reveals that the normal pattern of governments is to pay minimal attention to the issues of public safety in squatter settlements . . . Reasons for the lack of normal concern include a number of factors: their "illegality" which places them outside the sphere of many governments concern; the limited resources of governments in poor countries which are focused on day to day survival needs, not on long-term planning; but perhaps the major reason concerns the formidable problems in introducing disaster preparedness or mitigation planning in the light of severe social, economic, political and technical constraints (Davis 1987: 6)

Or as another author has written of political institutions in developing countries:

> Insufficient political will, especially when environmental impacts are far removed in time or space or when traditions of public environmental awareness and action have not been developed . . . inadequate institutional capacity for environmental management, especially for setting standards and for monitoring and enforcing regulations (Bartone 1991: 412).

But an unwillingness to take any relevant actions with respect to disasters is probably even stronger at the individual or personal level. For it has been said that:

> People who are already barely eking out an existence will not avoid a risky flood plain or the shadow of a volcano any more than they will eschew the squatter settlements around a pesticide factory in Bhopal or a liquified gas facility in Mexico City. In short, the poorest of the poor are probably likely to reside in the path of both natural and technological hazards (Bowonder and Kasperson 1988: 104).

Furthermore, the situation in cities in developing countries is more likely to get worse before it gets better. As Barclay Jones has written:

> Environmental conditions in many of the huge agglomerations
> that will emerge over the next few decades can be expected to
> be very bad and represent a deterioration over present
> standards (1991: 19).

Thus, it is easy to project that the normal problems in developing cities will magnify the impact of disasters, that the everyday problems will deflect attention away from a concern with a low probability occasion such as a disaster, and that both the problems and the magnification of disaster effects will increase at least in the near future.

However, it must be noted that the dismal picture can be somewhat overdrawn. For one, there can be considerable variation in the urban way of life, particularly so called social pathological features even in developing countries. For example, there is evidence that generally "Latin American urban crime rates are . . . much higher than those of Asian and African cities" (Dogan and Kasarda 1988b: 20). Not all large cities in developing societies have all the problems we noted earlier.

Furthermore, even the slum and squatter areas may not be all negative:

> The picture emerging from case studies does not suggest that
> informal settlements can be characterized as defeated, socially
> disorganized neighborhoods, bur rather vital, if oftentimes poor,
> communities (Kasarda and Crenshaw 1991: 480).

In fact, the generally negative view of life in large cities in developing countries echoes what used to be commonly said about eastern cities in the United States in the late 19th and early 20th centuries. Sociologists in the late 19th and early 20th centuries such as Tonnies, Simmel and Wirth, for example, all took the view that much of urban life was pathological and rife with social problems (see Light, Keller and Calhoun 1989: 231-235). However, later more specific social science studies showed that what seemed to be widespread social disorganization and personal pathology was an inaccurate misreading of life in urban America (Gilbert and Gugler 1992: 116-133). There now seems to be the beginning of a recognition that the situation is not a totally negative one even in urban communities in developing societies. Thus, a recent review notes that perhaps a distinction ought to be drawn between social problems at a community level and the perception of recent migrants to a city:

> Whereas additional numbers of migrants may bring more costs
> than benefits to the city, migration improves the conditions of the
> rural migrants who view the economic and social benefits of
> moving to a large city as substantially outweighing the costs.
>
> The point above was frequently overlooked in the early literature
> on urban growth in developing nations where giant cities were
> often depicted as abnormal and unhealthy and life-styles of the
> residents were cast in appalling terms. Even today, some
> popular press and academic writers appear surprised when they
> observe the high degree of optimism and satisfaction elicited by
> recent migrants residing in the most densely compacted,
> impoverished Third World cities. Residents of these cities, in
> turn, often are puzzled by the Western, middle-class
> perspectives writers apply to the economic, social, and
> environmental circumstances confronting the inhabitants. As
> one participant from Mexico City stated at the Barcelona
> Conference on Giant Cities: "We didn't feel we were in such dire
> straits until you told us how awful our conditions were."

Perceived deprivation, no doubt, is relative (Dogan and Kasarda 1988a: 21-22).

To indicate that rural migrants to cities might have a better life than remaining where they were born, of course does not deny that at the community level their migration could create social problems. If this is true, for our purposes it is important. For the reasons indicated above, even if the problems are only at the community level, they almost insure that there will be a magnification of any impacting disaster. Unfortunately there is every reason to believe that the urban social problems indicated will get worse, so it follows that future disasters in those communities will also be worse.

3. The social organizations and group configurations that emerge in metropolitan areas are not particularly well suited for coping with disasters.

For reasons already indicated, metropolitan areas will be more likely than ever before to be the impact locus of natural and technological disasters. In general, many social characteristics of such localities tend to increase the difficulties in coping with many kinds of crises (Kelly 1995). We particularly want to note two such factors: the highly bureaucratic nature of urban organizations, and the heterogeneous sociocultural patterns of urban groupings. Since both make crisis planning and managing more difficult, the more there are disasters in metropolitan areas, the more there will be problems.

a. Urban bureaucracies.

It is necessary to avoid stereotypic and negative notions of bureaucracies when discussing such types of social organizations. In principle, bureaucratic social arrangements whether in public or private groups are intended to standardize and routinize many of their operations to achieve certain specified goals. Thus, it has been noted that: "by providing for the performance of tasks on a regular and orderly basis, bureaucracies permit the efficient planning and coordination of activities" (Vanderzanden 1988:124).

Even given this, it is nevertheless true that bureaucracies are not the best adaptive social organizations to cope with fluid and ambiguous occasions, among the very hallmarks of the emergency periods of crises. Disasters involve non routine occasions. In those kinds of situations, as disaster studies have consistently reported, new or emergent rather than traditional or standard behavior patterns are more adaptive for the problems that surface (see Kreps, 1991). In line with this, **DRC** research has found that decentralized organizational decision making and ignoring of rules is often the best coping behavior in the early stages of a disaster. For example, hospitals and the hospital system can better provide emergency medical services if the bureaucratic authority structure, the usual decision making processes, and even the traditional division of labor, are not completely followed (see Quarantelli 1983).

Furthermore, at a more general level, most governmental bureaucratic organizations in developed societies are not models of efficiency and effectiveness. To some extent, the slow movement if not to privatize such groups, but at least to make them employ features that are more characteristic of the private sector with respect to accountability, budgeting, incentives and responsibilities, etc., is a reflection of societal unhappiness with the functioning of such government bureaucracies (Shaw 1999). This issue is not a matter of concern for this report, but it does raise a question if bureaucracies are often that poor in developed countries, what can one expect in less developed social systems?

It does seem, not surprising, that the situation is no better in developing countries. A recent examination of some government agencies stated that flexibility, adaptability, creativity and speed were found wanting in most centrally managed development efforts. Although focused on bureaucracies dealing with rural problems:

To make matters worse, central offices of bureaucracies are
slow in responding even in routine support tasks and
responsibilities, not to mention extraordinary ones (Wunsch
1991b: 10-11).

Urban bureaucracies certainly could not be expected to perform better or as has been said:
"there are few defenders and many critics of the centralized, bureaucratic, hierarchical
organizational strategy dominant since independence in Third World administration" (Wunsch
1991a: 431). In fact, some analysts argue that in most developing countries, the local
governmental structures are weaker now than they were several decades ago being devoid of
revenues, autonomy and technical capabilities (see Cohen 1991: 93).

Put another way, since municipal bureaucracies are not the best social organizations to prepare
for and respond to disasters, their presence in the midst of such crises, can only magnify the
problems that will appear. Of course again, an actual situation may be more complicated than
appears at first glance. In Mexico City, the formal governmental structure is, on paper, a highly
centralized and rigid bureaucracy. However, when the earthquake impacted the city in 1985,
DRC found that in reality the system was functionally decentralized. The result was that at the
local level the organizational response coped relatively well with a series of problems such as the
restoration of the public utilities (see Dynes, Quarantelli and Wenger 1990). But in the main, it
should be anticipated that urban bureaucracies in developing societies will magnify emergency
problems, and as such make populations more vulnerable to disaster impacts.

b. Heterogeneous subcultures.

Heterogeneity tends to be the outcome of large population size. That is, the larger the population
in a community, the more there will be social dissimilarity among the members (Wilson 1986).
This is true both in terms of individuals and groups.

Now, as already noted earlier, it is widely believed that many segments of urban populations live
in very disorganized and anomic social settings. But as previously discussed, this is incorrect.
Particularly when there are many dissimilar groups in a community, there is a tendency for
officials and some groups to see collective lifestyles other than their own as reflecting a high
degree of social disorganization if not pathology. This perception usually reflects the view of the
dominant and the majority groups when they look at the non-mainstream social groupings that
increasingly live in urban areas. But far from disorganization and anomie, what is usually present
are different social worlds and subcultures whose members have different group values and
beliefs than the dominant social pattern and culture, many of these stemming from different ethnic
and/or religious backgrounds (Alba 2000; Ember and Ember 2003). Many of the cities in
developing countries are the end point of migration from different ethnic and tribal groups. It has
been said about African communities that: even in cities and towns, tribal loyalties are still
meaningful or as said elsewhere:

> Many urban dwellers remain firmly rooted in the rural community
> in which they grew up. This is a widespread pattern in sub-
> Saharan Africa, much of Asia, and the Pacific. Thus, recent
> migrants who find themselves isolated in the urban setting . . .
> are quite likely to feel secure in the knowledge that they continue
> to be members of the community they came from . . . Significant
> ties with their rural areas of origin are not uncommon even
> among permanent migrants (Gilbert and Gugler 1992: 157)

Nevertheless, heterogeneity and different subcultures characterize the urban communities of
such societies.

These kinds of population mix can affect disaster response in a variety of ways, make disaster planning even more complicated than usual, and generally raise the risks and vulnerabilities for the persons and groups in the mix. Fothergill, Maesias and Darlington (1999) for example, although they focus almost exclusively on American society, note how race and ethnicity affect risk perception, preparedness, response to warning communications, physical impact, psychological impacts, emergency response, recovery and reconstruction. Isolated studies in developing countries hint that ethnicity is even more important in developing societies. However, we cannot paint a systematic picture of all that could be involved. Therefore, let us present some general examples (for research studies supporting the following assertions, see Bolin and Bolton 1986; Perry 1987; Yelvington and Kerner 1993; Oliver-Smith 1996; Peacock, Morrow and Gladwin 1997; Bolin and Stanford 1998; Fothergill, Maestas and Darlington 1999; and Kanisty and Norris 2000). Although most of the specific work deals with developed societies, the general principles derived should be equally applicable in developing societies.

For instance, some ethnic and minority groups see risks differently from other groups, with some assuming disasters can be overcome and others assuming human beings have to accept and adjust to such threats. Depending on the belief, this can affect efforts at disaster mitigation or prevention, with for example, those having a fatalistic cultural ideology unlikely to take any actions (for different cultural ideologies, see Thompson, Ellis and Wildavsky 1990). People from different cultures can also vary in their support for protective actions, with some taking a somewhat fatalistic and resigned position because of some religious values. Adoption of emergency preparedness measures can be affected by this. Also, some groups have very extended kinship systems which can provide considerable support at times of crises; conversely, other disaster victims or survivors because they trust no one other than their own kind, may have few or none to turn to for social support. But contrary to widely held views that urban migrants become totally cut off from their rural backgrounds, some studies such as one done in Nigeria found:

> The evidence is overwhelming that virtually all respondents
> maintain significant relationships with their rural home
> community, even though the minority who had a wife (and
> children) living at their home place had become very small by
> 1987 Gugler 1997a: 66)

As another example we may note that studies show some minorities often have the most problems recovering from disasters because they frequently are not that socially visible to those providing help.

These kinds of intergroup subcultural differences may be especially exacerbated in developing countries because some are the source of civil strife and disorder. Thus, in or near the urban areas of such countries as Afghanistan, Sudan, Sri Lanka, Uzbekistan, Somalia, the Congo, Palestine, Kosovo, Liberia, and Myanmar, to mention but a few obvious examples, are presently the loci of open conflict and violence. Cities also are often the end point of refugees from such strife. In both cases, the end result is the existence of many subcultural enclaves and neighborhoods in urban communities in developing countries.

The particular heterogeneous subcultural mix that will exit in any metropolitan area will differ somewhat from one locality to another. However, our point is that any kind of sociocultural mix along any of the lines indicated will complicate and generally make less efficient and effective any aspect of disaster planning or managing. A relatively homogeneous population is much easier to plan for and to manage in disasters.

4. Certain lifestyles of urban populations leave them especially vulnerable to disasters.

Populations in future disasters, because of social changes associated with urban living, will be more vulnerable to negative effects. We cannot provide a systematic coverage of all factors, but we will illustrate four of them: the large number of socially disadvantaged people, the varied

household composition, the youthful age distribution of urban populations and the gender distribution in cities in developing countries.

a. The socially disadvantaged.

It has long been observed that for a variety of reasons, the socially disadvantaged--essentially the poorer, less well educated, and less skilled segments of populations--usually suffer the most from disaster impacts. In urban communities they are more likely to be initially impacted because they live in more dangerous areas or zones. While this is probably true for any kind of disaster agent, it is very likely for potentially dangerous technological agents. This is because the risks from them are not evenly distributed throughout any society. As Britton notes, the social geography of technologically risky sites in Australia:

> is quite explicit. They correspond to the nation's major population centres . . . All these centres are major distribution locations from which hazardous materials either commence, or complete journeys, and hence represent important locales for related hazardous materials transport and storage.

More important, is the urban location of technological hazards as Britton notes:

> Hazardous industries are not randomly distributed within cities. Industrial zones in general, and hazardous industry sites in particular, tend to be located in less-affluent areas characterized by low socio-economic residents less able to capably deal with, or respond to, crises . . .
>
> For instance, when the LPG storage tanks exploded at the Boral Gas depot in Sydney's inner western suburb . . . the residential group most endangered was markedly over-represented in terms of the classification of youth and adult unemployment: overseas born non-English speaking background; unskilled: low income: and the least formal qualifications (1991a).

While this is a description of a situation in a developed society, the situation in urban communities in developing countries is likely to be even worst. It was not the well off who lived in the Reforma district in Guadalajara near the PEMEX gasoline distribution center, when a series of sewer-drainage explosions along an 18 kilometer course ripped thorough 13 square kilometers of the area killing several hundred, injuring around 1,500, damaging at least 11,000 houses, and doing an estimated 300 million dollars of property damage (Aguirre et al. 1995).

A UN report said that in 1990 roughly a billion people lived in slums and squatter settlements. In a typical expanding city in a developing society, it is not uncommon for over one third of the entire population to live in substandard housing, while thousands more are forced to live on the streets where they find shelter in makeshift shacks. Or has been written:

> in highly congested cities like Bangkok, Bombay, Calcutta, Cairo, Lagos, Mexico City, and Rio De Janerio, industrial plants are located in the middle of established residential neighborhoods-- and, when they are not, they are surrounded by slums and shantytowns populated by rural immigrants who cannot find housing elsewhere (Shrivastava 1987: 33).

Not surprising also, there are estimates that "40 per cent of the workforce in many developing countries are unemployed" (Population and the Environment, 1991: 9). Overall, this suggests that these urban dwellers are overwhelmingly made up of socially disadvantaged individuals. In

that sense, major components of future urban populations at risk will be less able to cope with the losses and disruptions to be expected in disasters.

Social class differences have yet to be found to be significant in crisis time behavior by the studies undertaken up to now (e.g., practically no such differences are cited in Drabek 1986 with not many more noted in the most recent review volume by Tierney, Lindell and Perry, 2000). But few disaster researchers would question that those at the bottom of whatever socioeconomic levels exist in a given community will both suffer the most and be least able to rebound from disaster impacts. The problem is compounded by the fact that certain of these populations in urban areas are particularly heterogeneous, as discussed earlier. That is, all the socially disadvantaged do not come from one particular ethnic or tribal group. This pre-impact variety in behaviors, attitudes and values necessitates different approaches to them for disaster planning, difficult enough to undertake even in wealthy homogeneous communities in developed societies and all but impossible in impoverished cities in developing countries.

It is also necessary to note that while generally it is almost always true that the poorest are most at risk in urban areas, there might be a relative change in this in the future. There could be two reasons for this. For one, the newer kinds of possible disasters such as computer system failures might, at least in the near future, more directly impact middle and upper class members. Furthermore, even in many mega and large cities, those in the higher socioeconomic levels, may also be vulnerable, and at least in a property sense, have relatively far more to lose. As Smith notes:

> . . . one of the truly interesting, if paradoxical, elements of these giant urban areas is that, despite all this human suffering and despair, they are concurrently places of tremendous wealth and opulent consumption. These cities of the poor are also sites for gleaming skyscrapers, suburban "grated communities," and five-star hotels that house societal and multinational elites as they work and play. Often, the shanty towns or slums are physically in the shadow of these monuments to opulence. "Underdevelopment" and "overdevelop-ment" literally exist side by side (1996: 1).

Actually a minor theme in the literature by students of urban areas in developing societies is that there are enclaves not only of the rich, but of a growing segment of middle class families in large cities (see Seebrook 1996: 211-216). Or as Kelley notes:

> Like Khartoum, both Port au Prince and Luanda have slum areas, but both also have many poor people living in districts of significant affluence (1995: 383)

Laudable humanitarian concerns should not obscure the possibility that the socially disadvantaged may not be the only major losers in disasters in mega or large cities. A focus solely on the poor who do represent a huge majority of residents in most such cities, may miss the fact that if the best off socioeconomic areas are impacted, not only will there be greater economic and other losses but it could reduce the use of material and personnel resources that otherwise could become mobilized in responding to a major disaster. In its study of the Mexican City earthquake of 1985, **DRC** did find that the proportionately largest and most significant and continuous informal volunteer help of different kinds was provided by non-victim middle class and not lower class residents (Dynes, Quarantelli and Wenger 1990). It is also a fact that most megacities in many societies contribute a quarter to half of the Gross National Product, and also that in one sense they heavily subsidize the rest of the country (Fuchs 1994: 6). Obviously if impacted in a disaster, the consequences therefore are more than just for the impacted area.

     b. Household compositions.

Ongoing changes in family patterns and in lifestyles can increase vulnerabilities to disasters. The form of the family typically changes in an urban setting. For example, more and more, the traditional type of the family in developing countries, the extended kinship one, becomes generally less important in urban settings (with some exceptions as we will note later). Besides the nuclear family type, made up of a husband and wife with children, households in cities increasingly are made up of members that may consist of single people, childless couples, both male and female single parents, unmarried same or different couples such as heterosexual partners and gay couples, as well as unrelated roommates, and even small collectivities. Much disaster planning everywhere implicitly assumes either the nuclear or extended kinship family type. But both types are a diminishing social pattern. In particular, the kinds of households more likely to be seen in cities of the future, are those whose members are likely to have less psychological and social support available for crises than was true when extended family systems predominated.

Furthermore, the other types of growing kinds of urban households we have mentioned all present different kinds of issues and problems for disaster planning and managing. For example, on the whole, they are less likely to get involved in any kind of preparedness planning. They also are more difficult to warn about impending dangers. They are not as likely to be found and serviced by disaster relief organizations. For these and other reasons, the newer forms of households have greater vulnerability to disaster impacts.

However, here to as elsewhere in our discussion, some qualifications are needed for the more general principle advanced. With regard to household composition, it has been noted:

> Kinship patterns vary across the Third World and differentially
> affect urban social organization. The rather independent nuclear
> family imported by the European colonizers in Latin America and
> the Caribbean provides only narrowly circumscribed support.
> When the family comes under stress, severe hardship for some
> of its members is common. Mothers who have been deserted,
> divorced, or widowed can expect little support from kin; children
> may be left to their own devices. In Africa and In India, in
> contrast, kinship support beyond the nuclear family is more
> readily available (Gugler 1996: 8).

So it should not be assumed that household compositions in all urban areas will be the same, or that city dwellers live in social isolation.

c. Age distributions.

As another example of problems in dealing with urban dwellers, we may note that there have been and are changes occurring in the demographic characteristics of populations in developing societies. These can result in qualitative changes in vulnerability. For instance, we are increasingly getting a young population in at least the majority of developing societies around the world. In fact: "40 percent of the people living in developing countries are under 15 years of age (Population and the Environment, 1991: 9). It is not by chance therefore, for example, that deaths were disproportionately concentrated among children, especially infants, in Bhopal (Bowonder, Kasperson and Kasperson 1985: 10). A study of the devastating cyclone which hit Bangladesh in 1991 found that sixty-three percent of the deaths were in the under-ten age category, whereas this age category represented only 35 percent of the pre-impact population. It is true that urban populations in the developing world tend not to have many elderly persons, and this is good because they are as vulnerable to disaster impacts as the very young. But overall the age distribution makes for vulnerability (as it has for centuries to infectious diseases where the very young and the elderly were disproportionate victims, Snowden 1995; and the elderly are

clearly the most vulnerable to heat waves as recent happenings in the United States and France well illustrate (for the former see Klinenberg 2002).

We should note that not only are residents of urban areas young as a whole, but there is a fraction of them that would seem even more vulnerable to disasters. We have in mind the fact that apparently among the large number of street people in cities (which we discuss later), a fair number are children. "A specially acute problems in many megacities is the growing number of street children, estimated at 30 million worldwide . . . (Laquian 1994: 203). That they suffer more from disaster is documented in a study of Hurricane Mitch where it was noted that in many affected areas children made up a majority of the victims and that those housed in temporary shelters suffered from severe physical, psychological and psycho social problems (Reconstruction 1999: 14).

        d. The gender dimensions.

There has been an explosion in the last decade in the social science literature with respect to the importance of gender in disaster behavior (Fothergill 1996; Khondker 1996; Scanlon 1997; Peacock, Morrow and Gladwin 1997; Enarson and Morrow 1998; Enarson 1998; Fordham 1998, 1999; Enarson and Fordham 2001). There are certain common themes in most of this literature. The list is long. But in terms of a few examples, women are more likely to be victims of disasters than men. Females very often have somewhat less of support systems around after the impact of a disaster. Women are less likely to be involved in mitigatory and prevention activities. They sometime are less reached by warning systems. These are but examples. If there is an overall theme in this ever growing literature, it is that women simply have not been recognized as important players, whether in terms of what happens to them or what they could be doing, in practically all phases of disaster planning and managing, going from mitigation through preparedness, to response and recovery. As Fordham (1998:126) felicitously puts it, there is a need to make "women visible in disasters" (1998: 126). Women until recently were relatively unnoticed in disaster research. More crucial, much disaster planning and managing has assumed that the behavior of women was basically no different from that of men, and therefore required no gender specific attention. Only very recently as illustrated in Enarson's review (1998) have disaster guidelines and plans for operational personnel taken the gender factor into account. As an example of a specific study see a recent one which found that even when men and women underwent the same physical impact in Hurricane Mitch in Honduras, they nevertheless: "evaluated these impacts differently depending on where the impact fell within the gender division of labor" (Paolisso, Ritchie and Ramirez 2002: 171).

Interesting enough more attention seems to have been given to the gender dimension in developing countries, rather than developed societies (Kelleher 1997; Fordham 1998). This applies elsewhere also. For example totally outside of the area of disasters, the same lack of recognition of gender as a very important variable in understanding behavior in many areas of life, has only recently been noted with much of the initial work focused on developing societies (e.g., World Survey on the Role of Women in Development: Globalization, Gender and Work 1999; Zmroczek and Mahony 1999; see also Chow 2003).

There are many implications in all of this for better planning and managing of disasters. The most important one however is the simple but general point that research agendas, policy positions, program statements, and operational guidelines should take the gender variable into account. It is one of the most important social dimensions that has to be considered. While, as implied, increasing attention has been paid to the problem, there is a long way to go yet.

However, in this report and in this chapter, our interest is primarily in indicating how the gender variable might enter into the disaster related problems of urban areas in developing countries. Simply as an illustration, it has been noted:

> Urban sex ratios vary considerably across the Third World . . .
> In China and India men outnumber women by a substantial
> margin. In Indonesia the urban sex ratio is balanced. Male-
> dominated urban populations are characteristic of most countries
> in the Arab World and Africa South of the Sahara. In Latin
> America, however, women outnumber men in every country,
> frequently by a substantial margin that cannot be explained by
> sex differentials in mortality (Gugler 1996: 5).

What do these observations suggest? If nothing else, it is that disaster planning and managing has to go beyond just noting that the gender variable is a factor. The quotation just cited indicates that finer distinctions need to be made. To what extent these affect the vulnerability of women in urban areas probably will depend more on their lifestyles than just the sheer number of females in a community. But if that is the case, as indicated earlier, it appears as if their lifestyles do make them more vulnerable to disasters.

There is little question that the different lifestyles that exist in almost all cities in developing countries, create problems for those engaged in disaster planning and managing for those communities. We have tried to indicate some of them. An attempt was also made to suggest that full acceptance of sweeping general statements about urban dwellers in developing countries, should be tempered with the probability that such generalizations need to be qualified in some instances.

5. Because of the complex social links in the modern world, certain future disasters will have catastrophic potential even if they would occasion no casualties nor have physical impact.

There is a very misleading tendency to equate disastrous occasions only with casualties and property damage. In the first place, even occasions that are catastrophes in the sense of such losses are relatively rare. As written of a particular disaster agent, earthquakes:

> Despite their often overwhelming and destructive effects, death-
> injury producing earthquakes are still relatively rare events. Over
> 70% of the approximately 1.3 million earthquake related deaths
> since 1900 have occurred in 12 single events . . . In the United
> States, only an estimated 1,600 deaths have been attributed to
> earthquake since colonial times (Jones, Noji, Smith and Wagner
> 1993: 19, 20).

However, to equate the magnitude of impact to the number of people killed or injured and/or to the amount of direct property damages misses often what is far more important. Focusing just on casualties and even property losses ignores the great psychological stress, social disruption, indirect economic costs, and political strain that are almost inevitable in disastrous occasions even when the killed and injured and direct property damage may be very low. For instance, there were no casualties and very little property damage in Mississauga, a suburb of Toronto, Canada when over 217,000 residents of the metropolitan area had to be evacuated because of a train derailment that threatened the release of very toxic chemicals such as chlorine toluene and propane (Scanlon and Padgham 1980). Yet the threat (and in retrospective it was actually a minor threat) and the evacuation was very disruptive for a period of days for the everyday life and routines of more than a quarter of a million people. The disruption was major in psychological, social and indirect economic terms.

In part because of the urbanization process, some future disasters will have similar characteristics which are not typically of those that occurred in the past. While not all disasters in the past had few or any casualties, the presence of such losses was typical. But that will not always be the case in the future.

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We are initially talking here of disasters that in terms of their direct effects, would be primarily economically costly. Slovic, for instance, has written:

> Some events make only small ripples; others make big ones. Early theories equated the magnitude of impact to the number of people killed or injured, or to the amount of property damaged. Unfortunately, things are not this simple. The accident at Three Mile Island (TMI) . . . provided a dramatic demonstration that factors besides injury, death, and property damage impose serious costs.

He goes on to note that although there was not a single death at TMI and that few if any latent cancer fatalities are expected:

> no other accident has produced such costly societal impacts. The accident . . . certainly devastated the utility that owned and operated the plant. It also imposed enormous costs (estimated at 500 billion dollars . . .) on the nuclear industry and on society.

It did this through stricter regulations and the reduced operation of reactors worldwide, greater public opposition to nuclear power and greater reliance on more expensive energy sources, and increased costs of reactor construction and operation. Slovic further notes:

> It may even have led to a more hostile view of other large scale, modern technologies, such as chemical manufacturing and genetic engineering. The point is that traditional economic and risk analyses tend to neglect these higher-order impacts hence they greatly underestimate the costs associated with certain kinds of mishaps.

> Although the reaction to . . . TMI . . . was extreme, it is by no means an isolated example. Other recent events that have had enormous indirect impact include . . . the discovery of pollution from chemical wastes at Love Canal . . . and Times Beach . . . the disastrous launch of the space shuttle Challenger . . . Following these extreme events are a myriad of lesser incidents events varying in the breadth and magnitude of their impacts (1987).

As a variant of this, we may note that some future disasters will be very socially disruptive, less because of their direct physical effects, but from consequences because of the way they will be perceived. We had a very good example of this in Brazil a few years ago. A cancer treatment machine abandoned in a junkyard released some dangerous cesium 137. The radioactive contamination killed about four people and seriously affected about 44 others. But far more consequential was the perceived risk to anyone in the affected locality, namely Goiania, Brazil, a city of 1.2 million. The occasion is almost a classic case of the potential negative impacts of perceived but not actual risk. Over 100,000 residents out of a total population of about one million in the area underwent Geiger counter examinations to detect possible contamination; it was reported that bout 8,000 formal certificates were issued to counter the effects of being stigmatized as a dangerous carrier of radiation. This was not an unreasonable coping effort since the anxiety over potential contamination led hotels elsewhere in the country to cancel reservations of persons from Goiania, buses and airplanes to refuse to take Ghanaians as passengers, and some doctors and dentists to take new patients who did not have the certificates. There were also cancellations of scheduled conventions in Goiania. One estimate was that regional tourism fell over 40 percent and it was reported that property values fell, with

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salves levels for the entire city and state being affected. Possible as much as 50 percent of the state's export sales were lost during one month with the area's agricultural products being boycotted (or purchased at 50 percent of value). Even textiles and clothing manufactured in Goiania were affected—some losing nearly 40 percent of their value (From press accounts and observations in 1987 by John Petterson of Impact Assessment; see also Camargo da Silva 2002). In terms of our earlier stated criteria, what happened was at a minimum a community disaster.

These kinds of future disasters resulting mostly in nonphysical but massive social, economic and/or psychological disruptions present many and major planning problems. For obvious reasons, they are more likely to occur in urban centers. There is every reason to think that such communities in developing countries will be increasingly vulnerable to such disasters. Views that take the position that, for example: "the so-called disaster of Seveso in 1976 did not claim one victim: phoney catastrophe presented to the world through the media as a chemical apocalypse" (Tazieff 1991: 14) would seem to equate disasters only with fatalities, a rather narrow and almost completely discarded notion in most of the social science research literature.

Finally, we may note such happenings as the stock market crash of October 1987. In the United States alone, the Dow Jones Industrial average declined by about a third. That represented a loss in the value of all outstanding American stocks of approximately one trillion dollars (Barro et al 1989: 127). If similar economic losses around the world are added in the total loss is much more since the U.S. market proportionately suffered the fifth smallest decline of 23 major markets, with Mexico the only developing country involved (Barro et al. 1989: vi). Natural and technological disasters in terms of any known statistics nowhere come close to such almost incredible economic losses, over but a four-day period (Compared with the supposed $13 billion loss a year in the United States, or the supposed $ 100 billion dollar loss from the earthquake around Kobe, Japan). To be sure some might object to characterizing such a societal crisis as a "disaster". Although advanced theoretical thinking on the conceptualization of disasters has made a case for treating such a crisis as similar to others where there are no casualties or physical impacts (Quarantelli 1998c). The issue is not whether the inclusion seems odd from everyday popular conception of disasters or traditional organizational ones, but whether such an scientific inclusion is justifiable in that it enables researchers and theorists to better understand the common phenomena under study. Apart from the matter of what to call market crashes, it is also to be kept in mind that as developing societies move more and more toward establishing financial institutions that prevail in developed societies, but they also will be subject to the possibility of such staggering economic losses in their financial markets. At the very least, such phenomena will have to be treated as part of the larger social context in which more traditional disasters occur.

It should be noted that while the example which follows is somewhat different from what just described, there are some common elements. A Japanese financial institution analyzed the effects on the world economy, if a major earthquake impacted Tokyo. The bank projected that because of the central role of Japan in the international financial markets, the economic aftershock would be reverberate around the world. It was noted that in 1987, some 18.7 percent of about two billion in foreign money which flowed from abroad into American securities came from Japan. It was also estimated that if the earthquake had occurred in 1988, the world economic growth would have been curtailed 0.3 percent in 1989; by 0.9 percent in 1990; by 1.5 percent in 1991; by 2.1 percent in 1992; by 2.4 percent in 1993, and by 2.6 percent in 1994 (Japanese 1989:1). To keep this in perspective it is necessary to report that other social scientists have hotly disputed the above scenario arguing that the figures used do not make for a realistic possibility (Hazards Assessment 1996: 7). Be it as it may, it is to the credit both of the proponents and critics of the scenario that they have treated it as a discussable matter. There was no automatic dismissal of the scenario as out of bounds for serious consideration. For our purposes here, however, this is a hypothetical example of an earlier expressed point by us that disasters are increasingly going to have effects distant from their immediate impact area.

B. Implications of These Observations.

The importance of the observations in this chapter is what they imply about future disasters. For the most part the urbanization process is creating greater and greater vulnerabilities, especially in urban areas in developing societies. Most such social systems have done a relatively poor job in coping with past and current disasters. If this is so, the challenge of greater vulnerability would seem to demand somewhat new ways of approaching disaster planning and managing in the future (Assessing Resilience and Vulnerability 2000). As in the instance of the industrialization process, the negative consequences of the urbanization process would seem to require a rethinking of old strategies as well as the better implementation of valid disaster planning and managing principles. The matter of new strategies will be discussed in the following chapter.

Again, it is legitimate to ask if there are any countervailing trends. Again, the answer is no with respect to any major trends. However, as in the instance of the industrialization process, the urbanization process is generating phenomena that could work to reduce the impact of more and worst disasters in the future. For example, modern urban life tends to create and support knowledgeable personnel with an interest in change such as scientists, or others with a vested interest in opposing the status quo, such as journalists. These kinds of things will be discussed later. But while these kinds of activities can contribute to better disaster planning and managing, on balance, they can in no way outweigh the negative generation of additional and worse vulnerabilities of urban populations in developing countries.

With our depiction of the problems of the future, we now turn to what might be done about them. In the next chapter, we discuss the newer strategies that ought to be considered. In the chapter after that, the better application of valid planning and managing will be the focus of attention.

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CHAPTER 4.

NEW STRATEGIES

We definitely need *new* strategies for improving disaster planning and managing in urban areas in developing countries. We have argued that there will be more and worse natural and technological disasters in the future. If that is what the world will face, it follows that past strategies will not be able to cope with that new situation. Even if current strategies are more or less working, and most disaster researchers would question such an assertion, the differences in the future would clearly seem to require at least some new strategies. To be sure, part of our intent is to be provocative in making such a statement so that readers might feel challenged to rethink their traditional positions. However, at another level we really do believe that the future will be different enough to necessitate thinking of new ways of trying to cope with the disasters that will be typically of the 21st Century in urban areas in developing countries. Actually while this report is focused on the developing countries, roughly the same situation will face developed societies. However, as we have tried to illustrate in this report, the problem will be worst in developing social systems.

We are not the only ones who think a major reexamination is needed of current strategies. Thus, the introduction to a collective journal issue on "Disaster Vulnerability of Megacities" (Parker and Mitchell 1995b) has as its subtitle, "An expanding problem that requires rethinking and innovative responses." (Parker and Mitchell 1995a: 295). However, the articles in the journal issue do not go much beyond illustrating the existence of the problem and some of the changes leading to it. Indicating some reasons necessitating a rethinking, we think is a good start. But little new of a strategic nature is specifically suggested. No major new planning innovations are actually advanced. The few non-current ideas discussed are rather limited coming out of certain selective notions in urban geography. Particularly unfortunate, given our earlier discussion of hazards and disasters, is that the journal issue from our perspective continues to see hazards as the crucial starting point for a rethinking of the problem. We will partly revisit our argument again for a focus on disasters rather than hazards in the next page or two.

Now, of course while we characterize our own suggestions as new, we do recognize that other analysts might consider them at best as primarily modifications of what is already going on. We do not see it that way. From our perspective, the ideas are new compared with present practice. In any case, we think what we discuss later in this section of the report, ought to be clearly emphasized in thought, word and deed by any organization interested in disaster planning and managing. The strategies we propose should be made very explicit.

That what we propose is not insignificant may be partly indicated by the fact that most of what we call the new strategies will certainly be seen by almost everyone as controversial. In part, this is because the strategies are in some cases at variance with the vested interests of powerful groups and organizations. There will be strong objections to most of our proposals. Such resistance says nothing about the merits of the new strategies we think should be followed. There can be valid objections to any new proposed course of action. But conversely, because some or even many professionals might be unhappy with what is proposed cannot in itself be taken as a valid criticism about any or all of the new strategies we suggest.

However, we should first note that some changes that on the surface seem significant, have already occurred or are in the process of being established. An illustrative case in point can be seen in the general approach to disasters in developing countries in Latin America and the Caribbean. Many of the changes have occurred in the last decade or so. A recent newsletter (International Strategy for Disaster Reduction 1999) describes the following variety and range of activities and programs. Numerous agencies and groups in the region are now involved in disaster planning and managing. A variety of educational activities have been initiated. A number of partnerships and links have been created. There has been the establishment of

information networks as well as warning systems. Relevant guides and reports have been published. Numerous disaster-related meetings and conferences have been held. Legislation for disaster prevention has been passed or advocated. Warning systems have been planned or put in place. Of particular interest with regard to this last matter, there is now a very active effort to develop generic warning systems for use in all natural and human-created disasters. The intent is to have a standardized terminology and protocols applicable in all crises (Developing a Unified All-Hazard Warning System 2002).

Without doubt this is progress. But it should be noted that at least insofar as described in the newsletter just cited, there does not seem to be any overall strategic thinking behind the multiple activities and programs advocated as well as established. There seems to be no sense that some actions should have priority over others. Some possibilities that we consider very important are not even mentioned. Many of the actions described seemed more advocated rather than describing something that was really operative. Some of the problems in actual implementation are illustrated by Olson and his colleagues in their study of recent disasters in Ecuador, Peru and Bolivia during 1997-1998:

> The principle finding is that while the civil defense organizations
> in the respective countries were the nominal "national
> emergency organizations" . . . each was rapidly pushed to the
> sidelines ("marginalized") by one or more new but temporary
> governmental organizations charged with supposedly managing
> the response. The result was 1) confusion and duplication at the
> institutional level and 2) a serious loss of credibility and morale in
> each country's civil defense structure. This is hardly the
> combination one would seek for optimizing institutional readiness
> (Olson et al. 2000: 5).

Another study of the response to Hurricane Georges in the Dominican Republic and Hurricane Mitch in Honduras and Nicaragua also found that existing civil defense organizations in all three countries ended up being largely irrelevant in the response, and being replaced by a set of temporary ad hoc organizations (Olson et al 1999). The same marginalization occurred. Thus, having an organization in place does not mean that it will be allowed to act in the way that was planned, and indicates why all claims about progress should be looked at closely.

Apart from what is described in the newsletter, other general trends can be noted in many places around the world. There certainly has been a shift from a reactive to a proactive stance with regard to disaster planning and managing. At least in words, everyone appears to be emphasizing mitigation. Greater emphasis has been placed on risk managers in contrast to response managers. The notion of planning with rather than for citizens has become widespread.

A. New Strategies That Should be Used

Nevertheless, even given what we have just said about proposed and actual changes, we still think that from a strategic point of view some aspects need to be stressed considerably more, or at least be more explicitly noted. In addition, some features so far little noted ought to be given higher priority. We discuss six new strategies. The general strategic framework guiding the specific strategies we suggest is based on our fundamental assumption that disasters are inherently and for purposes of planning and managing, social phenomena. Therefore, we start out with the notion that the focus should be on disasters and not hazards.

1. The focus should be on disasters and not hazards

There should be a very explicit focus on disasters rather than hazards, with the implications of such an orientation being taken seriously. Our first suggestion may seem to involve a quibble about which of two words to use. But our view is that "what's in a name?", to paraphrase Shakespeare, actually makes important assumptions about the phenomena being labeled. Our position is that the word which is used indicates the strategic approach which should be used, and as such is a very crucial assumption and starting point. In our view, the prime focus should be on disasters, not hazards. It is no accident that UN Decade, after being initially labeled "for hazard reduction" was eventually changed to "for disaster reduction." Also, the very recently formed *Congress* Directorate holding it's first meeting in 2001 has entitled it the *1st World Congress on Disaster Reduction*. A focus on disasters calls attention to the social nature of such happenings; a focus on hazards tends to emphasize physical and natural phenomena. With rare exceptions very little can be done about the latter; much can be done about the former. What needs to be lessened, or at least reduced, are the negative social happenings which are called disasters.

A focus on hazards also often leads to treating disasters as *epiphenomena*. This is a philosophical notion. In terms of what we are discussing, this would be the idea that disasters are secondary to or a by product of other more important phenomena, in our context, this being hazards. Or put another way, in dictionary terms, a disaster is "a phenomenon which is a mere accompaniment of some effect, but can not itself be considered as either cause or effect" (Funk and Wagnalls College Standard Dictionary) because it is secondary to a hazard. In our view, this is a poor way of visualizing disasters.

In fact, the imagery of hazards as leading to disasters is a very misleading one. To be sure, a hazard may be involved. However, the hazard, to the extent that there is one (as we have already noted there is for example none in famines and many technological disasters) is only one factor at best, and not necessarily the most important one. Studies which show, for example, that earthquakes of roughly the same magnitude are accompanied by drastically different negative social effects (as illustrated by comparison of the Armenian and Loma Prieta earthquakes where the fatalities in the latter were but a tiny fraction of those in the former happening), are implicitly making the same point. A hazard might have been involved but it was not the most important element in the disasters that occurred.

This general point is consistent with the view of social science researchers that all disasters are primarily the results of human actions. Actually this view precedes those disciplines. Thus, A. C. Bradley nearly a hundred years ago wrote:

> No amount of calamity which merely befell a man, descending
> from the clouds like lightning, or stealing from the darkness like
> pestilence could alone provide the substance of [this] story . . .
> The calamities . . . do not simply happen, nor are they sent: they
> proceed mainly from actions, and those the actions of men
> (1906: 11 cited in Hewitt 1997: ii)

A disaster is not a physical happening. It is a social occasion. 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 their societies (interestingly this is always recognized in the case of technological disasters). For instance, floods, earthquakes, and other so-called "natural" disaster agents have social consequences *only* because of the activities of involved communities, before, during and after the impact of a disaster. Allowing high-density population concentrations in flood plains, having poor or unenforced earthquake building codes for structures, delaying allowing housing on 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. The character of past, present and future disastrous occasions stem from social

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factors (Quarantelli 1999c). That is the image that we should keep in the forefront of our thinking about disaster planning and managing.

In one sense, the recent shift in much of the literature from a focus on hazards to one on vulnerability is a step in the right direction. Mary Anderson in discussing the historical shift in how the understanding of vulnerability to disaster has shifted and enlarged notes the following. She indicates that "early disaster studies identified natural hazards as the cause of vulnerability" (1995: 43). From another perspective we can say that this was the early time period when disasters and hazards were more or less treated as the same phenomena. As a current example, Degg a geographer says "a natural disaster is the actual experiencing of loss due to the occurrence of a natural, but hazardous process" (1992: 199). The next stage according to Anderson is when there was a focus on "costs as cause: Economists assess how much vulnerability reduction is rational" (1995: 44). This again from a different perspective is when researchers recognized that losses could not be seen as simply being of an economic nature. For understanding there was a need to take other variables into account. According to Anderson the third stage is when there was recognition that disasters had differential impacts on peoples who live in hazard-prone areas. There was an attempt to account for how "loss of life, health and property varies widely among people who experience the same disaster and among people who experience disasters of the same size and scope at different times and in different parts of the world (1995: 45). The conclusion was that more than just hazard and exposure needed to be considered in any accurate assessment of vulnerability. From another perspective, this is saying that the different lifestyles of impacted populations, especially at the lower socioeconomic levels, made a difference in the negative effects that appear in disasters. In short, human beings are responsible for vulnerability.

In our view, this kind of thinking is on the right track. However, it does not take the final step which we think is necessary. Others also sometime hesitate to take this additional step. This is true in the following quotation which while it indicates the direction which we think should be taken in the second sentence, does not take the final step but regresses back to a limited vulnerability argument.

> Most flood-related literature analyzes floods as natural disasters.
> In contrast the social sciences consider floods as a social
> category. Neither concept is broad enough to encompass the
> vast complexity of the issue. Floods are actually a link between
> society and nature, in the same way that natural resources and
> environmental problems are (Sejenovich and Mendoza: 2000:
> 24)

In our view the next necessary step is to argue, as expressed for some time now by different disaster researchers and theorists that disasters stem from the very nature of social systems themselves. Disasters in this framework are overt manifestations of latent societal vulnerabilities, basically of weaknesses in social structures or social systems. The source or origins of disasters are in the very system in which they appear. They should not be seen as the result of an external force from outside impacting the social system. Likewise, the appearance of a disaster goes beyond the effects of a hazard on different lifestyles among victims. Rather a disaster is rooted in the weaknesses of a social system which manifest themselves depending on the dynamics of that system.

In considering disasters, one should start with the social systems involved instead of first looking at the victims, the current traditional approach. One of the advantages of such a stance is that forecasts about possible disasters can be made ahead of time. There is no need to wait for a disaster to happen, to see casualties and losses. One of the few who indirectly seems to recognize this is Albala-Bertrand (1993; 204) who observes that the effects of disasters are to be sought not in casualties and losses, but in how much the disaster reflects a damaging of ongoing social processes, that is, the pre-disaster structure and dynamics of the social system involved.

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In a parallel fashion, but looking at a lower social level and focusing more on risks rather than disasters, Perrow argues that accidents in nuclear plants which have the potential to become disasters are not the result of human errors by the builders or the operators of the plant, or because of mechanical errors or the plant design. Thus, with respect to the Three Mile Island disaster, he says that:

> The cause of the accident is to be found in the complexity of the system. That is, each of the failures–design, equipment, operators, procedures, environment–was trivial by itself . . . it is the *interaction* of the multiple failures that explains the accident (1984: 7)

Equally as important, he sees accidents as normal in the organizations that run nuclear power plants, space missions, nuclear weapons systems, recombinant DNA production, ships carrying highly toxic or explosive cargoes, genetic engineering, chemical plants, or any other high-risk technology because:

> If interactive complexity and tight coupling–system characteristics–inevitably will produce an accident, I believe we are justified in calling it a *normal accident* or a *system accident*. The odd term *normal accident* is meant to signal that given the system characteristics, multiple and unexpected interactions of failures are inevitable . . . System accidents are uncommon, even rare; yet this is not all that reassuring, if they can produce catastrophes (1984: 5)

Our own view is that disasters similarly latently exist in the larger social systems, and are the result of a convergence of a variety of social factors, none of whom might be very important in themselves.

To emphasize disasters is to put the focus on the social nature of the phenomena. Disasters are when all is said and done, social happenings. Their origins, their manifestations, and their consequences are all basically social. In fact, disasters can occur independent of the impact of any physical hazards. They can occur just from rumors of a possible threat or a possible but never a realized threat. For example, in late 1999:

> For months scientists have been predicting devastating volcanic eruptions in Ecuador–prompting a series of evacuations and school closings that have disrupted life for hundreds of thousands of families here in the capital and in other parts of the country . . . while there have been some relatively minor eruptions, no cataclysmic events has yet taken place . . . predictions of an imminent eruption . . . have prompted officials to close 600 public land private schools in and around the city three times over the last two months, each time for several days, putting 320 000 students behind in classes . . . [In] the latest episode, officials said schools and the capital's airport would close for at least six days . . . The forced evacuation was an economic disaster for Banos, which makes much of its income from tourism (Ecuadoreans 1999: 15).

Also, some disasters, such as famines and many computer system breakdowns have no identifiable, originating agent. More generally, disasters cannot be identified in terms of any geophysical, hydrological or atmospheric aspect. An earthquake is simply a physical happening, a movement of land. According to one report, there are more than 3,000 such perceptible happenings every year, but only 7-11 of them involves significant loss of life (Guidelines 1994:

32). If there are no negative social consequences, there is no disaster. We see disasters only in the unwanted behaviors of persons and groups. As Albala-Bertrand (1993: 10) observes, it may be a truism but without people there can be no disaster.

Focusing on disasters does not mean that it is not worthwhile studying hazards. It should go without saying that there are many good theoretical and practical reasons for such research. But much of what goes under "disaster" research, planning, policy or even thinking, is really hazards research, planning, policy or thinking. As an example, studies of earthquakes are worthwhile. But the large bulk of it should not be confused with research on disasters that are associated with earthquakes. Sometimes even a conference or workshop which is labeled as one on disasters when looked at in detail, will show that it is really about hazards. In essence, such a focus misses the essentially social nature of disasters.

Also, there are certain very important questions and issues which are purely social in nature and have no relationship to any kind of hazard. For example, the cooperation and cooperative interaction of multiple groups or organizations is not only important but crucial for decision making, the setting of policies, the carrying out of programs, and the implementation of specific measures in all phases of the planning and managing cycle, that is, in mitigation, preparedness, response and recovery. The study and understanding of such key interorganizational relationships require a social science approach and a basic assumption that disasters are fundamentally social phenomena.

It should be noted that the idea of stressing "disasters" rather than "hazards" is also spreading among emergency and disaster managers themselves. An Australian official from the State Emergency Recovery Unit in Victoria has written:

> Governments, disaster management agencies and the community are increasingly accepting that the proper focus of disaster management is not the hazard agent in itself . . . but rather the community and the consequences for individuals, groups and communities. Successful application of this approach requires a better understanding of the resilience and vulnerabilities of various levels of human systems and social activity (Buckle 2001; see also Buckle, Marsh and Smale 2002; Gabriel 2002 and Buckle 2003).

Said in different words but saying somewhat the same thing is a statement from a British writer:

> There appears to be a very significant resistance to the analysis of socio-economic factors in disasters, and their socio-economic causes. Instead the scientific and policy emphasis, measured by spending, is on the "natural" causes of disasters . . . Why is there such reluctance to examine socio-economic causes of disasters, and to understand them in relation to "normal" everyday life? (Cannon 2001).

Increasingly, as a writer from New Zealand very recently noted, more and more the emphasis has come to be on "management" rather than "emergency" (Britton 2001:1). From our perspective, this means there has to be more attention paid to disasters than hazards.

There are also other positive effects from focusing on disasters rather than hazards. There are certain implications in moving to primarily focusing on disasters. In particular, such a focus calls for much more effort to standardize terms and concepts, to improve the statistics involved, and to distinguish between disasters and catastrophes and even worst. These are three goals associated with this that ought to be made explicit, pushed and implemented.

a. Standardization of terms and concepts.

As we discuss elsewhere (Quarantelli, 2001a) there needs to be much greater consensus on the various terms and labels in the disaster area. A few initiatives along this line can be noted. This has been attempted before in the medical area and recently, as an example, by the Regional Disaster Information Center (CRID) in San Jose, Costa Rica. The latter have created a thesaurus of standardized descriptors used in the documentation database of the Center (CRID 2000:4). Also, the Centre for Research on the Epidemiology of Disasters (CRED) has and is making major efforts to improve the data they obtain and process, and especially for the database it has on over 12,000 disasters that have occurred in the world since 1900. This has led to attempts to standardize terms so statistical compilations are not putting incompatible phenomena together. But this is just a start.

Very high priority ought to be given to the standardization of terms and concepts. We say this not with the notion that sooner or later, complete consensus will be reached on all important terms. Even in scientific research, at any given time, there seldom is full agreement on basic concepts of the field. However, it is not good to have multiple and inconsistent usages of many key terms, the current situation in the disaster areas (Mitchell 2000). But such drastic variants can be markedly reduced. In many fields of study, through conferences and meetings, and the leadership of important organizations, relative consensus has been reached on the definition of key terms and concepts. In particular, fields operating at the international level have often been forced to get agreements, so that there can be communication across national lines. For example, while there continues to be local variants, how chronological time is defined and measured, where the day starts and stops, etc. are a matter of international agreement, of social consensus. Similarly, we think there should be very conscious efforts to move systematically to bring some standardization to the key concepts in the disaster area, including the very term "disaster" itself. Otherwise, the present Tower of Babel will continue with people and groups continuing to talk past one another.

b. Improving disaster statistics.

As also discussed elsewhere (Quarantelli 2001a) In our view, very high priority also ought to be given to trying to improve disaster statistics, as over those that document the existence of hazards. Significant time, effort and resources ought to be spent on improving the statistical databases for deaths, injuries, property damages, social disruption, and other figures. What actually are the negative consequences of disasters?

To the extent that the statistics cannot be improved, far more caution and care should be exercised when any figures of any kind are advanced. At the very least, unless the quantitative data are from an absolutely certain source, rounding out figures to perhaps the fourth digit makes much more sense. That would be much better rather than coming up with absurdly precise figures such that 3,464,662 persons were directly affected by Hurricane Mitch or that 466,421 were housed in shelters when the margin of error in that case might be if magnitudes of two or more. Why imply precision when it is known that preciseness is all but impossible even in developed countries?

It is important that international agencies and organizations make clear that they expect manifest improvements in the statistics that are given to them. Validity rather than preciseness should be stressed. However, apart from indicating that relief and reconstruction groups would be very skeptical of very precise figures, guidance and training should be provided to officials and groups from developing countries on how to improve their quantitative data gathering. Doing this would be considerably helped by getting consensus on standardization of terms and concepts as noted above.

c. Distinguishing disasters and catastrophes.

Major disruptions of community life are not all of the same magnitude and consequences. It is fairly well accepted now that a disaster is more than an everyday emergency. Among the differences, especially among organizations, are the following as noted in Quarantelli (1998a: 5-8).

During community disasters, involved organizations have to quickly relate to more and unfamiliar groups. For example, a research team in the study of a massive fire near Nanticoke, Canada, identified 346 organizations that were on the site, that is, being at the scene of the fire, inside the evacuation perimeter or having to pas through a police check point to get involved (Scanlon 1992: 9). Even in an incident that was not a community disaster, but an air plane crash in Detroit, **DRC** found 241 organizations responding, including 59 different fire departments, with 69 different agencies having representatives at the Emergency Operations Center. Everyday emergencies do not bring about such a massive convergence of groups.

In disasters organizations have to adjust to losing part of their autonomy and freedom of action. Since community and crisis time needs and values take precedence over everyday ones, all individuals and organizations may be monitored and ordered about by social entities that many not even exist in routine times. Such organizations may even be from outside the local community as in the instance of some nuclear and chemical hazards where federal entities have the legal authority in the United States to take charge. Or even at the local level, some community organization can be authorized to make crisis-times decisions such as destroying private property to save lives in search and rescue efforts, or building levies or firebreaks to cope with the immediate emergency (which normally could not be done during routine times). Everyday emergencies do not involve such loss of organizational autonomy.

Performance standards or norms for organizations often change drastically during disasters. What is appropriate during periods of normalcy or minor emergencies typically becomes less relevant during the managing of a major community crisis. There frequently is a deliberate slow down in organizational activities which do not occur in everyday emergencies.

A minor emergency, is often managed by an organization (public or private) having responsibility or authority to effectuate an emergency response, or is managed by local organizations such as the police and/or fire departments. Seldom is there a crossing of boundaries between the public and private sectors. In a disaster, there often is the need for the mobilization of public or community resources which usually mean a preempting of some private rights by community rights.

There is widespread recognition both in the research literature and among disaster managers that disasters are different from everyday emergencies. However, there is less knowledge that there are occasions that might be better labeled *catastrophes* rather than disasters. Why is such a distinction important and what might be the major differentiating criteria that can be used?

In a catastrophe, compared to a disaster, most all of the community is heavily impacted. In a **DRC** field study, it was found that Hurricane Hugo destroyed or heavily damaged over 90 percent of all homes in St. Croix in the U.S. Virgin Islands. This made it impossible, for instance, for displaced victims or survivors to seek shelter with nearby relatives and friends, as they typically do in disaster situations. In contrast, the Mexico City earthquake of 1985, at worst there was a loss of less than two percent of the residential housing stock, with only 4.9 percent of the population in a survey conducted by **DRC** reporting that there was great damage to the building in which they lived. Those displaced primarily went to relatives.

In a catastrophe, the facilities and operational bases of a great many emergency or crisis type organizations are themselves usually directly hit. In some recent catastrophes in developing countries, practically all of the local medical or police personnel in some towns were fatalities. The resulting general inability to provide usual services happens, if at all, only on a very small scale in major disasters, and if it does, endures only for relatively short period of times. Another

consequence is that since much outside help is needed, the usual local-outsiders organizational friction that only occasionally arises in disasters can become a major problem in a catastrophe.

Even in major disasters, there is no massive across-the board disruption of community life. Particular neighborhoods may be devastated as happened in the Mexico City earthquake, but with life in many contiguous areas going on almost normally. Similarly this was true of the Northridge, Los Angles earthquake of 1994. For instance, 12,000 people went as usual to the horse racing track in the area the afternoon of the earthquake. In a catastrophe, most if not all places of work, recreation, worship and education such as schools totally shut down and the lifeline infrastructure is so badly disrupted that there will be stoppages or extensive shortages of electricity, water, mail or phone services as well as other means of communication and transportation.

Finally, in a catastrophe often help from nearby communities cannot be provided because in such occasions nearby localities will also be similarly stricken, as frequently can be seen in the typhoons that hit southwestern Asia such as in the Phillippines, and as occurred in areas around Chernobyl after the accident to the nuclear plant there. In short, catastrophes tend to affect multiple communities, and often have a regional character. In a catastrophe not only can nearby communities not contribute to the convergence flow that is typically of disasters, but they themselves often become competing sources for an eventual unequal inflow of goods, personnel, supplies and communication.

What is important is not that disasters can be differentiated from catastrophes. Rather what is crucial is that catastrophes partially require different kinds of planning and managing than typically can be used in major disasters. This is true whether the focus is on the planning for mitigation, preparedness, crisis management response, and/or recovery measures. We have noted the possible problems in sheltering victims/survivors or mobilizing local organizations in catastrophes. Many more differences can be surfaced and found by looking at the local community planning and asking what does it assumes as being in place after impact (Dynes 1994).

It is not unimportant that often catastrophes in developing countries affect very large numbers of people. It will forever remain unknown whether or not Hurricane Mitch directly affected 24.2 percent of the population in Honduras or 19.5 percent in Nicaragua (Reconstruction 1999: 13), but clearly huge numbers and a large percentage of the population was impacted in some way or other. The recent floods in Mozambique supposedly affected 27 percent of the country's population (Swarns 2000: 9). Perhaps how much in relative terms certain developing societies are impacted compared to developed societies may be illustrated by noting that the Federal Emergency Management Agency in a report said that from 1993 through 1998, over one million, four hundred thousand Americans were impacted by Presidentially declared disasters, and that additionally "hundreds of thousands of people" were impacted by events that were managed entirely at state or local levels (Report 1997: 1). But if these statistics are taken seriously, it indicates that over a six-year period, that only around a half a percent of the American population (assuming a population of 265 million) was affected. While the number of affected alone should not be used to characterize certain occasions as disasters or catastrophes, but at some point large absolute and relative numbers are going to disrupt community and in some cases societal life.

It also seems that economic loss also is a differentiating factor between what sometimes happens in developing and developed countries. For example, Berke reports that:

> the economic costs of disasters in poor countries often exceed 3
> percent to 4 percent of the gross national product . . . In . . .
> economically vulnerable East African countries, including
> Ethiopia, Mozambique, Sudan, Tanazania, and Uganda, the
> costs exceeded over 20 percent of GNP at various times during

the 1980s . . . In contrast, the $24 billion loss from the 1992
Hurricane Andrew disaster in South Florida, which was at the
time the costliest disaster in the history of the United States,
represent an almost undetectable proportion of the country's 6
trillion economy (1995: 372).

Others have noted that the Managua earthquake of 1972 resulted in five billion dollars of
damage, which was about 40 percent of Nicaragua's GNP, while the Loma Prieta earthquake
which resulted in eight billion dollars of damage, was only 0.2 percent of the GNP of the United
States (Hohn 1995: 573).   However one looks at these figures, and they are but one
measurement, they do suggest that there are "disasters" and that there are "catastrophes."

The notion of establishing only *one* definition of disasters or subtypes has no relation to kind of
social reality, but that does not mean that considerable improvement in conceptual clarity could
not be attained. There is no good reason why relative consensus could not be reached on
whether or not to include technological with natural disasters, whether or not **FEDS** (that is,
famines, droughts and epidemics as discussed in Quarantelli, 2001) should be classified or not
classified as disasters, and especially on wherein what categories should conflict situations be
categorized. Leadership on this goal by an established organization with world wide connections
would help considerably, as will be discussed later.

Finally, we want to call attention to something that is even over and above a catastrophe as we
have defined the term. One of the better statements on this possibility has been set forth by
McGuire:

> Geologically speaking, modern society has developed during
> remarkably quiet times. The Earth's 4.6 billion-year history has
> been punctuated by catastrophic events capable of global
> impact, but none during the last two millennia. Despite the
> millions of people affected annually by natural hazards, we still
> await the first natural megadisaster; a global natural catastrophe
> taking in excess of a million lives and causing serious disruption
> to the social and economic fabric of our civilisation.

He then goes on to say:

> Three events have the capability to cause major destruction that
> can affect the entire planet or a substantial part thereof. Two of
> these are terrestrial, a volcanic supereruption and a giant
> tsunami formed by the collapse of an oceanic island the third, an
> asteroid or comet impact, has its origin beyond our planet's
> atmosphere (2000b: 2)

From the perspective of our report, what is of interest are that developing countries are more at
risk from the first two possibilities which are talked about by McGuire (see also 2000a). This is
because the tsunami threat and the super-eruption threat are much more likely to be generated
from potentially dangerous sites in developing countries. As to the third threat, because
developing countries occupy by far more of the earth's surface than do developed systems, they
are statistically more likely to be potential targets.

At the very least some attention ought to be given to these possibilities. Clearly they will demand
planning and managing far beyond what would be needed for the typical disaster or even worst
kind of catastrophe. It is about time that serious considerations be given to the probability sooner
or later of a megadisaster, to use McGuire's term.

Our general suggestion of clearly distinguishing disasters and catastrophes will not be easy to implement. There will be resistance from groups that want to continue to use their own terms or concepts, which actually may make sense given organizational goals and operations. There can also be very honest disagreement on what should or should not be defined as disasters, etc. Objections might be voiced to spending money time and effort on improving statistical data gathering, when persons are dying and suffering. But short term humanitarian concerns should not be allowed to prevent more efficient and effective planning and managing of disasters. At another level, change is always difficult when persons and groups have gotten used to doing anything in a traditional way, a major problem in the next issue we discuss.

2. No distinction should be made between natural and technological disasters.

The argument here is that we all should take a generic approach to disasters rather than an agent specific one or a category specific one. To some extent this view with respect to natural disasters has increasingly spread. For example, Herath and Katayama summarizing the discussions at a recent international conference on natural disaster reduction held in Japan note that:

> It is remarkable to learn that the core issues in risk management
> for natural disasters are similar for all disasters. Value of
> planning and preparedness for floods or earthquakes, for
> volcanic eruptions of typhoons, is very similar. Involvement of
> people at risk in developing strategies for disaster mitigation is
> crucial (1994: 1)

This is a step forward, but real progress will be made when everyone accepts the value of ignoring the supposed differences between natural and technological disasters. This was discussed extensively in our earlier report (Quarantelli 1992: 97-105) so we will not repeat those details, but merely repeat one quotation in it drawn from Tierney:

> Regardless of the characteristics of a particular disaster agent
> and the specific demands generated by it, the same kinds of
> community response-related task are necessary in both kinds of
> disaster and for all disaster phases. In any community, for
> example, the assessment of hazards and the aggregation of
> disaster-relevant resources are necessary, regardless of the
> specific hazards and resources in question. Similarly, post-
> impact communication and decision making procedures must be
> planned for and activated in *any* community crisis.

Then she goes on to note:

> To draw an analogy, a battle on land is fought with different
> weapons, materiel, personnel and support systems than those
> used in sea battles, but, nevertheless, the general overall battle
> requirements are the same for both. In both cases . . .
> intelligence about enemy strength and movements must be
> gathered, resources must be collected, trained personnel must
> be led effectively, and so on. The same is true for disaster
> planning: although disaster agents and the human and material
> resources need to respond to them may vary, the same generic
> kinds of activities must be performed in the pre-disaster,
> pre-impact, response, and recovery periods, regardless of the
> specific threat (Tierney 1980: 18-19)

Later disaster theorists continue to argue that in a fundamental sense *all* disasters can be primarily attributed to human and group actions and decisions, and that there is no distinction

between "natural" and "technological" disasters per se that is particularly significant for general planning or managing purposes. See, for example, Wijkman and Timberlake 1984; Quarantelli 1987, 1991b; Bolin 1988; Smith, North and Price 1988; Stallings1988; Mitchell 1990; and Rochford and Blocker 1991. In an even more recent statement Quarantelli notes that the other eleven authors in his edited volume from six different countries and from six different social science disciplines seem to proceed from the fact that:

> Very extensive empirical studies, theoretical ideas, and logical
> analyses have been used to challenge the supposed difference .
> . . That most scholars in the area have taken them into account
> seems to be illustrated by the fact that the great majority of
> authors in this volume do not allude to or attempt to make such a
> differentiation. It is also not insignificant that the distinction has
> been increasingly abandoned in much emergency management
> operations around the world . . . (Quarantelli 1998c: 248).

However, for a contrasting viewpoint see Kroll-Smith and Couch (1991), Baum and Fleming (1993), Freudenburg (1997), Gill and Picou (1998), Picou and Gill (1999) and Picou (2000) who seem to think that technological disasters are unique in that they result in long-term social impacts not seen in natural disasters. And the distinction still continues to appear when conferences are listed as dealing with "natural" or "technological" disasters. For instance, in February 2001 in Washington, D.C. there was a meeting involving the 15 major federal agencies concerned with U.S. disasters under the title of "Forum on Risk Management and Assessments of Natural Hazards," although it must be admitted that in discussions the implicit distinction was ignored.

Still another objection to making a natural/technological distinction is that there are disasters where no agent is clearly identifiable. Famines are the best example of this. Also, for the newer types of disasters the world is facing, such as computer system breakdowns, the source of the problem can be natural, technical or social. That is, computer systems can be brought down by earthquakes, by power outages as well as by hackers (Taylor 2003).

Again, our point here is not contending points of view held by different disaster researchers. Such differences may matter significantly to what is studied in research efforts. But for our purposes in this report, what is important, are the implications for programs and policies of _not_ drawing a distinction. Simply put, if natural and technological disasters do not differ significantly, it means that what is learned in one disaster (to the extent that they could be labeled natural or technological), can be extrapolated to all other disasters. On the other hand, if there are significant differences, that would require not only a differentiation in research, but presumably there would also be some differences in the required disaster planning and managing. However, as we have explicitly indicated, we do not think there is any meaningful distinction, and that such a dual classification should be dropped in the future.

We do think it is hopeful that increasingly in research, theory and practice, there is less and less of an attempt to characterize natural and technological disasters as involving two somewhat different phenomena (for the viewpoint of emergency managers see Bokman 2003). In fact, some involved in the disaster area have accepted that both should be seen as more or less the same phenomena, but there is still the troubling question of whether or not crises should also be viewed as part of an "all-hazard" approach (e.g. Taylor 2003). This has recently and particularly come to the fore as researchers and others (Peek and Sutton 2003) have struggled on how to categorize the 9/11 terrorist attack on the World Trade Center and what implications this has for planning and managing crises (for example see Bokman 2003).

3. There should be a drawing of relevant implications of the globalization process.

The term "globalization" is widely used. There is an ever growing literature on the topic (see Riain and Evans 2000; Therborn 2000; Albala-Bertrand 2002; Kick and Jorgenson 2003; Lechner and Boli 2003; Schirato and Webb 2003). This ranges from partisan polemic attacks on what the term supposedly designates (e.g., Moore 2000) to balanced attempts to assess the value of the concept for descriptive and analytical purposes (e.g., as set forth in Short and Kim 1999 as discussed below). As a Swedish social scientist notes:

> Today few doubt the reality of globalization, yet no one seems to
> know with any certainty what makes globalization real. So while
> there is no agreement about *what* globalization *is*, the entire
> discourse *on* globalization is founded on a quite solid agreement
> *that* globalization *is* (Bartelson 2000: 180).

However, in our view a *rather good formulation is advanced* by Short and Kim. They note that the process involves three analytically separable but related aspects, namely economic globalization, cultural globalization and political globalization (1999: 3-4).

The first concept tries to indicate:

> that the world economy has been globalized through the
> formulation of global production, global markets and . . . global
> finance. The transnational of multinational firms have given rise
> to a new international division of labor, shifting manufacturing
> from developed to developing economies. The worldwide
> production of multinational firms has also led to the explosive
> growth of producer services including financial, legal,
> consultancy, accountant and advertising firms . . . globalization is
> most developed in the sphere of finance, creating ever-freer
> flows of capital on a global scale.

Short and Kim also observes that there has been cultural globalization:

> The increasing movements of people, goods, capital, and
> information have globalized the world. Culture, including
> ethnicity, language and religion has traditionally been associated
> with certain places . . . [but] as global cultural flows have
> increased . . . it has become difficult to find purely territorialized
> cultural forms . . . Although Americanization, homogenization
> and commodification are very useful concepts to understand
> cultural trends in the contemporary world, they highlight only
> certain aspects of cultural globalization . . . The growth of cultural
> flows has increased sameness between distant places; but it has
> also fostered the complexity of local cultures. The culturally
> globalizing world is a complex process of the creation of
> deterritorialized culture which are reterritorialized in different
> forms in different places (1999: 4)

Later, these same authors (1999:111) note that political globalization has come to mean in the literature a series of interrelated processes. These include reduced intervention of the state in the lives of citizens, the globalization of political issues (e.g., over NAFTA), a marked increase in the number of international organizations and collectivities, the formation of regional power blocs, the worldwide spread of at least a nominal democratic ideology, and an increase in migration which has eroded nation state control over their borders and has complicated the notion of citizenship (see also Waters 1995).

In their view political globalization has:

> Decreased the power and effectiveness of policy instruments
> used by the state to control activities within and across its
> boundaries . . . Individual states are no longer the only
> appropriate political unit for either resolving key policy problems
> or managing a broad range of public functions . . . The
> proliferation of quasi-supranational, intergovernmental and
> transnational forces is a very important sign of both the decrease
> of state power and the increase of international
> cooperation(Short and Kim 1999: 111).

Now it takes little imagination to see that there are very important implications for disaster planning and managing if the three conceptions of globalization above have any validity. For example, if key economic decisions about developing countries are made in developed societies, if national mass communication systems increasingly reflect selective aspects of a more global popular culture, and if national states are more and more less important than international and transnational organizations, then traditional disaster planning and managing which has generally assumed the central role of a national state in primarily influencing on what goes on within its territory, has to be reexamined.

It has been said that transnational corporations (see Hedley 1999) are the single most important actors in the world economy (Carnoy 1993: Dicken 1999) and produce between a fifth and a quarter of the total world production in the world market economies (Short and Kim 1999: 25). If so, what are the implications for national disaster planning and managing which have traditionally assumed that the nation state is the key player in influencing whatever is done within its national boundaries? If the product of transnational corporations is part of what has to be protected against disasters, what roles can, do and should such organizations play in the process?

Related to this is the matter of urban areas being influenced by factors far distant from them. Our purpose here is not to exemplify everything, but to be much more selective. What are some of the implications for disaster planning and managing as well as for policy setting and operational procedures in urban areas? We can note these by discussing "megacities" and "world cities," two concepts that have spread widely in the urban research literature (for the former see Mitchell 1999).

There are several problems with the use of the concept of megacities. As many students of urban life have noted:

> There is . . . a fundamental need to give far more attention to the
> basic concept of "mega-city." Rather than size alone . . . a more
> comprehensive set of criteria based on such variables as size,
> financial resources, industrial/commercial structure, political role,
> educational facilities and scientific personnel, service functions,
> and the position in the world system should be considered for
> classifying selected cities as "mega-cities. (Fuchs et al. 1994: 3)

Again the issue for our purposes in this report is not the matter of conceptual debate. The issue instead is that conceptual clarification can bring to the surface aspects that might not otherwise be seen.

For example, recently there has been discussion in the literature about the concept of "world cities"
Short and Kim 1999: 53-72; Soja 2000:219-221). What has happened according to Lo and Yeung is that:
> In the last two decades of the twentieth century, it has become
> more evident that the process of globalization has become part

of our daily lives . . . The world economy has changed in
fundamental ways . . . A new international division of labour, with
an accent on globally integrated production and the transnational
corporation, has dawned. The multinational corporation . . . has
now become common in every corner of the world. Global
factories, global manufacturing production, and global financial
networks and producer services have given new substance to
global dimensions of economic production processes and the
way in which countries and cities can contribute to them.
Indeed, world cities . . . have spawned a spate of provocative
and original studies . . . (1996: 1)

They go on to say that:

A central thesis of this study is the new concept of the *functional
city system*. A functional city system is a network of cities that
are linked, often in a hierarchical manner based on a given
economic or socio-political function at the global or regional level
. . . (1996:2)

Basically the argument is that the collection of different functional networks of a city serves to
define that city's external linkages with the world economy and it status within the world city
system. Some cities can no longer be defined by the size of their populations. Rather, they have
to be defined by the operation of their externally linked functions. In short, some megacities are
now also world cities with their functioning depending on their links to other cities not in the same
national state and far distant from them in other countries.

The aspects that distinguish this new city system is that what used to sustain the growth of cities
were their special advantages with respect to available raw materials, location, or transportation,
all derived form their spatial relations to an immediate hinterland. In contrast, in the newer
functional city system, it is the functions of a city that mostly determines its role and national,
regional and global importance. Through the globalization process, production, capital markets,
telecommunication systems, airlines and tourism links, networks of transnational corporations,
flows of new technologies, investments and labor forces, etc. are interwoven and superimposed
one over another on major cities across the countries at the world regional level. Thus, size is
much less important in this framework. Yeung and Lo, for example note that while the population
of Calcutta is larger than Singapore and Bangkok, the latter two are world cities while Calcutta is
not (1996: 17).

If this analysis is accepted, it raises fundamental questions of how one can undertake disaster
planning and managing for world cities. How does one deal with factors that are distant from the
immediate community? At the very least, it should be obvious that megacities cannot be seen as
just being of very large size, since in this framework that is relatively unimportant. It is of interest
that what can be seen here is somewhat parallel to our earlier observation that disaster impacts
are increasingly going across national boundaries and impacting far from their original source. At
the very least, anyone interested in disaster planning and managing in developing societies will
have to start taking into account the globalization of economic systems which essentially lead to a
borderless but global economic system whose key components are world cities some of which
are in developing societies.

Nevertheless, while a focus on megacities is understandable (Megacities 1995 Seabrook 1996;
Gilbert 1997; Wisner 2002), perhaps there is an overemphasis on them. There are many urban
dwellers living in localities that are not that huge or large. One U.N. study estimated that in the
year 2000 only 19.9 percent of the urban population lived in large cities, defined as having four
million or more population. In less developed regions, the figure was 23.2 percent. In terms of
different continents the respective statistics for Africa was 19.8 percent, for Latin America 28.1

percent and for East Asia 19.1 percent, and for South Asia 25.1 percent (cited in Oberai 1993: table on page 22). Interesting in this respect is a perhaps now outdated report about China which noted that 11,103 small towns constituted 47.92 percent of the total urban population in 1987 (Oberai 1993: 47)

Too often the definition of urban involves the person living within formal city boundaries. Thus, one 1998 report states that it is a myth that half of the world now lives in cities (World Disasters Report 1998). However, this may be true only if formal boundaries of cities are considered as the defining characteristic of "urban." This is not the way most social scientists would view the matter. An urban way of life is not necessarily limited to those living within such boundaries. As Laquian notes:

> With rapid urbanization, the spread of . . . social processes tends
> to jump the physical boundaries of the city proper and extend to
> formerly rural hinterlands. The technological revolution in
> information and communication in recent years has accelerated
> the spread of urbanism. In other words, since a persons
> nowadays does not have to physically live within a statistically
> defined urban area to become "urban," quite a number of people
> have now moved to "rural" areas although they continue to enjoy
> all the benefits of urbanism (1994: 196).

If this point of view is accepted, it seems relatively clear that the majority of the world's population became urbanites long before a usually accepted date of around the start of the 21st Century. So what? While being factually correct is worthwhile in itself, more important is that if an urban way of life has been dominant for at least two decades, than the current social transition to large cities may not be that significant. Some aspects of these situations which are currently thought of as unique or distinctive may not be the case. It also raises questions about whether the size of the population per se may be that important a factor. Now to be certain, the larger the city, the greater the possible disaster at least insofar as the number of residents is concerned. But accepting the just cited figures, there are tens if not hundreds of millions of people living in urban localities but not in megacities.

Overall, what is implied in this part of the discussion is that there is a need to take into account certain aspects of the globalization. In particular, what does it suggest about community disaster planning and managing, when as in world cities, their very functioning is dependent on far distant locations and organizations? Also, should not an urban way of life be used as a more important distinguishing feature than population size within certain formal boundaries? We think it is probably more important for planning and managing purposes, if the target population for such processes shares a common lifestyle, rather than that some of the residents may be within and others outside of arbitrary jurisdictional boundaries.

4. There is a need to take into account selective but significant aspects of the larger social context.

We want to discuss the larger social context within which disasters occur. The importance of this was strongly called to our attention by at that time Soviet social scientists that were studying disasters. They noted that the response to any disaster in the Soviet Union and later in Russia necessarily was strongly affected by the other existing problems in the society. Thus, any approach to disasters had to take into account the large social framework in which they occurred (Porfiriev 1998). Now it will be impossible to discuss all factors that might be involved. We have singled out four of them that would seem to be most relevant in the sense that they would clearly seem to affect what can or cannot be done in disaster planning and managing. In no particular order of importance, they are:

a. Ethnic conflict.

There is no need to document that current world is torn with ethnic conflicts, the great majority of them in developing countries. To the extent that conflicts are not thought of as disasters from a conceptual viewpoint (a position held by most self designated disaster researchers; for discussion of the issue see Quarantelli 1998c), they are nonetheless phenomena present in many developing societies. By almost any criteria that would be used, they make considerably more complex, any efforts at disaster planning and managing (for what effects relief responses in such complex emergencies, see Olsen, Carstensen and Heyen 2003). To be sure, not all ethnic conflicts take place in urban areas. But since cities are usually the recipients of rural migrants, there is often a spill over of the conflicts into urban localities even when they are not the major locales in which terrorist groups, guerillas, and/or formal armed forces wage their conflicts.

From the viewpoint of this report, the most important thing to note is that any realistic disaster planning and managing cannot pretend that such conflicts do not exist. However, even a superficial perusal of disaster plans from urban areas in developing countries quickly shows that the issue is almost never addressed in such formal documents. Nevertheless, the problem is not totally unrecognized. Conversations with disaster planners and emergency managers in some cities in developing countries will elicit comments that clearly indicate an explicit conscious recognition that there is a serious problem with respect to how the conflicts will affect any planning and managing of disasters. Such implicit recognition of the problem ought to be made more explicit.

Few analysts have explicitly addressed the differences between conflict situations and disasters or the coexistence of the two. Albala-Bertrand (2000) does attempt to draw an analytical distinction between the two. He observes that in complex emergencies involving conflicting parties most of the impacts and effects have deliberate institutional aims and overtones. In contrast, in natural disasters, most of the impacts are incidental and not normally widespread. This is but a start on the question, directly addressing an important matter, but it will have to be seen if this is the most useful way to approach the problem.

Perhaps it is not amiss to note that sometimes, not always, but sometimes major disasters can lead to a temporary cessation of open conflicts among contending groups. An examination of where this occurs might provide clues about what could be used to institutionalize temporary truces. With imagination it is even possible to foresee a few scenarios where a temporary suspension of conflict might be used as a lever for moving toward a more permanent solution.

Any step in disaster planning and managing which explicitly recognizes the problem of ethnic conflicts, is a step in the right direction. We recognize that such conflicts are inherently political, with all the complications that imply. However, as we will note later there needs to be a far more realistic recognition that political aspects permeate all aspects of disasters, from mitigation through preparedness to response and recovery.

   b. AIDS and other epidemics.

An ever increasing social context that will affect how urban disasters can be handled in developing countries is the serious health problems that plague many of them. Some of them are not new, such as malaria. But it is a new health problem that is more important.

The United Nations has characterized the AIDS epidemic as the worst infectious disease catastrophe since the bubonic plague (World Report 2000: 53). As noted earlier, if the figures about its existence are even remotely taken as face value (even granting such statistics are as dubious as others), the supposedly negative effects of the AIDS epidemic are awesome. For example, during the last decade, the life expectancy in nine African countries has fallen by more than 17 years, because of AIDS. In some societies, such as South Africa, about 20 percent of the population is HIV-positive. Projections for the future are even worse. Thus, it is estimated that 42 million African children will lose one of both parents to AIDS by the year 2010. In addition, the

gross domestic product in many countries is expected to decline by much as 20 percent. (Nelson 2000: Wade 2000). To be sure the figures cited above are about sub Saharan African societies, but the problem at some levels exists everywhere. "Since the pandemic began, 50 million people worldwide have been infected with HIV, of whom over 16 million have died" (World Report 2000: 55). Some developing countries have high absolute numbers. In India, for example, the World Health Organization estimated that about three and half million Indians were infected with HIV/AIDS (World Report 2000: 12). For a more general depiction of the AIDS problem world wide see the article in Newsweek, The Deadly Progress of a Plague, 2001. Finally, a most recent projection indicates that within a decade the greatest number of AIDS cases will be found in China, Ethiopia, India, Nigeria and Russia (U.S. Study Predicts Major AIDS Breakout 2002).

Apart from its effects on the general population, AIDS can also selectively affect key organizations in a society. Thus, recently it has been observed that this health problem is having major effects on armies in Africa with increasing proportions of the military becoming afflicted with AIDS (Cauvin 2002). Given that the military is often the only viable nation wide social institution the implications of this are very disturbing.

For a variety of reasons, it is difficult for most governments to acknowledge that AIDS is a public health problem in their societies, although a few countries have been exceptions to this unwillingness to publicly address the issue. However, to the extent that AIDS exists, it is likely to affect younger persons in urban areas, that is, the most likely productive workers. One report in 2002 noted that the Aids scourge in rural China was leaving villages full of orphans (Rosthenhal 2002). The massive loss of such persons could result in a **FED** like occasion and perhaps ever create a societal crisis. But even assuming that such a worst case scenario does not occur, the existence of an AIDS plagued population does create problems for the planning and managing of more typical disasters. It does this in a variety of which of which we will only mention two. To the extent that the AIDS problem is directly addressed, it takes resources away from disaster problems, given that many developing societies have very limited resources to start with. Also, given a fairly obvious and certain and personal problem, the choice for most people is to address that rather than to be concerned about an uncertain and low probability events such as natural and technological disasters.

The best way to deal with AIDS vis-a-vis disasters is not obvious. There does not appear to be much merit to try to get the problem to be seen as similar to other crisis situations such as disasters. A few of the means useful for dealing with disasters might be equally valuable for attempting to cope with AIDS. But in general, most community disaster measures from mitigation planning to recovery managing would not seem equally applicable. Our general impression is that to focus on AIDS as a public health problem and in that sense similar to other social problems in the society would make the most sense. Although a few disaster researchers (e.g., Kreps and Drabek 1996), also think of disasters as social problems, albeit nonroutine ones, the general consensus is that such a designation is not particularly useful either for study or research application (following the logic, for example of Stallings 1991a). In fact, the reasons why historically disasters have been rejected as being social problems, is what partly characterizes AIDS, namely that it is chronic, enduring, pervasive, diffuse, slow moving, etc.

It is possible that forced to a choice between dealing with the certainty of AIDS or the uncertain of disasters, it is probable many communities and societies will choose the former. But that is no different from saying that other issues will also be given priority over dealing with disasters. It is important to keep in mind that disasters will not always be and are not always given the highest priority for social attention. AIDS might be such an issue. However, it might be worthwhile to looking at how the eradication of smallpox around the world was achieved, and particularly how it ended up being given such high priority in attention and effort.

Even given that, disaster planning and managing should take into account what additional issues and questions are created by the fact that a given population may have a high proportion of victims suffering from AIDS. For example, there are certainly implications for how disaster

recovery might be handled. It almost raises a triage question. If AIDS-affected people are also disaster victims, how much time, effort and resources should be spent on them in recovery efforts? Obviously this touches on very fundamental cultural values about life, etc., and if openly addressed, would become a very politically sensitive question, to put it mildly. Raising this question indicates to us that at the very least, responsible officials and agencies need to think through how their planning for and managing of disasters might be affected by this health problem.

c. The development of the Internet and related computer technologies.

Much greater use should be made of the newer computer-based or linked information technologies for disaster planning and managing. This is a view that has often been voiced and is widespread (Gruntfest and Weber 1996). As we have written elsewhere, such technologies will allow an information/communication revolution even though there are many problematical aspects in their usage (Quarantelli 1997). But there should be some caution before assuming that this will provide a solution to all problems in the area, especially at the present time.

For one, it is necessary to recognize that access to the Internet can range from almost zero use to where even when large absolute numbers are involved, still reach only a fraction of the total population. Thus, in Myanmar use of the Internet is generally prohibited to all but several hundred business and government elites (Nua Internet Surveys 2000a). A report in January 2003 found that in Ecuador only 2.7 of the population had ever been online (Konrad 2003). In Russia more than six and half million people have Internet access but that is only about six percent of the Russian adult population (Nua internet Surveys 2000c). And a survey in March 2000 estimated that only 2.58 million persons had access to the Internet in Africa, 1.90 million in the Middle East, and 10.74 million in South America (Nua Internet Surveys 2000b). Given the populations of these areas, clearly these figures are only a small fraction of the total which is illustrated by another survey that found that WWW penetration had reached only 7 percent of the possible users in Poland, 4 percent in Brazil and Indonesia, and 0.7 percent in China and 0.5 percent in India (The wired divide 2000). In contrast to the United States in 2001 a survey found that 56 percent of the adult population had access (Stellin 2001) although a later review said that only 42% of American adults said they had access to the Internet (Hafner 2003). Furthermore, in a world of six billion people, as of October 2000 a good estimated seem to be that about 375 million people had access (Newsweek 2000: 74h). There certainly will be greater access across the board in an indefinite future, but for the next decade or so, this is the social reality.

Of course the development of the Internet and related technologies can also vary tremendously within a given social system, especially a large one. A good example can be found in India. This is well illustrated by this news report:

> HYDERABAD, India, March 15. Cyber Towers rises from the campus of a software technology park here, a sleek Internet-connected symbol of the new India that is feverishly courting foreign investment, selling its wares in the global marketplace and creating wealth at an astonishing rate . . . the $5 billion software industry . . . has generated 280,000 jobs for the educated and highly skilled. Those workers in, turn, are creating demand for housing, refrigerators and other goods that help the economy grow (Dugger 2000a: 1, 12)

However, in contrast:

> But less than 50 miles away, in the poverty-stricken village of Sheri Ram Reddy Guda, the old India is alive and unwell. Illiteracy, sickness and hunger are the villagers' constant companions. Women and children work in the fields for less

than 50 cents a day. The sole telephone–an antique contraption
of batteries and antennae–almost never works . . . No one here
owns a car or even a scooter . . . There is no health clinic . . .
The village gets only about eight hours of power a day, and that
is often of such low voltage that it does not operate the irrigation
pumps . . . This is still a country where half and women and a
quarter of the men cannot read or write; where more than half
the children 4 and under are stunted by malnutrition; where one-
third of the population, or more than 300 million people, live in
absolute poverty, unable to afford enough to eat; where more
then 30 million children 6 to 10 are not in school (Dugger 2000a:
1, 12)

However, even this example calls attention to the fact that world cities can be:

Control, command and management centers that orchestrate
global manufacturing production, financial transactions, producer
services and *telecommunications* (*italics added*) networks (Short
and Kim 1999: 54)

This is another way of saying that at least the world cities in developing countries in many
instances may already have an existing base for using the new computer-related technologies for
disaster managing and planning.

Finally, mention should be made of the recent development and establishment of a Global
Disaster Information Network (**GDIN**). Within it there is a subgroup which is considering how
GDIN can be of service to local governments, cities, countries, provinces and other-sub-national
governments. (Progress Report 2000). Overstated but in general conveying the basic idea, **GDIN**
is an effort to create a largely computer-based international network to distribute information
about disasters. The idea has merit, and as we discuss later, might be something that the World
Bank ought to examine to see its relevance for disaster planning and managing.

Overall, our point in this discussion in this part, is that these newer developments with respect to
computers and related technologies have considerable potential for improving disaster planning
and managing. As such there use should be encouraged in whatever ways possible. However, it
should not be forgotten that these technologies will never provide complete solutions, that there
are inherent problems in their use, and that there are limits to what can be done by and with them
in developing societies.

d. Decline of the nation state, but increased importance of politics.

There is little reason to doubt that the nation state has declined in importance, at least in the
sense that other social actors, especially those that cut across national boundaries are more
important than ever before (Guehenno 1995; Hirst and Thompson 1995;Evans 1997; Mann 1997;
Robinson 1998; Meyer 2000). This does not mean that the nation state will disappear. It is likely
to continue for a long time just as religion did not evaporate from modern societies as a more
secular orientation developed and the social institution of science became very important. But
existence is one thing; importance is another. Nation states will have the first, but they will be
increasingly less important. To place too much importance on the nation state is to miss a major
social trend of the late 20th century and even more likely to accelerate in the 21st century. Anyone
interested in disasters must take this into account.

On the other hand, more attention needs to be payed to the political nature of almost any
disaster. As Olson somewhat plaintively asks: "Why has it been so difficult to gain sustained,
systematic attention to the political aspects of disasters?" (2000: 265). An exception to this lack
of attention is the work of Rosenthal and his colleagues on crises, within which they see disasters

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as simply one category. The importance of political aspects is a major theme of their research. They note that increasingly crises have to be seen in transnational terms and that, increasingly, future disasters and crises will highlight the obsolescence of national boundaries (Rosenthal, Boin and Comfort 2001). Most of their research has been on developed countries.

However, there has been a series of studies on political aspects that for the most part have looked at developing societies. Olson (2000) in a study of long-run effects of disasters in China, Mexico, Nicaragua and California tries to document that in any major such occasions, there have been important political consequences in the long run (see also Olson and Gawronski 2003). In earlier studies, he and his colleagues have shown how political considerations enter into other phases of disaster planning from mitigation measures attempted to reconstruction policies established (Olson and Olson 1993, 1994). In another study a cross-national study of 12 countries struck by rapid-onset natural disasters between 1966 and 1980 found a positive relationship between disaster severity and subsequent political unrest (Olson and Drury 1997; Drury and Olson 1998). Nearly two decades ago studies by two political scientists working together, Davis and Seitz (1982) and Seitz and Davis (1984) looking at Africa and Latin America, studied and found a relationship between regime type, mismanagement and levels of disaster damage. In a very recent study, Shefner (1999) looked at whether the sewer explosions in Guadalajara in Mexico had any political aftermaths. While he found that the political activists that emerged right after the disaster had fairly well disappeared after about two years, there were longer run effects in later elections.

The importance of political considerations is also illustrated in case studies by Olson and his colleagues (1999; 2000) where they show how established civil defense organizations in six Central American and South American societies were superseded by temporary alternative social structures. They note that:

> The various offices of civil defense will remain each country's
> nominal "national emergency organization" . . . none shows any
> signs of being able to secure the kind of multi-ministerial, multi-
> sectoral coordination required for effective long-term mitigation
> and preparedness . . . Moreover, the precedent has been set for
> their future marginalization with the next major disaster . . .
> (Olson et al. 2000: 35).

They asked: can anything be done to break this pattern? They suggest two possibilities following on the notion that community crises can go past certain thresholds as they go from everyday routine accidents, to emergencies to disasters to catastrophes (Quarantelli 1987). One is to improve civil defense capabilities so that fewer crises will become emergencies, fewer emergencies become disasters, and fewer disasters become catastrophes. The other is to accept the fact that a disaster or catastrophe is very likely to become political and thus the civil defense organizations ought to actually plan for that eventuality (Olson et al. 2000: 36). This also applies in the disaster mitigation process for as has been said:

> The decision-making process about the acceptability of risks is
> essentially a political process (Porto and Freitas 1996: 24)

We think we have illustrated the point that more explicit and systematic attention needs to be paid not so much to the nation-state but to the political aspects of disasters, especially by anyone interested in planning and managing such occasions. That getting into such a topic poses serious "political" problems for any international organization that would move in that direction we would not doubt. However, if the matter is important, and we think that few would challenge that view, because some action is laden with such difficulties should not deter entering into that arena.

5. It must be accepted that risk is a social construction influenced by cultural factors.

The term "risk" is very widely used both by researchers and others involved in the disaster area. There are several problems associated with that usage. The term is sometime distinguished and sometimes not from "vulnerability." Others have argued that the modern world has become much more risky in one sense than previous societies (Beck 1995, 1999), but to many this seems an overstated historical conclusion. Giddens makes a similar but stronger point, namely that not only has external risk been added to by manufactured risk, but that we know very little on how to handle the latter. The former refers to "risk experienced as coming from the outside, from the fixities of tradition or nature" (2000: 44). Whereas manufactured risk is:

> Risk created by the very impact of our developing knowledge upon the world. Manufactured risk refers to risk situations which we have very little historical experience of confronting. Most environmental risks . . . fall into this category. They are directly influenced by the intensifying globalisation . . . In all traditional cultures . . . right up to the threshold of the present day, human beings worried about the risks coming from external nature—from bad harvests, floods, plagues or famines. At a certain point, however—very recently in historical terms—we started worrying less about what nature can do to us, and more about what we have done to nature. This marks the transition from the predominance of external risk to that of manufactured risk (2000: 44)

He further adds:

> As manufactured risk expands, there is a new riskiness to risk . . . every time someone steps into a car . . . for instance, one can calculate that person's chances of being involved in an accident. This is actuarial prediction—there is along time-series to go on. Situations of manufactured risk aren't like that. We simply don't know what the level of risk is, and in many cases we wouldn't know for sure until it is too late (2000: 46).

Therefore:

> Our age is not more dangerous—not more-risky—than those of earlier generations, but the balance of risks and dangers has shifted. We live in a world where hazards created by ourselves are as, or more, threatening than those that come from the outside (2000: 52).

There are very important implications for disaster planning and managing if this is anywhere near true. However, at this point, the more important matter we want to discuss is the differential perception of risk by experts and by laypersons, which we will now discuss.

The research and literature on risk is voluminous (e.g., see the web site of Risk Analysis at www.risk-analysis-center.com/). Interest in the topic is not new, with the intensive focus which started about 20 years ago escalating in recent years (For examples, see Johnson and Covello 1987; Wildavsky and Dake 1990; O'Riordan 1995; Lupton 1999; Renn and Rohrmann 2000). This report is not the place to review all aspects of risk, even solely with respect to disasters. Rather we will *only* stress the need to accept and think through the implications for disaster planning and managing, if risk is a socially constructed idea and its perception is strongly influenced by cultural factors. That view, widely advanced at least for nearly two decades in the social science literature (Short 1984), is our view.

The social psychology we accept is somewhat inconsistent with the dominant paradigm about risk. Fundamentally, our view is that "risk" is *always* a socially constructed idea. This is contradictory to the notion that risk is somehow or other something that exists out there in the external world, and that it can be objectively measured by strictly scientific analysis. Instead our view is that the meaning of risk is always constructed by human beings and consequently has no so-called objective existence. Actually even within the social sciences, such as those of us who use symbolic interactionism as their social psychology (Reynolds and Herman-Kinney 2003), would agree with the last position. So while the objective view of risk is the dominant scientific paradigm, the argument is not between science and non-science. In this approach, the so-called objective view of risk is merely another construction by another set of human beings who happen to be scientists or professionals, and who consider themselves experts. So Jasanoff notes that in this framework "all perception of risk, whether lay or expert, represents partial or selective views of the things and situations that threaten us" (1998: 91). Consistent with this is the statement that: "The empirical results suggest that the social processes that construct and maintain **risk** in the public eye are at least as important as, if not more important than, the physical and psychological dimensions of **risk**" (Rogers 1997: 745).

It follows that a common observation is that risk is consistently perceived in different ways by laypersons when compared to "experts" (Slovic 1993, 1998; Kraus, Torbjorn and Slovic 1992; Flynn, Slovic and Mertz 1993; Tierney 1999). In seemly every society the average citizen tends to view risk in rather different ways than do most professionals in the risk analysis area. Because of this there often is a tendency to characterize the perceptions of laypersons as incorrect and false, and not acceptable for any serious purpose. The Director of Risk Communication for the Harvard Center for Risk Analysis has recently made a typical statement which nicely summarizes the view of experts:

> . . . Billions of dollars and countless hours of effort will be wasted
> unnecessarily–all because we're afraid of the wrong things . . .
> In a frenzy of fear, we're pouring millions . . . into protecting
> ourselves from the West Nile virus, and spending only a fraction
> of that sum on public education encouraging people to wash
> their hands, which would eliminate far more disease than killing
> every mosquito in America.
>
> Public and private spending on the cleanup of hazardous waste
> is estimated at $30 billion a year. Hazardous waste is a real
> problem, but the number of people whom it puts at risk is quite
> low . . .
>
> In many areas, science can identify the physical hazards, tell us
> how many people are likely to be effected by each one, what
> various mitigations will cost and how effective we can expect
> them to be. We can rank risks and remedies and put things in
> perspective. But we don't. Instead, we make policy based more
> on fear than fact.
>
> This irrational response kills people . . . the principal underlying
> cause of wasteful choices is fear. But society must be more
> rational than that . . .
>
> Why not create . . . an independent nongovernmental agency . . .
> to provide credible guidance on risks? The institute would rank
> hazards so we could know which are most likely to occur,
> classify risk according to their consequences, and conduct cost-
> benefit studies to rank mitigation choices by cost and

effectiveness . . . How do we make policymaking more rational
(Ropeik 2000).

To many experts all this sounds very reasonable. But the fact of the matter, ironically well
recorded by social science specialists, is that many laypersons disagree strongly with the stated
opinions (Slovic 1987; 1995). It is not our purpose here to expound on what is now a well
documented different view of risk that is typically expressed by experts and by laypersons. That
difference exists in many societies. The general tendency of experts is to dismiss the views of
laypersons as was done in the above statement, as resulting from "fear," an "irrational"
response," or in other instances as "nonscientific" or just "downright wrong."

But what also shows up from the studies made of laypersons, is that on the whole, they simply
view risk in a different way and use different criteria of evaluating risk (Slovic 1998). Again, we
will not go into this in much detail. But laypersons have less trust in so-called scientific results
than do experts. They also tend to dismiss results or positions of people or groups they do not
trust; so many positions on risk enunciated by corporate interests and certain government
agencies are viewed very suspiciously by the typical layperson (Slovic 1993). Also, it is clear that
the average person takes a rather different view of a risk that may quickly eventuate in great
losses or one that can in no way be controlled by the person that might be threatened by it.
Finally, risk is seen as less if the layperson voluntarily gets involved in a threatening situation as
over against when the threat is imposed on the average person. All of these statements apply to
risk generally, but to the extent that they have been studied in connection with risks about
disasters, the generalizations stated seem to hold across the board.

Our overall conclusion from all this is that instead of dismissing the views of laypersons, they
should be put into the forefront of any analysis and policy position with respect to disasters.
Persons are not going to be convinced they should change their position when that position is
characterized as "irrational," "emotional" or "non scientific." The evidence is clear that name
calling might make the callers feel better, but it is not a very good way to change the thinking of
others. Thus, our view is that it would be far better to incorporate the layperson's view of risk into
disaster planning and managing. If nothing else, it would be consistent with the currently
frequently expressed idea that one should plan *with* people and not plan *for* them.

Particular examples can illustrate a number of these matters well. For example, in late November
of 2000 there were riots in New Delhi where buses were torched and major roads were blocked.
What was the violent protest all about? Basically the rioters were demanding that the
government not obey a Supreme Court order that more than 90,000 small factories, many of
which pollute residential areas be closed. These plants employ close to a million people. The
Court has issued repeated orders to close the polluting industries on the premise that health is
the overriding concern. But the rioters, many workers in the plants supported by the factory
owners, see the risk of losing their livelihood as far more important (Dugger 2000b).

Not only is risk socially constructed, but it also a perception that is strongly influenced by cultural
factors. The current dominant expert view of risk is deeply embedded in Western views of the
nature of knowledge and of the world (Douglas and Wildavsky 1982). It would take us too far
afield to look at, even superficially, the fact that there are multiple views which exist, especially in
developing countries, about the nature of knowledge and the world. There is a substantial
anthropological literature that well documents these cross-cultural differences. To ignore this,
especially when dealing with disaster planning and managing in developing societies with
consequently drastically different perceptions of risk, does not make much sense. Let us leave
totally aside an increasingly voiced charge of "cultural imperialism" on the part of Western
oriented persons and groups. Far more important, is that to go down the path of only using the
Western idea of risk, is to insure that it will not be accepted in many other different cultures. It
may appear bizarre to Western oriented persons that "most of [the] Armenian population believes
that the earthquake was artificial" (Safaryan 2000: 291), that is what happened in 1988 was
created by other human beings, primarily political enemies of Armenia. But unless one accepts

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that was the operative perception of many Armenians, it is impossible to understand the post-impact reaction to the disaster and how it affected both recovery and other aspects of that situation.

It is also time to take seriously one other fairly well research-established point. This is that while there are some universal dimensions on how risk is perceived by non-experts, there are also some more culturally specific reactions. We would suggest that in many developing societies, especially those where the great majority of citizens live sub marginally, risk is seen in somewhat different ways than elsewhere. In a very good analysis, Schmuck-Widmann (1996) compared the view of European engineers and the indigenous residents living in islands in the Brahmaputra-Jamuna River, one of the world's largest. The engineers defined the almost annual flooding as something that needed to be controlled, and the inhabitants of this area of Bangladesh, as helpless victims, since about 30,000 riverine people (the" char dwellers") are forced from their homes annually. However, in contrast, the local population perceives the floods not as a disaster, but as a normal and useful part of the annual cycle. The char-dwellers have developed a stock of local knowledge and strategies to cope with the environmental conditions and even take advantage of them for agriculture, their main source of income (Schmuck-Widmann 1998:1). From our perspective, we think it is of interest that in some ways they see themselves as "survivors" rather than "victims".

Consistent with what was just said, a recent analysis of the social life of residents of shanty towns in Mexico makes the following observation, asks an important question, and concludes with a significant finding:

> A common prejudice found in the sociological literature on poverty consists in portraying the urban poor as people bedeviled by a wide range of social pathologies, amounting to a supposed incapacity to respond adequately to social and economic incentives . . . My work in a Mexican shanty-town . . . deals with a basic question: how do millions of Latin Americans manage to survive in shanty-towns, without savings or saleable skills, largely disowned by organized systems of social security?

> The fact that such a large population can subsist and grow under conditions of extreme deprivation in Latin American cities has important . . . implications. The proliferation of shanty-towns . . . indicates that these forms of urban settlement are successful and respond to some sort of objective social need . . . My own work in Mexico City tends to support this view, by providing evidence that shanty-towns are actually breeding-grounds for a new form of social organization which is adaptive to the socio-economic requisites of survival in the city . . . the networks of reciprocal exchange among shanty-town dwellers constitute an effective stand-by mechanism, whose purpose is to provide a minimum of economic security under conditions of chronic underemployment (Lomnitz 1997: 204)

On an everyday basis, the social links, relationships and networks involve the exchange of information, training and job assistance, loans, services, sharing of facilities and more and emotional support.

These two examples from Bangladesh and Mexico not only clearly illustrate that everyday people can perceive risks differently from experts (and of course the same for vulnerability, see Heijmans 2001). More important, they also show how persons cope with adverse conditions, and that the

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coping activities are of a collective nature. That is, they are rooted in the everyday lives of groups with particular cultures

To us, all this suggests it ought to be possible to use these everyday social structures, informal links and groups as means of implementing disaster planning and managing. In fact, to state the point even more strongly, unless one starts with the existing and usual social organization, it will not be possible to implement much of anything. In another way, given that attempting, for example, to eliminate shanty towns and slums in urban areas in developing countries is far beyond the capability of any reasonable disaster planning and managing, one should build on whatever possibilities are in place (this is not an argument against other kinds of efforts to reduce poverty, structural inequality, etc., but that cannot be the realistic goal of organizations or programs focused on disasters per se.). Efforts at improving disaster planning and managing do not lend themselves well as levers to bring about major societal changes.

Overall, our general point in the above part of the report, is that it might be wise to assume that risk is both socially constructed and culturally affected. With that perspective, it then becomes useful to look at how ordinary people cope with and adjust to the risks and other threatening things they perceive. The two examples cited from Bangladesh and Mexico strongly suggest that there are adjustable social mechanisms, which actually be used as a local base to start improving community disaster planning and managing. It is however important to keep in mind that what are collective social mechanisms and not just individual psychological coping attitudes. These are manifested in social networks and relationships. If residents of an area view and cope with risk and other difficulties through elaborate social mechanism and collectively supported activities, it would make sense for disaster planners to start from such real life experiences and behaviors.

There is a role for experts on risk. However, in our view as will be discussed later, they should be used for more circumscribed and technical goals. To try and to impose their perceptions of risk on the population at large will not work as it does not work at present on most issues of risk.

6. More attention is needed on underemphasized social institutions

Community life is not only embodied in the behavior of the residents and groups of which they are members, but also in the local social institutions through which the functions of the locality are enacted. Without getting into another conceptual quagmire, we can say that social institutions can be understood under the terms or the labels which are typically attached to chapters in introductory sociology textbooks. There are the universal and traditional ones such as the family, religion, education, the arts, the polity, the military and the economy. Increasingly so, as societies become more industrialized and urbanized, there are the newer institutions such as science, mass communications, sports, and popular culture. For the purposes of this report we single out those social institutions which in our view have not been incorporated well into disaster planning and managing, ignoring for the moment this could vary substantially from one society to another.

In particular, we want to discuss five institutions, in part or in their totality. The first has to do with the business and service parts of the economic institution. This is particularly important in many developing countries where most of these activities were once state run, and are now in the process of being privatized. Another important social institution is the military. In a few societies it is the only and viable nation wide one; and in most developing countries it has a leading role. A third institution we spotlight is the mass communication system. This institution in many respects provides the social spectacles through which many view disaster phenomena. Then, we say something about the intersection between the institutions of education and of science, especially at the local community level. Finally, we will note the neglect, insofar as disaster planning and managing is concerned, of the social institution of religion.

What we think should be emphasized is not that there are five social institutions on which much research has been done, although only some of it has been done in connection with disasters.

More important is that the results of studies have not been applied as much as they should be in disaster planning and managing. For example, a very recent and excellent manual for managers and policy makers Community Emergency Preparedness 1999) has almost nothing on the five major social institutions we discuss.

a. Business and industry.

Business and industry until recently has not been the focus of much social science disaster research. However, this has changed in the last decade and there is now an ever growing literature on the topic with much of the research being done at **DRC** (see Tierney, Nigg and Dahlhamer 1996; Tierney 1997; Dahlhamer and D'Souza 1997; Dahlhamer and Tierney 1998; Tierney and Dahlhamer 1998; Dahlhamer, Webb and Tierney 1999; Webb, Tierney and Dahlhamer 2000; outside of the **DRC** research see Drabek 1994; Gordon et al, 1995; Jones and Chang 1995; Alesch and Holly 1996). There is of course much emphasis in recent times on the need to develop public-private partnerships. However, almost all of the emphases are statements advocating and encouraging such partnerships, with few or no studies of how such relationships are created and maintained and if they achieve what is intended. Elsewhere, we have suggested that it should never be forgotten that the private sector and governmental agencies have different goals and constituencies, and disasters do not basically change those aspects. Calling it a partnership does not eliminate those differences (e.g., businesses normally have to be responsive to stockholders; government presumably has to be responsive to citizens in general).

What has been studied about businesses in disasters? The **DRC** research since 1993 has looked at all phases of the planning and managing cycles, that is, what can be said about the disaster related mitigation, preparedness, response and short time and long recovery activities of businesses and industries. The work focused on four major American disasters, namely the 1989 Loma Prieta earthquake, Hurricane Andrew in 1992, the 1993 Midwest floods, and the 1994 Northridge earthquake, as well as some business focused but non-disaster settings in the Memphis, Tennessee area. Methodologically, the studies have mostly used stratified random sampling techniques to obtain large representatives samples of businesses, including large corporations and small shops.

What do the studies show? Again, we will not go into detail but sketch the major overall findings. As to mitigation, it is clear that the average or typical business place does little by way or mitigation or preparedness measures. Large corporations tend to do more than smaller entities, but even those that do the most, do relatively little. Certain businesses such as financial institutions, insurance and real estate companies are likely to do the most, with those having some prior experiences with disasters likely to be more active in preparing for future disasters. As to actual impacts on businesses, direct damages in a disaster are only one factor that effect their operations. In fact, seemingly equal as important in closing or reducing business activity are such conditions as disruptions of community lifeline systems, curtailments of product and service delivery by suppliers, and disaster-affected personal problems of workers and potential customers. While the general picture is that most businesses recover in the long run, those that were the most marginal in the predisaster period are most likely to fail or not reopen in the aftermath of a major disaster. Surprisingly, prior preparedness planning seemed to have little effect on recovering from a disaster, which might be explained by relative poor preparedness planning to start with, or the fact that most planning did not take into account lifeline disruptions, etc. There also was no clear relationship between recovering from a disaster and disaster assistance provided by governmental agencies. In fact, "there was no relationship whatsoever between the number of aid sources businesses relied on during the post-disaster period and the extent to which they recovered" (Webb, Tierney and Dahlhamer 1999: 16).

These research results are from a highly-developed society with extensive disaster planning and managing at the national and in some instances the local community level. To what extent such observations can be extrapolated to urban areas in developing countries is of course a question that would have to be answered empirically. But it would be surprising if the absence of much

mitigation and preparedness planning was not even more prevalent in cities in developing societies. Conversations with Russian researchers who have been looking at the increasing importance of the private sector in that country as it privatizes much of what was previously state owned, indicate that almost no disaster planning exists in that sector of that society (see also Vorobiev 1998). That the kind of postdisaster assistance available to businesses in American society is not particularly successful does raise questions of what kind of recovery aid would work well in urban areas in developing countries.

Overall, what is suggested by the research conducted so far in only one developed society is that it is time for this whole area to be explored in developing countries. Almost all societies, where it was not the case before, are undertaking to privatize industries and businesses, most of whom will be located in an urban setting. The very process of industrialization also means that there will be more and more of a private sector. Given these trends, it follows that without some research-based understanding of business in disasters, it is not at all clear in what directions and what business planning and managing ought to be undertaken in developing societies (for an initial examination of the problem see Twigg 2002; however the private sector played an important role in the response and recovery from an earthquake disaster in Taiwan, see Prater and Wu 2002: 58). Maybe there is some relevant data buried in the records of international agencies that provide disaster recovery assistance to businesses and industries. But if so, they should be analyzed to reach some meaningful conclusions on what would be the most effective and efficient steps to take.

Finally, it should be noted that not only is there a world wide trend toward privatization and a market type economy, but this tendency is also appearing in the crisis area. That is, various government performed activities and programs in the crisis area are increasingly being turned over to the private sector. As Handmer notes:

> There appears to be nothing inherent about warnings and emergency management that makes them exempt from this general trend . . . This paper examines privatisation from the perspective of emergency services. It suggests that the sector is becoming increasingly private . . . it is likely that organisations responsible for warnings and emergency services will come under increasing pressure to adopt many of the attributes associated . . . with the private sector (2000)

There are of course advantages and disadvantages of following this path, although examinations of the phenomena already are showing signs of partisan bias (e.g. Handmer 2000). Nevertheless, the trend towards privatization in the crisis area is occurring and as such is another reason for paying much more attention to the research in the business area. To the extent that developing countries follow this world wide trend, those interested in policies and programs for disaster planning and managing should pay some attention to what the research shows (or support studies that would do so).

b. The military.

There is a surprising lack of explicit attention in disaster planning to the possible and actual role of the military. Summaries of the research literature ignore military forces (e.g., the volume by Drabek 1986 does not even mention them in its index; the same is true of Dynes and Tierney 1994). Only an article here and there can be found on the topic (e.g., Anderson 1994; Gaydos and Luz 1994). Recent general discussions of disasters and cities (such as Mitchell1999; and the collection of papers gathered by Kreimer, Arnold and Carlin 2002) also ignore the military. The absence of explicit attention to the military is also fairly widespread in planning guides and operational manuals. To be sure, military involvement is frequently described in descriptions of responses especially in developing societies (e.g., Olson et al.1999) But though their involvement in disasters does not go unnoticed, the military is simply not analytically approached

in the planning literature and gets little attention even in the operational planning and managing literature

Yet this is a social institution which not only exists in practically every society, but which especially in developing countries are often among the most important and in some cases *the* most viable social institution in the society.   For instance, in the 2001 earthquake in India, the great majority of social institutions were very slow and generally inefficient in responding to that catastrophe.   However, at least according to press reports, the one exception was the military. Thus, it has been written:

> The successes, often, have been the work of the one
> government institution in India that has almost universal respect
> for its efficiency, the army (Burns 2001a: 4).

Also, the military is not an unstudied institution; the literature on it is vast (searching in any major library will find thousands of relevant publications, e.g., Caforio 2003). Maybe the lack of relative attention has to do with cultural values. Many groups and individuals involved with disasters hold strong humanitarian and democratic values which on the surface at least seem not fully compatible with the manifest role and functioning of armies, navies, air forces and semi-militarized police forces. But whether this speculation is correct or not, the far more important point for our purposes is that the military is a very important social institution that needs to be paid attention to by anyone interested in disaster planning and managing in developing countries. To ignore it because it might be incompatible to certain, mostly Western, political values is indefensible.

Systematic efforts should be made to evaluate what roles the military can play in different phases of the planning process, and what they can contribute to the managing of disasters. Whether one likes it or not, the fact of the matter is that in many developing countries the military and associated forces are important in responses to disasters. As such, this institution requires far more attention for planning and managing purposes than it has been given up to now

The military in some societies are also important in being major social actors that respond to disasters in other social systems. In other words, foreign military resources are at times important in the immediate aftermath of disasters, and to some extent in disaster relief (Walker 1992). To be sure the use of armed forces in such instances is almost always dictated by domestic political considerations in the providing country. Nevertheless, just as the domestic use of the military needs far more attention in disaster planning and managing than it has been given up to now, there is also a need to look more closely at how foreign military assistance might be used in managing disasters.

c. Mass communication systems.

Another topic which needs more attention for disaster planning and managing is the mass communication systems (**MCS**), some of which are international in scope. We should note that commonly reference is made to the "mass media" but that is not a very useful way of thinking about the phenomena because it primarily emphasizes the technology involved and misses the point that **MCS** are social institutions in the same sense that education, the polity, science and art, etc., are social institutions. Thus, we will use the acronym **MCS** instead of mass media in our discussion.

There is a considerable and ever expanding literature on **MCS** at the community, national and international levels (see Fang 1997; Maherzi 1997; Croteau and Hoynes 1999; Grossberg, Warttella and Whitney 1998; Demers and Viswanath 1999; McQuail 2000; and Weimann 2000). Some of it does deal especially with the reporting of disasters, such as Van Belle (2000) who reports on how American newspapers and network televisions depicts foreign disasters (see also Walters, Wilkins and Walters 1989). Then there area a series of studies, some of a cross-cultural

nature, on the operation of community mass communication systems in disasters in developed societies (Wenger and Friedman 1986; Wenger and Quarantelli 1989; Quarantelli 1991c; Mikami, Hiroi, Quarantelli and Wenger 1992; Quarantelli 1996b).

There are many references to the role of the **MCS** with respect to warnings (Cate 1994). But little has been incorporated about them as major social actors in all phases of disaster planning and managing. For example, one reason that mitigation has been difficult to implement almost everywhere, is that for the most part it is a topic that is avoided by local **MCS** since it is difficult to treat such activities as an interesting news story. Likewise, whether or not recovery measures are seen as successful by officials involved in the process to a considerable extent depends on how the story is reported in newspapers and depicted on television. But because of cultural values in the journalistic world that values conflict more than agreement, the tendency is to report negative stories about disaster recovery activities. To the extent that is done, recovery can be seen as less successful than if the process were evaluated in other than news stories that reflect badly on public officials.

Actually, what we have just noted is part of a much larger picture. The importance of looking at **MCS** is that there has been a growing recognition that they have increasingly become the spectacles through which most of the residents of the world see disasters (Seydlitz, Spencer, Laska and Triche 1991; Balm 1993). Therefore, the picture presented by such systems is to many the reality of disasters. As Rosenthal, Boin and Comfort say:

> . . . future disasters and crises will increasingly follow the
> media-instigated lead of the Thomas theorem [If men define a
> situation as a crisis, it will be a crisis in its consequences]: IF
> CNN defines a situation as a crisis, it will indeed be a crisis in all
> its consequences. Mediazation will be one of the driving forces
> in the world of future disasters and crises (2001: 7)

Few who know anything about **MCS** and the use of new technologies which increasingly allow on- the-scene and immediate reporting, would challenge the ever growing importance of this system in defining what is a disaster and what the phenomena involves. Sometime this is referred to in popular parlance as the "CNN" syndrome, that is, what is depicted in that television and cable channel is not only accepted as the reality of the situation but also as something that often requires some response on the part of certain groups and officials. There is no reason to think that as a social institution the **MCS** will not grow even more important in the future.

If what we have just said is true, it has important implications for anyone interested in disaster planning and managing. Among other things it means that this system has to be looked at considerably beyond its admittedly crucial role in warning the population in many societies. In fact, a strong case can be made that while its warning function is significant, there are even more important roles that the system can play. The **MCS** both at the national and local level, if understood as a social institution can and does affect disaster mitigation, preparedness, response and recovery activities.

Unfortunately the problem is very complicated when we consider the **MCS** in developing countries. Many news outlets are driven by politically partisan views, often being formal outlets for political parties or associated political movements (further compounded in some instances by some outlets operating with certain religious orientations). Put another way, the supposedly "objective" presentation of news that presumably exists in most Westernized societies is far from the norm in many other places in the world. At least in relative terms this is true, although as we and others have written elsewhere with respect to news reporting about conflict situations (e.g., riots and terroristic attacks) in the United States, the American media outlets project a strong "command post" view of such happenings (Quarantelli 1981,1991b). While there are overtones of such biases in the reporting on disasters in the American **MCS**, it is relatively insignificant

compared with the partisan bias of how disasters are described and depicted in many other countries around the world.

This said, and as we have mentioned about other complicated matters in the disaster area, getting both the local and national levels **MCS** more involved in disaster planning and managing should still be an important goal. The issuance of warnings is clearly a major function of such systems. However **MCS** should be involved in much more than just issuing warnings. Without far greater involvement of **MCS** in disaster planning and managing, any efforts will fall far short of what might be achieved.

        d. An intersect between education and science.

The third topic which we want to call attention to briefly is an intersection between two social institutions, namely education and science. As separate institutions they are involved in varying ways in disaster planning and managing. For instance, scientific research is very widely used in disaster studies and strongly advocated for application in disaster planning and managing. As an instance of the latter, after Hurricane Mitch hit Central America it was recommended that three projects be instituted that would strengthen organizations involved with hazard monitoring and forecasting, such as training meteorological personnel in the detection and monitoring of extreme hydro meteorological phenomena (Reconstruction 1999: 47). As for education, one very widespread means used to spread information about disasters is to use school classes to reach children in them. These activities of science and education are worthwhile and should be expanded.

However, we think there are other related routes that might be followed. Let us lead into that by noting the following observation. In many societies there is little factual knowledge available about risks and disasters. For example, Dhaka, Bangladesh, has been the site of numerous floods including some recent ones that have inundated most of the city (Faisal, Kabir and Nishat 2003). One in 1987 flooded almost two thirds of all slum dwellings and another in the following year covered 77 percent of the city (Huq 1999:130). But a recent analysis made to us the following surprising statement:

> Historical data on hazard an disasters in Dhaka are almost totally lacking. This makes it difficult to project likely patterns of risks and potential losses in the expanding city of the future (Huq 1999: 125)

From our perspective, we see a possible role for a link between science and education along the following line. In large cities, and especially mega or world cities, there is certain to be a large pool of knowledgeable individuals in the colleges, universities and other higher educational entities in that locality. While perhaps there might be a relatively larger pool in cities in developed societies, such professionals and scientists also exist in most developing societies. It appears to us that the expertise ought to be taken advantage of by using the scientific knowledge of such persons to obtain community information and data relevant to local risks and disasters. Whatever is found then could be used in an educational manner at the local level. It might be worthwhile to build up local community capabilities along the lines indicated. Almost certainly, both encouragement and support for creating pools of local disaster experts would have to come from outside the social system of developing societies.

        e. Religion.

Let us conclude, very briefly, with another social institution, that of religion (Fenn 2000; Stark 2000; Hunt 2002). At the very least, religion in most societies provides a world view, that is how people are supposed to view nature, life, the past and the future, "causation", violence, etc. (Selengut 2003) In other words, religion in the broadest sense of the term undoubtedly structures

how people and groups think of risks and disasters and in general how they adapt to personal and social crises.

At another level, religion is certainly important in how actual and potential disaster victims immediately cope with those crises. For example, in a survey of two villages in two coastal communities in Bangladesh eventually struck by a cyclone, it was found that "prayed to Allah" was undertaken by 72.5 percent of the residents in one village and by 89.6 percent of those in the other village. In both localities it was the most frequent precautionary measure taken (Haque and Blair 1992: 225). Although studies here and there have explicitly looked at how religion has been used by victims to cope with disasters (e.g, the famous and classic NORC study in the 1950s; see Quarantelli 1988b), but for the most part this social dimension has been largely ignored in the study of victims. Perhaps this says more of the strongly secular orientation of Western social science researchers than it does about how people use religion in both their everyday and crisis behavior.

Also, in many societies relief provided by church and organized religious groups frequently ranks very high in being a major sources of help. At the international level, much of the help provided to developing countries comes from religious organizations. Given such observations, it seems strange that the institution of religion is mostly addressed by silence in both the disaster research and the planning and managing literature. To be sure there is frequent acknowledgment at the descriptive level of the role and importance of religious groups or agencies backed by religious entities in international disaster relief. But a question can be raised if the institution of religion could better be incorporated into formal disaster planning and managing. That this might be worthwhile follows from the fact that in many non-Western countries there is a much closer link between religion and other social institutions than is found in the West. The sharp gap between state and church as this formally exists in the United States is not typical elsewhere. As to developing countries, many are strongly influenced by Islamic views that in some instances lead to the religious institution strongly influencing the political/governmental institutions of the society such as in Afghanistan and Iran. But even when it does not move in that direction, religion both in terms of formal churches as well as in sects and cults permeate the everyday life in many developing societies (for illustration of the situation in Latin America see Blancarte and Motta 2000).

From our perspective, what might be done is unclear. Until we obtain a much better picture of two aspects, venturing suggestions is not too warranted. At the impressionistic and anecdotal levels, outside religious groups certainly seem to be important in the provision of disaster relief to developing societies, and in some cases of providing help in the reconstruction part of the recovery phase. However, what such external agencies actually do, how they distribute their aid, and how useful is it, would seem worthwhile exploring. If what occurs is as important as what superficially appears to be the case, then there is an argument for better integrating such assistance into disaster planning and managing.

Then there is the question of the help provided by domestic religious groups within any given developing society. Again there are questions of what is actually done and what does it accomplish? These questions are related to the question as to what extent is religion an integral part of the governmental structure. The purpose of addressing such matter of course is to see if, and in what ways, the social institution of religion at the local and/or national levels might be brought to bear so as to improve disaster planning and managing. If religious groups and religiously influenced governments are going to participate in responding and recovering from disasters, would it not be worthwhile to find out what is going on and seeing if such efforts can be better linked, if not integrated, into larger disaster planning and managing efforts? An occasional exception to the lack of attention to religion can sometime be found. For instance, the Presbyterian Church in Vanuatu is central to the disaster planning of that island state (Ali 1992).

Probably the area of religion, at least in certain Western circles, is seen as possibly the one area of life where there should be the greatest distance between it and other activities in the society.

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Let us leave aside the ethnocentric value judgment in such a view. The more important matter is the extent to which the institution of religion is already involved in disaster-related activities. If the involvement is of any magnitude, it does not make much sense to pretend it does not exist. That is our basic point here.

B. Other Possibilities For More Attention in the Future.

There are probably other strategic points that might be used to address the central focus of this report. We will note three other possibilities.

First, a question might be raised about whether more attention should be paid to mental health aspects of disasters. What follows is noted because of a recent tendency in the disaster literature on developing countries to suggest the need to establish crisis consulting to reduce the supposed incidences of posttraumatic stress disorders (**PTSD**). The existence and extent of **PTSD** is a very controversial area apart from any connection with disaster phenomena, but there are strong differences of opinion even with respect to disasters (Tierney 2001; Goode 2003; Lee 2003). We tend to side with those that have some doubts that disasters are automatically bad for mental health. As a recent examination of the research literature notes:

> The assumption of an automatic link between disaster exposure
> and pathological outcomes is increasingly being questioned.
> Recognition of the possibility of positive reactions and growth
> outcomes in this context necessitates the development of
> alternative models and, in particular, the accommodation of the
> resilience construct in research and intervention agenda (Paton,
> Smith and Violanti 2000: 173)

The usefulness of the concept of **PTSD** for non-Western cultures has also been raised. For example, Bracken and Petty (1998) have edited a book with chapters written by persons who have been involved in humanitarian efforts to help victims of conflicts in non-Western settings. Essentially most show considerable skepticism about the appropriateness of applying Western concepts in non-Western social settings. Examples are given of how experiences in developing countries do not match up with local beliefs, or, more important, with local needs.

It is true that many victims or survivors of disasters do have problems in restoring their lives to something resembling normality. But it is one thing to assume that this should be approached as a matter of mental health; it is another to think that the problems can be handled by improving the efficiency and effectiveness of those organizations involved in disaster recovery efforts. Which position one takes on this is a matter of strategy on where it would be best to expend resources, time and effort. Should the attempt be oriented toward the mental health of victims, or the competence of organizations? We think it is the latter as discussed elsewhere (Quarantelli 1985; Tierney 2000), but the question needs further study. However, even at the anecdotal level a case can be made that maybe there is less here than is usually supposed. As a "victim" in a hurricane in Florida wrote in a letter to a news magazine:

> In "Disasters and Denial" you say, but the strongest motivation
> [for the disaster victims' rebuilding in the same place] may be
> what psychologists call denial." Wrong. We rebuild here
> because this is where we have jobs that enable us to pay for
> food. We rebuild here because mortgage companies will not
> forgive our loans and, for many of us, real estate is our only
> valuable asset. We rebuild here because this is where we have
> a family doctor, a letter carrier, a veterinarian, a mechanic,
> teachers and friends. But until you've been there, you'll never
> really understand why (Pickard 1993:12).

Second, in developed societies some recent attention has been given to the problem of disabled persons (Tierney, Petak and Hahn 1988). We particularly mention this because a number of developing countries have had or have ethnic conflicts or have been involved in wars or revolutionary activities which have not only killed many civilians, but have left many maimed and otherwise disabled persons (and that sometime long after the conflict is over, may continue to maim persons as the result of the explosion of land mines or unspent ammunition). There is some indication that such survivors who are hindered in such ways have many difficulties and problems in disaster occasions that other people do not have. As such, perhaps some consideration might be given to the special and distinctive disaster planning that is necessary for such persons. On the other hand, given always limited resources, there may be a question whether such resources and efforts as might be spent on the disabled may not be more effectively used for other disaster problems. Without more data on the extent and nature of the problem of disabled persons in developing countries, we think that for the moment this ought to be left as an open question.

Third, there are newer foci that perhaps are too new to take up at this time. There is one in particular which we will allude to in passing but not take up in any detail. This is that the concept of "sustainable development" has come to be used very widely in connection with disasters in developed (see Boulle, Vrolijks and Palm 1997; Mileti 1999; Britton 2001) and in developing societies (see Berke 1995; Hamza and Zetter 1998; Handmer 2002). But it has come to be an increasingly controversial idea and has come under very sharp criticism. The critics have argued that the term has come to have rather different meanings among its users, that in most usages it is unclear what the ultimate referent is, and that in many ways it is typical of faddish ideas that occasionally sweep the disaster area as well as others (see Aguirre 2002a and b; Barton 2002). The controversy is a very complex one. It appears to us to stem from different assumptions made about the nature of social change and social systems, as well as the application of different cultural and social values by different users and critics of the concept. Thus, given also that the controversy seems to be hitting a climax as this publication is being finished, and would take us far afield from our central concerns, we will not address this issue. In several years, as the corrective influences of scientific controversy plays themselves out, a detailed look at the issue might be warranted.

In this chapter we have suggested some new strategies or a much stronger emphasis on certain current strategies. Some will be much more difficult to implement in planning than others. Still others can be planned for, but will not be easy to incorporate into disaster managing. But it is our view that if most of what we have talked about in this chapter is not seriously addressed, there will be very strong limitation to the improving of disaster planning and managing in urban areas in developing countries.

CHAPTER 5.

BETTER APPLICATIONS OR IMPLEMENTATIONS OF APPROPRIATE DISASTER PLANNING AND MANAGING PRINCIPLES.

Apart from possible changes in the strategic approaches to be used, better and more systematic attempts should be made to apply or implement appropriate disaster planning and managing principles. Obviously we assume such principles exist. From our perspective, they are the ones that have been research derived. This is not to suggest that everything is known about disaster phenomena. But even if nothing else were ever to be learned, the full application of what is currently known, would substantially raise the level of disaster planning and managing everywhere.

Given this, the discussion in this chapter primarily attempts to do three things. For one, it suggests what principles ought to be given the highest priority for application. We also try to clarify some principles which it seems to use have not always been fully understood or worse, at times misapplied. Finally, we attempt to suggest which organizations or entities might best take lead roles in attempting to bring about the operative implementation of abstract principles.

However, before discussing the above matters, we do two other things. First, we discuss some differences between developed and developing societies. Our reason for doing this is to indicate similarities and differences between the two kinds of social systems involved which might affect the applicability of the principles in actual situations. As will be indicated, there are both positive and negative factors affecting the ease of implementation of principles. We then briefly discuss the disaster planning that is currently in place in developing countries. In general terms, it can be said that there is considerable room for improvement before urban areas in developing societies will have good planning and managing in place for the disasters of the future.

Planning can make a significant difference in mitigating pre-impact vulnerability to disasters, help to better prepare for their occurrence, improve the crisis or emergency time response to them, and for better managing the recovery after their impacts. This has occurred to a degree in Western societies for all kinds of disasters. In principle such planning should be as equally possible in developing societies. Along some lines, a few countries in the developing world already have materially improved their disaster planning, and many are trying to improve their stance in disaster planning and managing. But overall, the present situation is not good, the future is likely to be difficult and problematical with respect to efforts aimed at improvements.

Regrettably, the rather dismal future we have projected to this point, do not fully indicate how bad the situation is likely to be. This is because the outcomes of industrialization and urbanization in developing societies will not be identical to what occurred in the evolution of the Western World We now turn to noting in what ways the outcomes and consequences of the trends are more likely to be worse in developing societies.

A. Some Relevant Differences Between Developed and Developing Societies.

We initially discuss in what ways *relevant* for disaster planning and managing, present day developing societies differ from those that developed in the past. No attempt is made to look at all differences.

The industrialization and the urbanization processes have of course been operative in the developed world, culminating in the kinds of societies we see at the present time in most of western and northern Europe, North America, Japan, Australia and a few other places (Palen 1997) To a considerable extent, we have up to now in this report mostly projected what these two

processes will bring about in developing societies, especially their urban communities. Although in a few places we indicated possible differences in the manifestations and outcomes of the processes in developed and developing societies, we might have seemed to imply that the developing countries will simply repeat what has happened in Western type nations.

But this will not quite be the case. The parallel in the processes is not completely present. There are major similarities but also important differences. The first viewpoint has been expressed as follows:

> Social scientists seek to generalize and urbanization has long been the object of such generalization . . . One of the enduring elements in these efforts has been the proposition that cities have assumed a more homogenous form through time . . . the assumption underlying all these arguments is that urban form and development have become more universal (Gilbert and Gugler 1992: 23)

These authors go on to project into the future:

> There is no obvious reason given the current world distribution of capital why contemporary descriptions of capital, why contemporary descriptions of Third World cities will seem to belong to a different world when our successors looks at urban conditions in the year 2050 (Gilbert and Gugler 1992: 26)

However, in flat contrast, Ian Davis has noted:

> facile comparisons between urbanisation in Third World cities and nineteenth century cities such as Manchester or Hamburg are not valid (1987: 6).

And in Smith it is stated that even in the 1970s:

> There was a growing consensus among social scientists that the process of city growth, in both structural form and social consequences, differed from urbanization in the developed world (1996: 5)

Clearly the research literature differs on this point. Our own view is that there are both similarities and differences depending on which dimension of the urbanization process is the focus of attention. For our purposes in this report, if differences do exist, they need to be noted because they might imply differences in disaster planning and managing.

Now actually any formulation which seeks to explain the problems of disaster planning in urban complexes in developing countries necessarily assumes some kind of model about the basic changes and social dynamics involved. Likewise, any recommendations about the kind of relevant planning and managing which can be undertaken to cope with disasters stemming from such social factors also must make a similar assumption. The model would presumably explain both similarities and differences between the processes and outcomes in developed and developing societies.

Unfortunately, there is no consensus in the rather large body of research literature about such a model. There are several competing macro level theories about the growth of developing societies and the social dynamics involved. They go under such labels as modernization, dependency, world system, urban bias, etc. The contentious debate among proponents of each viewpoint has not abated in the last decade (see, e.g., Tiryakian 1991; Oberai 1993; Agrawal

1996; Gugler 1996, 1997a and b; Smith 1996; Inglehart 1997; Mann 1997; King 1999; Roberts and Hite 1999; Hall 2000; Latham 2000; and Wallerstein 2000).

There are some major differences in assumptions and the factors which are considered important in the various theoretical schemes. For example, modernization theory generally assumes that the problems of developing societies and their urbanization are primarily internally generated. Whereas the dependency and/or world system theories place the source of problems outside the developing countries themselves (see Shannon1996; Hendricks 2000). In fact, this last position has increasingly been assumed by political activists, especially those that explicitly blame capitalism and market economies and their agencies (such as the World Bank, the World Trade Organization, the International Monetary Fund, etc.) for supposedly implementing these ideas which are seen as responsible for the current woes of much of the developing world. Clearly the theoretical model that is accepted will affect what could be suggested about what to do with whatever issues or problems are being addressed, disasters or anything else.

This last point is reinforced by the observation that the major and more traditional theoretical formulations which have dominated thinking in the area, have all been equally criticized by a recent counter modernism view. This newer approach draws from diverse sources such as liberation theologies, feminist ecologists, and some Western development practitioners. In part, their complex argument is that the traditional views, however they may vary among themselves assume a monolithic and single path Western model of national autonomy, social democracy, and technological growth as the appropriate one to be emulated (Edwards, 1989). Instead, counter modernists argue for grounding knowledge and action in local histories and experiences, a people bottom up rather than organizational top down approach to development, and participatory action research (PAR). Thus:

> At root is a rejection of abstract, "top down" development plans
> which attempt to universalize the Western experience; an
> encouragements of local grassroots initiatives; and stress on the
> need for economic processes that are both rooted in the needs
> of specific communities and appropriate for local ecosystems.
> Emphasis is placed on grass roots inquiry into what development
> means to poor and disenfranchised people . . . As a
> consequence, it is hoped, development ceases to be something
> that is done to, rather than by, people, and becomes instead a
> process in which people participate in the making of their own
> communities. PAR stresses diversity, plurality, and
> empowerment (Manzo 1991: 28).

While this general perspective has overtones of a "Paradise Lost" and an idealization of a "Golden Age" rural way of life, it is clear the implications of such a view are rather important with respect to the fundamental strategy that ought to be pushed in the development process and dealing with associated problems.

However, it is neither our purpose nor is this the place to attempt to resolve what has been a 50-year intellectual and professional disagreement about the topic (Wiarda 1989). While there have been a few attempts to marry and merge some of the approaches (see, Soja 1990: 266-267), it is obvious that on the whole the theoretical formulations involved are fundamentally incompatible. Thus, we will proceed at a somewhat lower analytical level, noting what has been suggested as some important differences in the social dynamics which affected developed societies and those which are influencing the developing world.

Our purpose in doing this is to emphasize that such differences will make the future situation relatively *worse* for disaster planning and managing in cities in the developing world than they did in the past for those in the developed world. The majority of the problematical aspects of the industrialization and urbanization processes will be both quantitatively and qualitatively more

severe. In short, urban communities in the developing world will not only have the problems that surfaced in the evolution of large cities in Western type societies, but they will have more and worse problems, be these large number of under and unemployed, inadequate service and delivery systems, poor municipal governments and administration, etc. In turn, this is likely to make disasters in such communities worse and planning for them more difficult than in the developed world.

Of course there are some features of the two processes that could be seen as somewhat positive for the problem we are discussing. We indicated two of them earlier. For instance, cities are likely to contain as the result of having universities and research operations within them, a pool of experts and expertise on various aspects of disasters that would be useable in any phase of the planning cycle from mitigation to recovery. Almost always too, there are crisis-relevant means of mass communication available that would not usually be found in rural areas. Often also key decision makers in both the public and private sectors will be immediately available for crisis time decision making. So there are some aspects of urbanization (as well as industrialization) that could be functional for disaster purposes, although the overall balance goes the other way.

At a more general level, it is again important to emphasize that industrialization and urbanization occur because there are a number of positive and favorable outcomes of the processes. They are "plus driven" in some important ways. In many instances, there is an explicit understanding of the political, social and economic tradeoffs that are involved when certain environmental risks are accepted in order to have industries and jobs for an ever increasing population (Bartone 1991: 412). Of course it could be argued as some world system theorists and semi- and neo-Marxist approaches do, that developing countries have been "forced" along such paths by dominating colonial powers or capitalistic oriented trading partners. While this may be a viable hypothesis, recent world events and the socioeconomic status of the most advanced developing societies such as Taiwan, South Korea, or Malaysia indicate that whatever the explanation is, it involves far more than just the possible domination of certain countries over others.

Now, among the differentiating factors which have been singled out between the evolution of developed and developing societies, and about which there is relative although not total agreements are the following. As stated in a recent summary of the dimensions, determinants and theories of urbanization in developing societies:

> Several differences in the situation of the contemporary Third
> World and the First World at the inception of industrialization
> help to account for differentials in urban trajectories. First,
> Europe and North America enjoyed superior physical factor
> endowments and higher absolute levels of development,
> attributes which moderated the problems associated with rapid
> urbanization (Kasarda and Crenshaw 1991: 468).

These authors then go on to additionally indicate that the natural population increase was much lower in the West during the Industrial Revolution than is the case in much of the developing world today. Thus, others have indicated that the present urban population increase in developing societies is roughly double that which occurred in Europe at comparable levels of development (see Williamson 1988).

Still other analysts have argued that the situation is different because of the source and pace of introduction of technology. In the Industrial Revolution in the West, the varied technologies were created within the countries involved, sequential built upon one another, and came into the systems spread out over time which allowed them to be made compatible with the rest of the sociocultural setting. In contrast, developing countries are importing technologies that are foreign rather than domestic creations, that are not sequentially introduced but often top of the line, and that are quickly applied and not allowing the slow evolution of a supporting infrastructure and sociocultural setting.

As a number of researchers have noted, any technology is always embedded in an embracing sociocultural setting. Thus, the chemical industry is not just the plants and equipment necessary for producing chemicals, but an organizational structure which is set up to handle accidents, an organizational culture which emphasizes safety, etc. Unfortunately, when technology is introduced into a developing country, often only the physical machines or material items are transferred and not the social infrastructure which is a vital component of the total technology involved. For example, there is a strong safety and accident prevention culture manifested in organizational operations in most of the chemical industry in the West. This seldom is imported into the developing world as easily and readily as the machinery and equipment used. Therefore, in many respects, the technology transfer is usually only a partial one leaving behind the social and cultural values, norms, beliefs, social structures, etc. which are an integral part of technologies in the West. In fact, the argument has been made by any number of analysts that the chemical disaster in Bhopal in India is a good example of the consequences of only partial technology transfer (Bogard 1989)..

Equally as important, a number of writers have observed that there is a difference in the larger global context which differentiates the development of past developed societies and that of developing societies. For example, in the former, the industrial growth did not have to face more advanced economic competitors. Relatively inefficient production practices: "which could not compete effectively today were quite profitable in that era (Kasarda and Crenshaw 1991: 468). Moreover, the colonization of the New World allowed Europe to export its surplus population, people who otherwise would have migrated to European cities (Massey 1988). In addition, the heritage of colonialism as well as the oligopolistic practices of multinational corporations--new in this century--makes it difficult for many developing countries to cope with their urban problems (London 1987).

It is not necessary to accept all of the above views, to take the position that there *are* some operative social dynamics affecting the developing world which is different in important ways from what influenced the growth of developed societies. If this is so, at least those we have mentioned generally create both more and worse problems for cities in developing societies. This does not deny there are many important parallel features; it just makes the point there are also major differences.

Again, our emphasis has been on negative consequences. Certainly a question could be raised if there are not some differences which are positive for developing countries compared with what they were in the evolution of developed societies. In fact, the topic of this very report illustrates one advantage—the developing world has a much clearer image of what to expect as the trends continue, which was not true of the Western world during the time of the Industrial Revolution. However, on balance and with regard to our central focus, it seems to us that differences between the two societal evolutions will make for quantitatively and qualitatively worse problems which will complicate planning with respect to disasters in metropolitan areas in the developing world.

Finally, and related to what we have been discussing, planning for and managing of disasters is currently not well handled in most of the developing parts of the world. There have not been enough resources, among other things, to set the best social coping and adjusting mechanisms in place, as we will now discuss in what follows.

B. Disaster Planning In Place.

The degree and kind of disaster planning that is in place in developing societies varies considerably. In some societies such as India (for floods see Mohapatra and Singh 2003) and Iran it is significant; in other countries, such as Venezuela there is not even a clear cut national

level disaster plan. In Turkey there is no single national coordinating agency for disaster management although there is a blue print for actions and which suborganizations have what responsibilities (Gulkan and Eegunay 1999: 176). In Taiwan, emergency management functions are in the domain of a relatively minor agency (Prater and Wu 2002), at least as manifested in a 1999 earthquake.. Of course the existence of some governmental agencies says nothing about the quality of its operations, either in planning for or managing disasters. While there are exceptions, on the whole, the national level organizations are not of high quality if evaluated against criteria that have been advanced for such purposes in developing societies (Quarantelli 1998a)

There is also considerable variation in planning for any aspect of technological disasters within whatever more general planning exists. Thus, a survey of mitigation and other preparations for disasters in many developing countries in Asia and around the Pacific found that while there was at least minimal planning for natural disaster events in almost all those societies, there was almost none for technological disasters (Disaster Mitigation 1991). This is supported by the fact that an examination of a non-random sample of national disaster plans of developing countries suggests that, at the governmental level, technological disasters are given considerably less attention than those involving natural disaster agents. We were able to look at only a few such documents from cities in developing societies. Mexico City, for instance, until the massive reorganization of planning after the 1985 earthquake, had paid no special attention to coping with technological disasters, even though the emergency services did a respectable job in responding to the San Juan Ixhuatepic explosion. As to Bhopal, it has been said: "an institutionalized hazard management system [had] not been developed" (Bowonder 1985:970), and in the plant itself: "there was the absence of an emergency plan" (Bowonder and Miyake 1988: 254). In Venezuela, we know that until very recently its cities planned more for natural rather than technological disasters, and the same is true for Indonesia.

Now some in-plant planning to cover the emergency or crisis time period is not unknown in the operations of many transnational chemical companies, but as Bhopal showed this is far from a universal pattern. Even when something exists, it seldom is at the level found in developed societies. Moreover, such organizational planning typically focuses almost only on some aspects of the preparedness and response phases and not the mitigation and recovery time periods of chemical disasters. In addition, as found even within Western societies, there is little linkage to community emergency or crisis management systems; the plans often stop "at the plant gate" (Quarantelli 1984). Despite this variability, nevertheless, it is possible to make some generalizations about the kind of disaster planning, and the organizational and institutional capabilities that exist for disasters generally in developing societies.

First, we are not talking of a static situation insofar as such planning is concerned. In fact, just looking at the historical situation from the past to the present, one might be encouraged in terms of dealing with future disastrous occasions. The present is certainly better than the past if one looks at most developing countries around the world. In the last few decades planning for and responding to disasters has improved. There has been a particular acceleration of the process, for example, in Mexico. Where nothing once existed, much has been created; where there was something in place it has been made better. Actually almost anywhere, except perhaps sub-Saharan Africa, that one looks the present as compared with the past is an improvement (Quarantelli 1990).

There is no reason to think that the indicated improvements will not continue to occur. Major or image creating disasters in particular (such as a Chernobyl or a Bhopal) tend to generate efforts at crisis planning distant from where the occasions occurred. The destruction in 1985 of the town of Armero by the eruption of the El Ruiz volcano, seemed to have created the political will to create a new emergency management system in the society (Mattingly 1999: 135) Additionally, general social conditions such as greater expectations by citizens that they should be protected against environmental threats, as well as particular happenings such as the recent UN Decade

for Natural Disaster Reduction, assure that in almost all societies we can anticipate, at a minimum, symbolic if not actual increased attention to disaster planning and managing.

In fact, it could be argued as suggested earlier, that the developing world has a particular advantage over the developed world with respect to planning and managing disasters of any kind. They can directly apply the more current advanced models of disaster planning that exist in developed societies (see, for some recent work, Boin and Lagadec 2000) and avoid the trials and errors' efforts and the simplistic plans attempted in Western societies during the course of the last half of the 20th Century. Planners in the developing world can also use the social science research on disasters accumulated over the last four decades, which only slowly and erratically became available to crisis mangers in the West. In fact, this very report represents an effort to transfer directly the latest and best established of such knowledge.

Thus, the potential of "short-circuiting" some of the historical evolution of disaster planning undoubtedly exists. However, knowledge of problems and how they might be handled does not automatically translate into concrete implementations of policies and programs. In addition, even if disaster planning is in place, it does not mean that it will necessarily be administered and managed well. This is presently true even in many Western societies where disaster planning and crisis managing often falls far short of the ideal. Given this, with the usual lack of resources married to sometime an unawareness of risks and of good disaster planning, and inefficient and ineffective management and organizations, it should be expected that planning for and managing of disasters will almost necessarily always be worst in cities in developing countries.

Overall then, disaster planning has improved and will improve further in developing countries. Nevertheless, when all is said and done, the planning is not that good and it is difficult to see it soon approaching the level that presently it is at in cities in developed societies, which itself is far from ideal (Quarantelli, 1984). But there is a social base upon which improvements can be made if the proper disaster planning is undertaken, the essence of which we will now discuss.

C. Good Disaster Planning and Managing Principles.

As any numbers of researchers on the basis of their studies have concluded, *good* disaster planning typically has a number of characteristics that can be stated as general principles. Presently in the West, for example, it is generally recognized (Sorensen 1988: 242; Quarantelli 1991a) that the best planning to have in place should be based on the following ten general principles: The planning should:

> 1. view disasters as quantitatively and qualitatively different from accidents and minor emergencies;
>
> 2. see that catastrophes are also quantitatively and qualitatively different from disasters:
>
> 3. be on multi risks rather than single in focus, generic rather than agent specific;
>
> 4. include all four time phases of the planning process rather than just one time phase;
>
> 5. aim at multiple rather than single hazard or risk reduction goals;
>
> 6. focus on general principles rather than specific details;

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7. highlight a continuing process rather than an end product, such as the production of a written plan or a document for mitigation;

8. build on research findings derived from systematic data rather than just personal anecdotal experiences or "war stories";

9. emphasize the need for coordination both at the intra- and inter- organizational as well as the community level, rather than "command and control"; and,

10. distinguish between planning and managing, between the strategies and the tactics necessary.

It should be noted these general principles are applicable to all four phases of disaster planning, that is to mitigation, preparedness, response and recovery activities, and not as is sometime mistakenly believed, just the crisis time period of disasters.

A relevant question that can be asked is whether these general principles are equally applicable in developing countries, given that they were primarily derived by Western researchers doing studies mostly in developed societies. The evidence is that these notions can be reasonably imported to developing systems from developed ones, in the same way as the principles for the building of bridges, the setting up of computer networks, or the creation of disaster resistant communities (for the last see Nigg, Riad, Wachtendorf, Tweed and Reshaur 1998; Wachtendorf, Connell, and Tierney 2001) can also be attempted to be used anywhere. The principles at the level at which they are stated are seemingly universal, applicable across different social systems. It is true that a number of developing countries have inadequate and often poorly run disaster planning agencies, and do not do a good job in setting up relevant policies and programs (for illustrations in Asia, see Research on Socioeconomic Aspects, 1989). In a report on Central America, it is noted there are major weaknesses in the institutional management of organizations that deal with disaster related activities. The problems range from weaknesses in the monitoring and issuing of forecasts to the lack of vulnerability and risk analysis in the design of development projects (Reconstruction 1999 38). But these are mostly a problem of organizational implementation and administration, not the lack of applicability of the principles stated above. In other words, managing disaster planning is something different from the process of disaster planning itself.

Along some lines, the above listing can be used as a checklist to evaluate whatever general planning is in being or being considered. Overall there should be general planning initially for all disasters irrespective of agent sources. This does not preclude additional specific planning for particular technological risks and natural hazards within the larger framework.

In fact, we turn now to selectively noting what is some specific planning and managing principles, again research derived, principally addressing mitigation, preparedness, crisis or emergency response, and recovery planning for disasters, mostly at the local community level. Now one general guidebook on planning just for chemical emergencies and disasters outlines 71 pages of topics and dimensions which should be considered in the process (Planning Emergency Response 1981). Clearly we cannot address here the full spectrum of issues involved in the range of specific planning necessary. Thus, we confine ourselves to those that are major, that we think can make a significant difference, and that are more or less realistic in the context of the average city in developing countries. Some communities can do more than we suggest, others by any realistic standards, could not reach the proposed level. Nevertheless, to use a current slogan, steps can be taken to move toward disaster-resistant communities (Geis 2000).

1. Mitigation planning.

To some mitigation is a new idea for disaster planning and managing. The fact of the matter is that activities which were clearly of a mitigatory nature, especially of a structural nature, have been reported for ancient Egypt and China (in the last, mitigation measures were undertaken since at least 4000 B.C. and perhaps in the 16th Century B.C., see Qingzhou 1989: 193-194; see also Waterbury 1979). And even in the United States the recent focus on mitigation has tended to overlook that in the 1930 and 1940 extensive efforts particularly at structural mitigation measures against floods were undertaken by the U.S. Corps of Engineers. So mitigation is not new (Tierney 1989). The importance of this observation is that it might be worthwhile looking at past efforts to see if and in what ways they were successful or not. Lessons can be learned from earlier attempts at disaster mitigation.

That said, it has to be granted that the call for mitigation almost certainly has never been as widespread as it is at the present time. However, it is important to note that the term "mitigation" tends to be used in two major but different ways in the research and professional disaster literature. In American society and some others it generally refers to the away-from-and-before impact time measures and activities to eliminate or weaken risks, reduce probability of their occurrence or weaken the negative effects of disaster impact. Examples would be appropriate building codes, undertaking of consciousness-raising about risks and disasters, targeted educational programs, relevant zoning and land use rules, insurance purchase (Britton 1991a), compliance and enforcement of safety regulations, etc. Thus, mitigation in this framework is seen as but one of the four phases of disaster planning and managing. Thus, Vatsa and Krimgold note that:

> Mitigation . . . focuses on measures to reduce the vulnerability of households and communities, lower the probability of a hazard event, or reduce the impact of a disaster. Mitigation represents typically ex ante measures, and these measures could easily be integrated to normal development activities . . . Mitigation . . . must be distinguished clearly from . . . disaster preparedness (2000: 142)

In most other parts of the world, mitigation often has a much broader referent. It is used to refer to any measures taken at any time to reduce the impact of disasters, including what those using a much more limited reference of the term would think of as preparedness and response measures (like good warning systems or evacuation). At the mid 1990 meeting held by the UN at Yokohama, Japan to mark the midterm of the International Decade of Natural Disaster Reduction, there was much talking past one another by the participants using a very broad referent and those using a much more limited referent of the term (although it was disturbing that many participants showed no conscious recognition that they were not communicating at all about the same process). Actually even within any given society, there are often contradictory uses of the term. For example, while the Federal Emergency Management Agency uses the term mitigation in the more delimited sense, a very recent report from the Board on Natural Disasters of the U.S. National Academy of Sciences uses the term in the broadest sense (1999)! Anyone using the term should make explicit their referent. This of course is equally applicable to organizations who say their primary goal is disaster mitigation.

With respect to disaster mitigation, at least as we use the term in its more limited sense, the ultimate ideal goal is to eliminate the threat. But this is mostly an unrealizable dream. Apart from the eradication of a few diseases which could take epidemic form, such as smallpox, there are almost no cases in which this has happened historically and usually the elimination of any threat has been only along very narrow lines (e.g., what used to be frequent explosions of boilers, has been because of some safety features introduced, reduced to a rare occurrence). As such, reduction of risk is a much more viable possibility. It can and does occur. For example, strengthening building and construction practices, passing and enforcing through strict inspections relevant structural codes and housing standards, training and educational programs for public officials and citizens, etc. have substantially lessened the number of deaths and injuries

after earthquakes in cities in developed countries. Thus, the huge difference in casualties between the earthquake in Armenia and in Northridge (with reports of 10,000-25,000 dead in the first case and only 61 in the second case) has been attributed mostly to differences in building construction and enforcement of housing codes in the two societies involved (Poghosyan 2000). It is of some interest also that both in the Mexico City earthquake of 1985 and the Armenia earthquake of 1988, the greatest physical damage occurred in *new* construction (Krimgold 1992: 217), which raises a question of why later construction proved less reliable than earlier work. If nothing else, given the societies involved, it suggested that perhaps inspections and the maintenance of quality control might be rather important variables.

Our three points below are aspects that we think ought to be stressed with respect to mitigation especially in the more limited use of the term. In other words, mitigation planning would be improved if the following aspects were stressed.

> a. An initial requirement for mitigation planning is that the community is or becomes aware of probable disasters in that urban locality.

This may seem obvious. However, it is a fact that for many communities, a major disaster is a one time happening during the course of a generation. This of course is not true of very disaster prone localities such as Buenos Aires, Argentina which in the last 15 years has been flooded 37 times (Herzer and Clichevsky 2000: 34; see also Herzer 2002). But for most specific communities, even in developing countries, a direct impact of a major disaster, from a statistical viewpoint, is a rare happening, unlikely to be experienced directly more than once during a lifetime. We know of no surveys on this matter in developing countries, but some studies in the United States seem to indicate that the majority of citizens report that they have never directly experienced a major disaster. This would hardly be the case for a country such as Bangladesh, and even some Pacific island nations, but these are the end point of a continuum about experiences with disasters. Most developing countries are not at either end of the continuum. The important point is that although people can come to believe that they are at risk from a disaster, this will usually not happen without some direct experience. An ongoing **DRC** evaluation study of Project Impact in the United States reported:

> Repeatedly, DRC researchers have heard from [Project Impact] community leaders . . . that it would be necessary to have a disaster hit their communities in order to focus attention on the need to support mitigation activities (Disaster Resistant 2000: 25).

And even such an experience can be easily dismissed as the only such likely experience of that kind during a lifetime. Thus, any effort at disaster planning especially for mitigatory measures must take into account the experiences of the particular society to disasters, maybe over the last 20 years or so.

The probability of disasters needs to be recognized. Awareness of the risks and threats involved is a crucial precondition for almost any meaningful actions. As Shrivastava noted for technological disasters, a first step is to:

> acknowledge the possibility of crisis potential. Corporations and governments, particularly are sometimes reluctant to admit that their industrial activities could lead to serious crises (1987: 118)

While some governments in developing countries know and accept the probability of natural disasters, this is less true of the technological ones we have discussed, and almost certainly for probably none of the newer disasters those we have projected for the future

Initially, what is crucial in setting the stage for disaster mitigation is that local community officials be aware of the possible problem. The notion that residents or citizens need to be first aware of such a possibility can be questioned. Such a view seems to be based on pseudo democratic ideas that changes in community life need to be pushed from the bottom, at least from citizens up to community officials. Now it is true that implementation of local disaster mitigation measures absolutely requires if not the active help of citizens, at least their conscious willingness to go along. But good disaster mitigation planning necessitates that local officials should be the first to be aware or to become aware of possible disasters for their locality.

In some respects our view is that from a strategic viewpoint the first stakeholders that need to be convinced about the possibility of disasters, are local officials. They should be the targets for attention by any policy planner or group interested in pushing for disaster mitigation measures. Across the board mass educational campaigns to inform citizens makes much more sense after the consciousness of local officials about the possibility of disasters in their community has been raised.

The position being suggested here does not preclude national level organizations, programs or policy from being used to try to influence local bureaucrats. In fact, it is often possible, depending mostly on the political and governmental structures of the society, for higher level entities to directly or indirectly pressure local entities to take certain actions. Of course that usually requires a fairly sophisticated understanding at higher levels, about what actually can be done through which ways that are politically realistic in the situation. As studies of wartime Germany and in the Soviet Union have shown flat directives or unexplained orders from the top, often do not result in any hoped for compliance by lower official levels. One does not have to be Machiavellian in orientation to understand why this is the case.

> b. Knowledge about possible disasters at the community level is not enough; there must be a willingness to as well as an ability to implement mitigation measures.

General awareness of potential disasters does not automatically translate into action. In a recent survey of the disaster planning in Tehran, Iran, it is noted that the area has a history of earthquakes of magnitude 7.0 and higher. And while a comprehensive plan for disasters has been developed by officials, "The steps that people can take to protect themselves are not known and the demand of the community to have themselves protected is not forthcoming" (Nateghi-A 2000: 210). In short, there is no supportive social climate for mitigation measures in this particular social setting where national and local officials have established the risks involved. The same seems to be true from the threat of floods in Seoul, Korea. City officials are aware of potential disasters but flood risk zoning and land use control is not practiced partly because of citizen "indifference" and also because in that large, densely populated fast-growing city it is very difficult to leave any land for just open space uses (Kim 1999: 112).

In the instances of the importation of technologies into developing societies, some steps could be taken before any they are set into place. Unfortunately in many cases community agencies often can only react to a threat that is already in place. For example, most advanced technologies are usually imported from the outside into developing countries. But chemical companies for instance, especially the multinationals operating in developing countries, ordinarily deal with the central government. As a result, local authorities frequently have little say on the siting and inspection of chemical facilities and the policing of adherence to safety regulations and standards. Similarly siting decisions about nuclear power plants are typically made at the national rather than local level (Towfighi 1991: 107). Thus, it is crucial that urban municipalities are at least cognizant of the kinds of threats that are entering into or present in their communities. For this they need a local agency which can monitor the advent or increase of such risks. While a local organization with specific disaster responsibility would be the ideal choice, community planning agencies could carry out the task since it is somewhat relevant to their normal operations.

Even where the local community might have little input on the placement of technological risks in their local area, they can often undertake actions which will reduce the risk to vulnerable populations. Clearly an important step would be to keep large population concentrations away from dangerous facilities or places. Technical knowledge on establishing the boundaries of flood plains, for instance, can easily be obtained. Of course, as the Mexican case study on the petrochemical explosion we described earlier indicates, people are likely to converge around such locations and establish squatter settlements. There are meaningful reasons too why people live in flood plains. Thus, there are difficult political considerations that can enter into any decision about keeping people away. Nevertheless, it is a fact that restrictive/exclusionary land use measures and zoning codes can be used to attempt to reduce risk. But of course there has to be socioeconomic and socio-political support for such measures. That is not always present: In Brazil it has been said that because of the elite's vested interest in rapid economic growth there is an absence of or a weakness in many institutional strategies for the reduction of accidents, such as risk analysis, land-use planning in the sitting of hazard facilities, mandatory accident notification, disaster planning and information dissemination between community members and workers about risks in and measures for crisis situations (Porton and Freitas 1996: 20). Even in developed countries, it is not the absence of knowledge about flood plains, but an unwillingness to use it in community planning.

Furthermore, it is possible to project some of the degree of risk that is present by the undertaking of environmental impact assessments before locating a plant in a particular location, and by an impact assessment if a facility is already in place. Along this line, there is no need for the extremely detailed assessments that are often used in the West which sometime become caricatures of bureaucratic paperwork running amuck. It does not require any great sophisticated technical skill or much field work to judge that if a densely peopled neighborhood is right across the street, as was the case in the San Juan Ixhuatepec occasion we described earlier, from a facility handling dangerous substances, that there is considerable risk for those persons. Similarly, at Bhopal, two of the largest slum colonies in the city existed across from the Union Carbide plant even though the area was not zoned for residential use (Shrivastava 1987: 4). Similarly, it is not lack of knowledge by people who reside in much of Bangladesh about the risks from cyclones that is the real problem. It is the failure of the communities involved to take measures that if not totally protective of all areas will reduce exposure of residents to the most vulnerable locations. The first point we made is that there must be knowledge of the threats involved; the second point notes that knowledge is not enough whether at the level of citizens or community officials. There must be an understanding of what measures can be taken and a willingness to take them.

> c. Non structural mitigation measures should be given priority over structural measures at the local community level.

Without doubt, thinking about mitigation has changed markedly in the last two decades. One of the differences is that nonstructural measures have been emphasized more and more. This has been a world wide trend.

That said, our perception is that the move toward non structural mitigation is more complicated and less clear cut than a simple statement about the trend would imply. For one, lip service to the idea is not infrequent. While the value of nonstructural measures is stated, actual measures that are implemented are mostly of a structural nature. To some extent this may be because mitigation is still often thought of a problem that requires an engineering solution. If so, engineers are not professionally oriented to think of non structural approaches.

A current controversy in China about damning the Yangtze River partly illustrates the problem. Opponents have argued that most of the end results desired could be achieved by non structural measures with also less of the negative effects of building dams, such as from having to uproot and evacuate millions of residents to permanent losses of part of the cultural heritage of China. The particular example here is not important in itself but is used as an illustration of the fact that

national and local decision making regarding structural and nonstructural mitigation is often highly contentious with the choice frequently ending up being the result of the exercise of political power from the highest levels. Given governmental structures and assigned levels of responsibility, it is not surprising that the wishes of local communities often do not win out.

However, in some cases appropriate mitigatory measures are well within local prerogatives. In these instances there should be efforts toward the use of safety technology and an effective regulatory system. Although we indicated some of the possible unwanted negative effects earlier, it is nevertheless true that technology can be used to increase the probability that key installations are properly designed and run, and that appropriate monitoring systems are used. A regulatory system controlled by community authorities, if correctly administered, can increase social pressure for proper maintenance and correct procedures.

As was said of Bhopal:

> Had the plant been properly operated and maintained the whole tragedy would have been avoided. Design lacunae were amplified by poor maintenance factors (Bowonder 1985: 96. See also Bowonder 1988.)

It is of course possible to over regulate as many have said is the case of the American nuclear industry, but that said, it is true that even including the Three Mile Island disaster, there has been no nuclear plant accident in the United States that has resulted in casualties outside of the facilities. Current regulations and supervision of lifelines in developed societies, although far from perfect, also seem to make a difference in increasing safety and reducing accidents.

Our overall view is that nonstructural mitigation measures should be given the highest priority at the local community level. This does not mean that structural measures should not be considered in the planning. However, at the local community level, when looked at from the viewpoint of costs involved and acceptability by residents, the non structural route would appear to be the best one to take.

It might be said that none of the three recommendations we make regarding disaster mitigation likely to be fully implemented. This may be true, but a start has to be made for without awareness of disasters for local communities nothing is even likely to be considered. Furthermore, as we will indicate later, a case can be made that mitigation measures are not necessarily those that should have the very highest priority in planning. Creating resiliency to react to disasters when they occur perhaps should be given greater weight rather than just trying to achieve unattainable levels of elimination and reduction of risks (see Mitchell 2002). If so, preparing for disasters becomes very important as we now discuss.

2. Preparedness planning.

For those who use the four phases or stages of disaster managing, this kind of planning is intended to improve crisis time response if a disaster were to occur fairly soon. It includes a number of ahead of time activities as: (a) might minimize disaster damage--such as the creation or improvement of forecasting and warning systems, or informing organizations ahead of time on how to safeguard themselves at times of impact, and also (b) which could enhance response operations at crises times--such as the prior inventorying and stockpiling of medical supplies and food stocks, or the setting up of emergency operations centers (**EOCs**).

> a. Urban communities have to at least put preparedness planning for disasters on their community agenda.

As in the instance of disaster mitigation, there is also a need to put disaster preparedness on the community agenda. In many respects the planning problems are the same except that in most

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cases, mitigation is frequently not on the agenda at all. In the instance of preparedness, at least at the organizational level in most community, there usually is either some formal or informal group with at least some responsibility for local emergencies.

At the citizen level, apart from areas that are frequently subject to disasters and have a disaster subculture expectation (such as for typhoons in Vietnam), it is rare to find populations to be self interested much less concerned about such threats before they materialize. The great majority of people in all societies are oriented to the "here and now." As such, the idea of a possible future disaster in which they will be directly involved is seem as so remote, unlikely and uncertain that the threat does not enter into consciousness, or if it does, is usually quickly dismissed. Human beings are unlikely to be engaged by something they do not see as personally involving themselves (or what they value such as their family), which is not immediately present, and which are not certain to occur. This is true even in localities which are subjected to recurrent disasters, such as Seoul, Korea which has had serious floods in 1966, 1972, 1984, 1987, and 1990 (Kim: 1999: 92). The ordinary individual is preoccupied literally with day-to-day concrete problems of living, and is not interested in remote, abstract, rare statistical risks which may be on the scale of years.

All this suggests that insofar as preparedness planning is concerned, the major initial effort ought to be given to raising local organizational sensitivity and awareness of local dangers and threats. Awareness of threats by citizens and their taking precautionary steps is certainly desirable. But citizen participation is not the panacea that much writing about developing countries seems to imply. Insofar as any threats are concerned, it might be more important initially to improve the emergency stance and preparations of those urban agencies and groups which will necessarily respond if a major disaster occurs. Charles Fritz suggested this 50 years ago insofar as America disaster planning was concerned. While a number of things might be desirable, when everything cannot be done at once, priority ought to be given to that which can be more easily done and which on balance would have the more immediate and greatest payoff. Thus, he suggested that priority be given to having local emergency groups in the United States undertaking disaster preparedness planning, instead of first attempting to teach citizens through mass educational campaigns about disasters and how they could personally prepare for them. We think this view is equally applicable to disaster preparedness in cities in the developing world.

Now given all the problems the typical metropolitan areas have in developing countries, it is rather unrealistic to expect they would give any high priority to disaster planning. Many can barely cope with everyday municipal problems. However, it would be an improvement simply to get such planning or part of it on the community agenda, that is, at least given some formal attention by the local political and governmental system. Otherwise, many other necessary, preparatory steps, such as a local risk assessment and measures we suggest later, cannot even be initiated.

However, it probably would not be wise to just undertake planning for possible disasters alone. That risk should be considered as part of overall developmental planning (see Freeman, Martin, Mechler and Warner, 2002). This is especially important given that in many cases in developing countries, there are relatively few specifically disaster oriented agencies at the local community level. Establishing a new group is almost always more difficult than assigning a new task to an already established organization whose traditional activities might have some connection to whatever change is being proposed. Thus, it should be easier to make disaster planning part of community developmental planning. Such a link to local developmental planning would additionally in the long run allow the possibility that local disaster mitigation and recovery planning could also be linked in the same way (Petterson 1999).

Making a link between forms of planning at the national level has of course been long advocated by some (e.g., Cuny 1983; see also Twigg 1999). An even stronger case can be made for a local level linkage. The actual carrying out of the great majority of disaster planning of necessity takes

place at the community level, be this a city, town or village. This is because human beings everywhere are organized at the local community level to carry out collective tasks.

>   b. The major organizations likely to be involved in responding to disasters in urban areas need to be identified by some local group and their roles and responsibilities spelled out ahead of time.

Convergence of people, goods, equipment, communication, is a very common occurrence in almost all disasters (Drabek 1986: 174-175; Scanlon 1992). For a variety of reasons, community disasters are especially likely to create a massive convergence of many extra-community and even transnational groups, as well as organizations from the private as well as public sector undertaking a variety of technical and nontechnical tasks. After a cyclone hit Orissa in eastern India in 1999, "235 international relief organizations arrived to help" (Moorehead 2001: 4). Who these convergers will be, what they will do, and their legal and other responsibilities, cannot be primarily left to emerge spontaneously at the time of an emergency or a crisis. While there is little reason to think much of the convergence can be stopped, prior planning has to occur so that many problematical aspects could be lessened. In particular the local community organizations and government must know with whom they are likely to have to deal with at the time of crisis.

Otherwise, there can be the confusion that occurred at Bhopal:

>   Not confirming the leak when the civil authorities telephoned the
>   factory staff to enquire about the leak, delayed the evacuation
>   process. This caused confusion among the police and civil
>   authorities (Bowonder 1985: 250).

Advantage can sometimes be taken of relatively minor crises to learn what might happen, although it is important to remember that disasters are more than simply a big accident. In any case, some kinds of drills involving all major social entities should be undertaken. While the planning and exercises required around nuclear plants in the United States, based as it often is on extensive use of computer technology, probably should not be used as a prototype for communities in developing countries, but many of the general ideas and activities involved are certainly relevant and ought to be incorporated into greatly simplified local plans. Another possibility of course is for areas subject to recurrent disasters is to systematically look back at those experiences and see what was done right and what could be done better. Such lessons could then be incorporated into drills and exercises. Here again, at least initially it is less important to get widespread citizen involvement as it is more important to get key organizations that will be involved in disaster management to participate in drills and exercises.

Crucial for this kind of inventorying and preparing activities is that some local organizations take the lead role at least to get it going. If the locality is accustomed to natural disaster experiences, there probably is an already existing group which takes the leadership in such crises, informal as the responsibility may be. In many developing countries, police agencies would seem to have some of the required understanding of and everyday linkages in the community to do the job. However, they often are not always positively viewed and given the legitimacy that would be necessary by all the multi ethnic groups that live in many large metropolitan areas. Perhaps some regular social service agency has or could take such a role. It should also be noted that in Western Europe and the United States, certain non-public segments such as the local Red Cross or parts of the private chemical industry have taken a leadership role in preparatory measures insofar as that threat is concerned.

>   c. There is need to have extensive and continuing dissemination of information about likely risks and how to cope with them to those who need to know in local areas.

This necessarily is dependent on a local risk assessment being made in the first place. To be maximally useful, it has to be locality specific. Only some cities are seaports. Not all have

nearby chemical and/or nuclear plants. Not all are in flood plains or in the paths of volcanic eruptions. Some have high rise buildings, while others have huge squatter settlements. Certain urban areas are populated by a vast array of ethnic groups. A few are just entering the computer age. Many others have barely functioning lifeline systems. Particular localities have many natural disasters whereas a few may have none. These all affect the risks and vulnerabilities of any specific urban area.

However, it is not enough to know what the threat is. For example, as studies in the United States have shown with respect to potentially dangerous chemicals (given also as we indicated earlier, the different forms the threat can take), even a correct identification does not automatically translate into knowledge of the correct protective actions that should be taken. In fact, there have been instances where because of lack of knowledge, responding fire departments by inappropriately spraying water on an otherwise inert chemical have provoked an explosion or fire. In part, this is why it is necessary to prepare ahead of time before a crisis situation emerges.

With correct knowledge of the threat and how it might be coped with, then relevant information can be circulated to potential victims, emergency organization officials and the medical sector. For example, with respect to Bhopal it has been written:

> The information that MIC is a toxic material should have been available to the public staying in the vicinity of the plant, the public health authorities, and government agencies. The possible precautions which should necessarily be taken in the even of a leak should have been publicized. Mere inhalation through a moist towel would have made MIC inactive. If this information had been disseminated . . . a number of lives could have been saved (Bowonder 1985: 96).

Of course in the case of nuclear material, hazardous waste, biotechnology substances and some other technological threats, both more specialized knowledge and equipment would be needed.

On the other hand, it should not be ignored that the new technologies may be dysfunctional in certain situations. A case in point is what happened in Lima Peru in 1999. A report emanating from an unknown source on the Internet said that Japanese scientists had predicted that a magnitude eight earthquake would strike the city between two and three a.m. on a Tuesday. In a process not understood at present, local radio stations then passed on this misinformation to their audiences in the capital city. That Monday night and Tuesday morning, hundreds of persons in four of the poorer neighborhoods slept out in the streets fearing a massive earthquake would occur. Although local authorities issued statements on the radio that the report was incorrect, firefighters reported treating seven cases of hypertension attributed to the rumor and news stations received hundreds of telephone calls asking about the earthquake (www.popsci.com).

In the above discussion, our emphasis has been on organizations, the leadership roles they must play, and on their having relevant information and circulating it. Almost anything else that might be advocated about preparedness planning we would suggest could not be undertaken without such organizations in place and ability to communicate about different matters. Again, a start must be made somewhere, and we have indicated where it should be with respect to this phase of the planning process prior to any disaster impact.

3. Crisis time managing.

This planning generally has to do with those actions that most closely follow a disaster impact. These include activities which are designed to: a) provide crisis time assistance such as search and rescue or emergency medical services; b) reduce the probability of secondary damages such as setting up roadblocks or evacuation routes so that evacuees will not go toward but away from

danger; and c) help speed the initiation of recovery operations such as through the undertaking of a systematic damage assessment or the arranging for temporary sheltering and housing.

      a. As much attention needs to be paid to principles of managing as to those of planning.

Disasters are particularly characterized by all kinds of specific *contingencies* which cannot be handled well by general planning. Now it is very easy to assume that if there has been community disaster planning there will be successful crisis or emergency management. That would seem to be the purpose of planning ahead of time. But often there is a big gap between what was planned and what actually occurs in a major disaster. The reason for this is twofold. One is that the planning, particularly preparedness and response planning, can be poor in the first place. Poor planning can only lead to poor management activities.

But more important, is a failure to recognize that the principles of emergency or crisis management are somewhat different from the principles of disaster planning. These principles are *not* simply two sides of the same coin. Perhaps if a parallel is drawn, the last point can be made more clearly. The military draws a distinction between strategy and tactics. The former has reference to the overall approach to a problem or objective. But there are always some situational factors or other contingencies which require particular adjustments to attain a specific goal if the overall objective is to be attained. This is the area of tactics. In somewhat parallel terms, good disaster planning involves the general strategies to be followed in readying for disasters. In good crisis management, particular tactics are used to handle the specific situation contingencies which are present or which arise during the course of the crisis.

All major disasters are characterized by all kinds of situational contingencies. For example, a flood or a tornado does not just happen; it occurs in a particular locality at some social time in the community life. In every locality, and particularly urban ones, there is a rhythm to social life with certain activities ebbing and increasing in particular patterns and cycles which vary and not always directly to the time of the day, the day of the week, and the season. Such situational contingencies have to be well managed to avoid problems in mounting an effective and efficient response. While it is not possible here to even indicate the full range of contingencies that are possible, let us illustrate further by giving an example.

For instance, a dangerous biological, nuclear or chemical incident in most places around the world can occur on private property, a mixed public-private setting, or a public location. There are different implications in managing the crisis response depending on which was the situation. They range from the degree of knowledge about the occasion that is likely to become publicly available, to the probable courses of action that responding organizations will or can take. Thus, **DRC** in its studies found that when chemical accidents occurred inside the company's property, the larger community rarely found out quickly about such happenings unless there were immediate casualties or fatalities. In nearly all cases **DRC** examined, there was a time delay in the time between when the accident on private property was turning into a disaster and when this happening became public knowledge. Until the accident at Three Mile Island, many internal mishaps in nuclear plants elsewhere never came to the attention of outsiders (Schlager and Petroski 1994: 488-539).

As we have just indicated, it is necessary to keep in mind that planning and managing are two different processes. There is only a partial relationship between the two. Planning may exist, but it may not be good planning. In that case, implementing poor planning in the managing of a disaster is obviously not a good thing. Good planning may exist. But it does not follow that the implementation will necessarily also be good. A post earthquake examination was made of the 1999 earthquake in Turkey, especially in the city of Dinar. The conclusion of the study was that:

      Previously prepared disaster management plans could not be
      implemented. 'The plans just stayed in written documents kept
      in dusty shelves. Furthermore, the community was not

adequately informed about rescue and relief operations (Karand and Aksit 1999: 36).

Of course part of being able to link planning and managing is an understanding that the two processes are different. This is not even fully understood by disaster researchers, let along emergency planners and crisis managers. It is a point however that any organization wishing to influence disaster managing anywhere should convey to relevant groups.

   b. Greater attention needs to be paid to especially difficult disaster management
   problems.

There are at least two major problematical kinds of crisis time responses in disasters in cities in developing countries. One has to do with search and rescue, and the other is evacuation. For reasons we will indicate later, both tasks are especially difficult in urban areas.

The great majority of search and rescue activities in disasters are overwhelmingly carried out by friends, relatives and neighbors in or near impacted localities. Such emergent and informal behavior is all but impossible to plan for, so little can be done about this activity in the preparedness phase of disaster planning (except to make citizens conscious of the fact that they may very well try to help others). But there is a particular management problem in disasters that destroy or collapse large or high rise buildings which bury or entomb victims, dead and/or alive, under much debris (Noji 1989: 257). Finding and getting to such victims can usually not be done by individual or small groups of citizens, although they may try to do so as happened immediately after the Mexico City earthquake and the Indian earthquake of 2001 (Gardiner 2001). Such kind of search and rescue requires earthmoving equipment, heavy duty drills and other specialized equipment, that only personnel with the appropriate knowledge and skills can use.

This task needs to be planned ahead of time when it will have to be implemented in the managing of a disaster. But there maybe be a question about the availability of the necessary equipment and/or personnel even in large cities in developing countries. In fact, our non random review of a number of disaster plans from urban localities found few of them even addressed this potential problem (the planning for Singapore did, but it is a small city state and not really a developing country). But ready or not, any city with very large or high rise buildings should expect that it will have this management problem in search and rescue. Even developed countries have struggled with this problem. The United States for example has created some standby highly trained urban search and rescue teams which it hopes will be able to move into an impacted area soon enough, but there has been no major test of these groups so far in actual disasters (although the regional level urban search and rescue teams were mobilized in the aftermath of 9/11, most such activity was carried out by more informal groupings; see the highly controversial book by Langewiesche 2002).

While there can be many crisis time problems, evacuation can be especially problematical (Perry 1985; Vogt and Sorensen 1987). For a variety of reasons, even when people receive adequate warnings, there still may be reluctance to leave. For example, in a 1991 cyclone in Bangladesh, half of the households in two coastal villages, all of whom received early warnings of the threat, did not leave their homes to seek shelter (Haque and Blair 1992: 217). Moreover, although evacuation is a very common occurrence in all kinds of disasters (see Lindell and Perry 1991), it is extremely likely in technological ones. Sometime this behavior can involve large numbers even when the occasion results in only a few casualties. Thus, a toxic sulfur trioxide release in New Delhi, India in 1985 forced around 100,000 to evacuate and a crude oil explosion resulted in around 200,000 evacuating from a crude oil explosion in Guadalupe, Mexico in 1989 (Cutter 1991: 280), even though in both cases there was no significant damage to human beings. Moving such large numbers efficiently and effectively requires both prior planning and good managing. That it can be done rather well is illustrated by the Canadians evacuating around 215,000 residents in a Toronto suburb, Mississauga, as a result of the perceived spill of dangerous chemicals from a train wreck (Scanlon and Padgham 1980).

However, it is the termination of evacuation that is especially problematical, a fact seldom recognized by operational personnel who worry more about getting people away than bringing them back into the local community.   The termination of evacuation is often conflict ridden (Stallings 1991b: 193). It is typical that there is disagreement over the level of danger remaining and thus whether it is safe for evacuees to return. At least in developed societies, although there is no reason to think it would not be the same in developing countries, evacuees tend typically to be more skeptical about what is safe than are government personnel. In addition, local officials often want to terminate an evacuation because of the costs involved whether this is for overtime pay or the economic losses from work stoppages and business interruptions; whereas residents are often more leery about permanently going back.

Furthermore, most evacuations in chemical and nuclear disasters (as well as future biotechnology ones) involve situations where there is no visible threat (as also in the case of radiation) from the perspective of citizens (Stallings 1991b: 195). Thus, there may be no physical clues that the crisis has ended. This makes both evacuees and public officials dependent on experts, who may or may not be readily available, unless preplanned. The crisis situation is often exacerbated in that no official guarantee can be made that even the absence of current symptoms does not rule out the future occurrence of negative effects (possibly even in yet unborn infants). This is usually in the context that in many societies there exists extremely negative cultural images surrounding toxic chemicals and nuclear risks. These are images that conjure up strongly held fears of an out-of-control technology that can be viewed as evil incarnate (see Wilkins 1986). Future biotechnological threats will probably be perceived in even a more horrid way.

> c. In responding in the crisis time period of disasters, a balance has to be achieved between organizations undertaking traditional tasks and engaging in new ones.

A general disaster planning and managing principle is that it should stay as close to possible to everyday patterns. However, in all major disasters, there is the emergence of many new behaviors and groupings in the attempt to cope with the multiple contingencies created (Drabek and McEntire 2003). This is because the usual patterns cannot deal with all the demands created by a disaster. In fact, the greater the disaster, the more organized improvisations of all kinds appear accompanied by pluralistic decision making in tasks ranging from evacuation and the providing of emergency medical services to interorganizational coordination and community priority setting (Quarantelli 1996a). While the emergent phenomena are partly rooted in and come out of preexisting structures and functions, there is also always an element of the new, novel, nontraditional or nonroutine in what can be seen at the height of a disaster (Kreps 1991; Drabek and McEntire 2003; see Aguirre et al. 1995 for emergent groups in the Guadalajara, Mexico, gasoline explosion disaster).

However, it is necessary to note that metropolitan areas and in particular those in developing countries have to deal with everyday emergencies, for instance with respect to traffic and parking congestions, garbage and waste collection, delivery of health services, etc. There are relative effective if not efficient activities in almost all cases, because if that was not the case, the cities involved would not continue to exist. Therefore, whatever the crisis time situation, it has to build on what is in place as well as taking into account that management issues and questions will force some deviation from old often bureaucratic patterns.

In the discussion above we have been generally suggesting the necessity of putting in place a responding system that would be relatively resilient. Particularly in major disasters, some happenings in the response phase are more likely to be problematical than others, and there will be the necessity of coping through nontraditional and nonroutine managing patterns. The crisis time period demands more managing than planning, which partly distinguished it from the recovery phase where the more institutionalized structures can come into play again (see Petterson 1999).

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4. The managing of recovery.

Recovery has to do, in our framework, with those disaster-relevant activities that are undertaken after the crisis response period is over in an attempt to return to relatively normal functioning. In the short term, the focus is on restoring infrastructures, delivery systems and other activities to minimum operating standards. In the long term, the attempt is to restore community life to some degree of normality. The specific measures can range from the providing of financial assistance or of technical information on how polluted farm lands can be restored to production, to the setting up of counseling services for survivors, to the restoration of major lifeline services and the rebuilding of damaged and destroyed facilities (see Mitchell 1996). Often in this time period there is the possibility to amend old laws or pass new ones with respect to disaster planning, or legislation which will facilitate the rebuilding, restoration, and recovery of populations and communities.

> a. Citizens sometimes can become involved in disaster managing as a result of being exposed to a technological and/or natural hazard.

Even in the aftermath of a disaster, many citizens have little interest in becoming involved in managing aspects of the situation. But some people may organize themselves, sometime with the assistance of political activists. Where there is the possibility of recurrent threats, citizen groups are more likely to be generated. At least in developed societies, if people come to define a serious, likely, probable threat in their immediate neighborhood, and if they judge the local authorities as illegitimately dismissing the concern of residents over the danger, the groups may emerge (Quarantelli 1988a). These groups, only a small fraction of who are successful in any way, often tries to pressure governmental entities to do something about the specific threat. On occasion, this involves attempting to get laws, ordinances or regulations passed to prevent, reduce, or to prepare for the threat. Such informal groups may also at times try to prepare the local population for a possible danger from the particular threat involved. To the extent such groups are successful, and only a few do sometime succeed in a localized area, the awareness and preparations for specific disaster agents may increase substantially in certain neighborhoods of a community. While such citizen groups are currently less likely to emerge in developing countries than developed ones, they do appear as they did in Mexico City after the 1985 earthquake (Dynes, Quarantelli and Wenger 1990), in Bhopal after the chemical poisoning and in Turkey after the recent earthquake there.

These emergent groups should be planned for in the sense that the local authorities should be cognizant of their possible appearance during the recovery phase and have some ideas of how they might be used to support improvements in overall community disaster management. In part, this would reduce the tendency for governmental bureaucracies to set up a "we-they" confrontational stance. Of course this will not always be easy for some such citizen groups tend to be co-opted, led or used by political activists of different kinds who often have a non-disaster related agenda.

> b. Local social mechanisms or procedures should be set up to learn from the experience of natural and technological disasters and in various ways better plan for and manage them.

Real experiences of a disaster are much more powerful than anything else in convincing community officials that prior planning should be undertaken. However, the full implications of the realization of a community risk cannot be adequately captured unless the experience is carefully looked at and analyzed. Thus, as part of the managing of recovery there should be a standby activating mechanism or procedure to insure that such a record is made. Some agency should have the responsibility to document the occasion and its problems. Without such information, as hospitals and the medical sector have frequently found, it is all but impossible to assess what the actual problems were, what was done effectively, and what could be done more efficiently in future disasters. In Bhopal, for instance, it was found that physicians and hospitals in the

absence of any prior planning about the real nature of the threat only gave symptomatic treatment to those ill from an unknown poisoning (Bowonder 1985: 86). In both the Three Mile Island and the Chernobyl nuclear accidents, the iodine pill that would reduce some of the effects of radiation had neither been stored enough nor well distributed during the crisis time period.

However, expectations of major changes as a result of a disaster should not be too high. At the organizational level, in the immediate post impact period there usually is much public discussion of how improvements should be made in preparations for future crises. This is particularly likely to occur in the case of technological threats to the extent they are seen as subject to human control and reduction in ways not thought of with respect to "Acts of God." However, even in developed societies there typically is relatively little actual change in group structures and functions after major disasters. The talk seldom gets translated into much concrete actions. But there are occasional exceptions. A few crisis-type local organizations have sometime markedly changed their preparedness planning after undergoing a disaster (Ross 1978; see also Drabek 1986: 284-288). Usually the impetus is the willingness of some key officials to lead an effort for better disaster preparedness so as to get better management of the post disaster situation.

At the community level, across-the-board change is even less likely but not impossible. In developed societies, there is some evidence that there can be community change as well as functional and dysfunctional consequences (Scanlon 1988). As to the former, there is some evidence (see Drabek 1986: 293-298) that disasters can both accelerate some ongoing community trends (e.g., toward more efficient local governmental arrangements), and generate limited new patterns (e.g., mitigation measures). In rare cases, new disaster-related laws can be passed if the experience is well examined and documented. As to dysfunctional effects there is some indication, for example, of magnification of pre-impact community conflicts and generation of new ones (Quarantelli and Dynes 1976); some of this, as a study of a major explosion found, is manifested in blame assignations which however may deflect attention away from social structural flaws to a mass media influenced search for individual scapegoats (Drabek and Quarantelli 1967). Widespread scapegoating and blaming tend to occur after major technological disasters such as occurred in the instance of Chernobyl and Bhopal, and after the recent flooding in Venezuela, and earthquakes in Turkey and in Algeria for the last see Smith 2003) .

So overall while post-disaster change is not widespread, it can occur if efforts are made that are meaningful in the situation. It would be necessary to try to direct the changes toward functional rather than dysfunctional outcomes.

> c. Recovery activities in connection with natural and technological disasters should be preplanned as part of overall community developmental planning.

To plan for disaster recovery by itself is not usually very viable in either developed or developing societies. Such efforts isolated from other social forces operative in any community usually do not go very far. Unfortunately, that is usually what is attempted. It is better to link recovery to more traditional and existing social patterns so that one consequence would not only be helping recovery from disaster but contributing also to the general developments in the community.

It is also necessary to recognize that agencies and groups that get involved in recovery, just as in the instance of mitigation, are typically rather different from those organizations that participate mostly during the preparedness and response phases of disasters. For example, police and fire personnel, emergency medical people, emergency or crisis managers, etc. who typically are the major players during preparedness and response are seldom so for mitigation and recovery planning and managing. City officials, such as community planners, building and housing inspectors, etc. or from the private sector, real estate agents and bankers, etc. will be more visible during the recovery period. The existence of two somewhat different sets of officials living in somewhat two different social worlds with different values and beliefs is something that is always not recognized, and serves to separate in an unfortunate way those groups mostly interested in crisis management and response planning, from those primarily interested and

involved in mitigation and recovery. There are no easy answers to bridging this social gap, but at least all players should be made aware of the problem.

At the individual and family level, it may be important that in some disasters the victims see themselves as facing an uncertain future as regards their health and that of others who are psychologically close. This can become very stressful especially in disasters associated with some technological agents. Although as said earlier, we are not convinced that high priority should be given to measures that assume that there will be major mental health problems associated with disasters. Some evidence in support of this can be seen in a recent study that the probability of developing post-traumatic stress disorders in natural disasters was estimated to be only 3.8 percent (Brody 2000: D8). However, it also appears to be true that one consequence of being exposed to certain kinds of risks like those that supposedly existed after the initial impact of a Chernobyl, Bhopal, Love Canal and Three Mile Island, made the duration of the disaster indefinite for the victims. Much of this results from the perceived uncertain but also the drastic consequences of actual radiation fallout, chemical poisoning, or toxic waste site contamination. Clearly efforts ought to be directed to reducing the stress for such people in the recovery period, although that would not necessarily mean instituting crisis counseling aimed at dealing with post traumatic stress disorders, as we have elsewhere discussed.

Often in the West this is attempted through psychological crisis intervention programs. But the evidence of their effectiveness is far from clear. Apart from that, however, the intervention programs tend to define this part of recovery as requiring a special and primarily disaster-focused effort. We would suggest that perhaps victims can better be reintegrated into normal life through a reinforced or expanded use of traditional service delivery systems concerned with health, poverty, unemployment, etc. (Quarantelli 1985). This could be reinforced if they were thought of as survivors more than as victims. This would indirectly support overall community development programs already in being, because the additional funding, resources, personnel that could be used instead of going into a defined disaster social envelope, would instead be part of the larger community social patterns and processes.

At another level, many disasters contaminate and pollute objects, buildings and even the very ground itself. While this is more likely in technological disasters, this can also happen on a large scale in some volcanic eruptions such as happened at Mt. St. Helens, and in many floods such as the one in August 2000 in eastern India which contaminated vast supplies of water (Kim 2000). These problems need to be dealt with relatively quickly otherwise the community recovery effort is considerably slowed because normal work, school, religious, office, etc., routines cannot be reestablished. Here too, perhaps local personnel could be trained for the more specialized tasks and existing means and facilities that can be used for decontamination, etc. ought to be enhanced. In the long run, such a way of proceeding would not only forward disaster recovery, but also leave in its wake a body of skills, community personnel and resources useable for non-disaster problems.

Of course both of the efforts suggested would be enhanced if a built in pre-impact procedure existed for allowing and moving some of the everyday personnel, facilities, resources, etc. to being used (and augmented for the occasion) for disaster recovery purposes. The best arrangement would be if this stand by procedure was a part of prior community developmental planning. If the community is already doing similar work or undertaking similar tasks, there should be less need for specialized disaster-related only recovery activities.

However, again there is a need to be realistic. Let us note two aspects of this. For one, fundamental social aspects of a society are not easily set aside. For instance, the January 2001 earthquake in India forced the creation of tent cities to house the thousands of homeless victims. However, to the dismay of both domestic and foreign disaster relief organizations, they found that many of the camps were organized along caste lines. Thus,

when relief groups showed up to hand out aid, town leaders
presented them with six lists of residents; Four different Hindu
castes, the untouchables–lower even than the formal caste
system–and Muslims. All the camps are separate. (Caste
marks . . . 2001).

Obviously such a situation presents major problems for relief groups with starkly different values.
There are no easy solutions to such problems, but at least awareness that they are likely to arise
should at least cushion the "cultural shock" that outsiders might undergo.

It should also be noted that there is reason to think that the farther away from impact the more
likely are pre-impact social factors likely to reemerge. At the very height of a crisis, sometimes
even the most traditional of behaviors may be temporarily changed. Thus, while above we
indicate what happened in India during the recovery period, it is necessary to note that in that
same disaster, in some stricken villages Hindu, Muslims and untouchables interacted together
without friction in the search and rescue immediately after impact (Burns 2001b). But the
research evidence is that deviation from deeply rooted traditional social roles and behaviors only
exists for a very short period of time, sometime in terms of hours only.

The second aspect to note is the following. As already indicated several times catastrophes
present different problems than do disasters, and this is also true in terms of the recovery period.
For example, in catastrophic disasters, those who have left may find it very difficult to return
because of the massive destruction of buildings, including both those used for residential and
work purposes, and the slow rebuilding of such structures. This seemed to be true in the
Armenian earthquake of 1988. The population of Leninakan went from about 230,000 to
120,000, of Kirovakan from about 170,000 to about 74,000 and of Spitak from about 18,000 to
three thousand. But literally for years there were not enough livable quarters for them to return to
live in their home areas (Poghosyan 2000). Can such extreme recovery problems be planned
for? Probably not. On the other hand, a careful study of the recovery problems in such a
situation as Armenia might provide some useful clues for other areas faced with potential
catastrophic disasters. It is after all, today, a functioning society so certain "right" things must
have been done.

In the section above, we have in some respect been suggesting that the recovery phase of
disasters offers some windows of opportunities of which advantage should be taken to improve
city life. Citizens can be involved in disaster managing at this stage; lessons can be learned from
the experience and perhaps can be made part of larger social forces already at play in the urban
area. But to some extent this requires that disaster planning be part of existing policies and
programs at higher levels of the social system than the community. Consequently, we will now
turn to this issue.

CHAPTER 6.

RECOMMENDATIONS FOR POLICY AND PLANNING

In this concluding part, after restating our basic theme, we will make some policy and planning recommendations for developing countries as well as international agencies and other organizations who get involved in the disaster planning and managing in such systems. We end this chapter and the report with several general cautions.

A. Our Basic Theme.

In our view, it is very clear that on balance matters are going to get worse at least in the short run. We are going to be faced with more and worse disasters in the early 21st Century in urban areas in developing countries, no matter how much disaster preparedness and personnel in any realistic sense could improve during that time. If we look not from the past to the present, but from the present to the future, the outlook is less favorable. Such changes as will occur in disaster planning while in the right direction will not for the time being be able to match the quantitative and qualitative increases in disasters.

Of course this is no different from what others have observed of more general environmental problems that face the world. As Smelser has written:

> The various environmental crises that the world is facing--
> exhaustion of resources, spoilage, toxicity, and pollution--will
> grow worse before they grow better. The logic behind this
> assertion is that the impulse among nations to develop
> economically and compete with others is so strong that they will
> give this greater priority than impulses to protect the
> environment. In the short run, environmental considerations
> constitute a cost and a liability in the drive toward competitive
> productivity. This effect will no doubt be stronger in those
> nations struggling to catch up--the former Eastern bloc and the
> Third World countries--than in the developed nations with
> developed environmental movements (1991: 519).

Nevertheless, this does not mean nothing can be done. At the most general level, the industrialization and urbanization processes do not have to be completely stopped or somehow undone. As Shrivastava has written:

> Sustainable development does not mean deindustrialization or
> regression to preindustrial modes of production. Instead, it
> simply requires a create search for safer, environmentally less
> stressful, labor-intensive "appropriate" technologies that can be
> operated on a decentralized scale to fuel more balanced
> economic and social development (1987: 120).

In any meaningful sense, the important question is not whether industrialization and urbanization will continue in developing countries but in what way the processes and end results can be modified to reduce the present negative effects.

Furthermore, with respect to emergencies and disasters, if the general and the specific disaster planning principles discussed in the previous section were more or less put into place, that would be a tremendous accomplishment, substantially altering the social landscape of cities in the

developing world. But even if only some of them were put into and manifested in local and national disaster planning and managing, there would be a notable improvement over the existing situation. Some achievement is better than none even if it is not all.

However, rather than restating the implementation of the disaster principles already discussed, in this section we first want to stress that it is the social rather than the technological arena where the future effort to improve planning is needed. We move from that to recommendations as to policies and programs for both developing countries and international agencies and organizations.

The social arena is where future efforts are needed. Much can be attempted, but to be even moderately successful, the "right" approach has to be taken. If the sources and facilitating conditions for disasters are not correctly identified, even good planning will accomplish little.

In addressing the issue of disasters there is a tendency that seduces many. That is, it is thought that the solution lies in more or better technologies. This is not surprising because even when just natural disasters are addressed, there is also a tendency to fall back on technological and engineering solutions. So a major criticism of the approach taken in the UN International Decade of Natural Disaster Reduction was that it:

> holds a narrow view of hazard and hazard reduction. The
> concept of hazard as interaction among physical risks and
> human responses is largely bypassed in favor of a focus solely
> on physical risks . . . In perhaps the program's most glaring flaw,
> no attempt is made to take hazards and hazards reduction into
> account in the context of economic development . . . [it] rest on
> expansive and optimistic assumptions about the role of natural
> science and engineering knowledge in the hazards policy arena
> (Mitchell 1990: 147).

A general implication of our research-based observations is that solutions are not to be found primarily in new technologies or greater use of existing ones. To import more or different disaster technology into developing countries will not solve the problem. The difficulties noted stems from social factors although they may have a technological component. Social problems can only be dealt with by social improvements. Such technological solutions as may seem possible, can only address technological problems.

In fact, as noted earlier, new and different technologies can in themselves aggravate or introduce new problems. This is not always foreseen. For example, an English physician in 1902 blamed the massive air pollution of the time on the dust kicked up by the numerous horses galloping across the slowly disintegrating pavements of London. However, he confidently asserted that:

> the general introduction of motor vehicles and the entire
> banishment of the horse to the country should do much to
> remove from the atmosphere its most prevalent source of
> pollution (quoted in Shaw 1971: 1).

This is not an argument against the use of technology per se or its improvement, only that if something is socially problematical, social answers and explanations must be sought. Sometime in disaster planning an argument is made that it is necessary, for instance, to have more radio transmitters to improve intra- and inter-organizational communication. But studies have consistently shown that good information flow, for example, is mostly dependent on pre-impact established consensus regarding who plays what roles, accepted legitimacy for decision making, social mechanisms for facilitating coordination, pre-impact interaction among local officials who are likely to be involved in crises, etc., rather than an increase in the mechanical means used for communicating.

It certainly should be clear from our discussion that the more and worse disasters of the future can be primarily attributed to changes or trends in human or social factors. Thus, if there are as there are poor rural migrants flocking to and residing in more perilous zones of metropolitan complexes such as Mexico City, Dacca, Lima, Hong Kong, Lagos, and Rio de Janeiro, it is because of the urbanization process, which in turn reflects social conditions that create migration into the cities of developing countries. If the chemical industry is expanding in such societies it is because there are social values that push for improvement in standards of living and because there are complex power relationships between the public and private sectors which make the industrialization process go the way it is going. A similar logic applies to why people live in flood plains or on the slope of active volcanoes. It is the values, norms and beliefs of societies that lead people to act the way they do. If so, the source of disasters as said earlier, are in the social systems themselves.

If the social arena is what needs to be addressed, it can be approached in several ways. We have already indicated general and specific planning principles that should be applied to cope with disasters in cities in the developing world. However, in some senses, such principles ought to be the end result in the implementation of more basic policies and programs. We now turn to such matters in making some recommendations developing countries and international groups might want to adopt to improve disaster planning.

Among other things, it is necessary to recognize that at least in ideal type terms there are different stages in the total planning process, namely:

> 1) a need to formulate relevant policies;
> 2) once formulated, adoption by some relevant government agency or social institution;
> 3) then the development of appropriate country specific programs;
> 4) once adopted, identification of the more relevant target audiences for such programs (these could range from village women to higher levels of national governmental bureaucracies);
> 5) once identified, implementation of the programs by whatever governmental and/or private organizations are appropriate;
> 6) application of both the general and specific disaster principles we have already discussed;
> 7) the need to assess the implementation, that is, to obtain feedback on whether the desired results are being achieved, and
> 8) taking into account such social changes as are occurring that may affect both the newer threats and vulnerabilities that may appear. (Adapted from Wenger and Drabek 1987; also Community Emergency Preparedness 1999).

While there are a number of implications for developing countries and the policies and programs of international organizations on the matter being discussed, we would suggest the following ten could be among the more important ones.

B. Recommendations For Developing Countries.

The following suggestions are primarily intended for national governments and their agencies. Even in developed societies with relatively decentralized governmental systems such as in the United States and Australia, without leadership and assistance from the top of the political hierarchy, not much will usually happen. Some of the steps may be primarily symbolic but important nonetheless, whereas others may require concrete steps.

The governments of developing countries, as indicated earlier, currently have varied and different kinds of disaster planning, ranging from almost nothing to arrangements that are at least

minimally satisfactory. But in all cases there should be attempts at improvement. Planning can be improved. But because something *can* be done, such as undertaking disaster planning, and that something *should* be done, such as undertaking good planning--the can and should in this case will not occur unless there is also the attitude that something *will* be done. The *can*, the *should*, and the *will* are not the same, even though they are related.

The *will* refers to the point that there must be an explicit policy by those responsible for such action so that disaster planning and its implementation is defined as not only worthwhile but something to which time, effort, and resources must be directed. Put another way, there has to be a clear commitment by policy and decision makers in and out of government if anything is going to happen (for how policy makes can be influenced by social science research results, see Coffey 2004). A passive willingness to accept disaster planning is not enough. Implicit rather than explicit support is not enough. If anything is going to happen, there has to be open leadership and provision of some wherewithal to do something. Leadership as the term indicates means taking the lead, getting out in front. The wherewithal involves not only some degree of material support, but the providing of legitimacy and saliency for the undertaking is also crucial. Disaster planning has to be on the regular agenda, not something turned to after a disaster has already occurred. This leads us to our first recommendation. However, as Boin and 't Hart (2003) have noted, there might be some inconsistencies between the expectations and the realities of crisis leadership).

1. Systematic disaster planning, as a matter of policy, must be at least on the formal agenda at the highest governmental level. It is not always high on the agenda in many places, and until recently was almost nonexistent in such listings in sub Sahara Africa, even though the area is hardly immune to natural and technological disasters (Nanjira 1991, but see Holloway 2000 who argues that Africa, while risk prone, has very few sudden natural disasters). Disaster planning need not be given the highest priority, but it must be given some official attention. Without national level attention, local communities are also not likely to pay too much attention to the problem of disasters in their areas.

2. It is one thing to put disaster planning on the agenda. But there must be follow-through measures, particularly financial support. As an example, Olson and his colleagues note that while a national law about disaster planning had previously been proposed five years earlier in Nicaragua, it was not until the 1999 legislative session that a budgeted disaster fund was provided for the first time in the history of the country (Olson 1999: 56). Disaster relevant laws without financial support to implement them are not unknown in developed countries, as was witnessed in the instance of the Super Fund legislation in the United States. But whether the country is developed or developing, without adequate funding even strong laws will be simply paper statements. There are of course complicated issues in any society regarding the relationship of national level and community level budgeting and financial support. Given the history of different countries, the tax base available, the perceived threat of disasters, there probably is no one model of the relationship that would work well in all social systems.

3. More attention needs to be paid to urban disasters as compared to those more likely to impact rural areas. Some developing societies have still not recognized that where they were once primarily rural, they are getting more and more urbanized every day. This lag in thinking is sometime illustrated by the fact that governmental departments that primarily deal with agricultural or farming matters are still the major organizations responsible for national disaster planning or managing. In addition, as we have previously documented, future disasters will impact the megacities in such systems and not just urban areas. And as we described earlier some disaster problems have particular urban related qualities that will be need to be addressed in planning and managing. Nevertheless, if a society still has many people living in rural areas and especially if a rural rather than urban way of life is still widespread, attention will continue to be needed so that such areas will have proper disaster planning and managing (see Brammer 1999 for disaster management in agricultural areas). That this may still be a problem is illustrated by the fact that just a decade ago, approximately 80 percent of the population lived outside of

cities of 100,000 or more (Kasarda and Crenshaw 1991: 472), although the earlier point we raised about an urban way of life should be kept in mind.

4. There is a need for specific risk analysis of the possible disasters in particular countries. However, the earlier problem of the differential perception of risk by experts and laypersons has to be addressed in some way. Perhaps for projecting potential risks in a strictly technical sense, without involving citizens generally, the expert views might be used. For many natural disasters, this frequently can be considerably helped by the use of new tools such as Geographic Information Systems (**GIS**). It is not clear that such technologies are equally useful for dealing with projecting threats from technologies used for industrialization purposes. Probably more than specific risk technologies per se, it might be more useful to encourage the development of social networks. We have already mentioned the establishment of **GDIN**. It will need trained personnel who can communicate the information in acceptable ways (see the **GDIN** electronic newsletter at www.gdin-international.org). Just recently an English satellite developer announced plans to launch in orbit a constellation of five satellites in early 2002 devoted to monitoring natural and human-created disorders. Leaving aside the specifics of this particular innovation, clearly any similar technology can only work if there is the creation of some information dispersal network that links people and groups. The point here is somewhat similar to one made earlier that the problem in Bhopal was not the technical breakdown of some machinery, but the failure to import a safety culture along with it that would allow a coping with any breakdown. In short, technologies without people, who can competently run them, will be inherently problematical. So some international organization might take as its responsibility the training of personnel to operate risk monitoring and related technologies.

5. All four aspects of disaster planning--mitigation/prevention, preparedness, crisis time response, and recovery--need to be concurrently addressed. They are as we have written elsewhere linked to one another in a circular fashion--what is done in one stage will have consequences for what is planned at the next later stage. While all phases should be attended to, it does not follow that all should be given equal weight. As we have implied earlier, we feel that planning to create resilience in the crisis response should continue to be given attention. At a logical level, the highest priority should be given to attempts to eliminate or weaken threats through mitigation measures. But in many developing countries what can and will be done to mitigate disasters will be little and in many cases will occur very slowly. Thus, it would be foolish to give priority only to disaster mitigation. In most cases, the preparedness phase of disaster planning and managing will still require attention. Even if considerable mitigation is achieved, it is inconceivable that disasters will disappear. What the proportion of attention should be given to mitigation and to preparedness probably needs to be decided on a case-by-case basis. For many urban areas in developing countries this would be the best approach to take.

With the current strong emphasis on mitigation we should note the following. Even with respect to planning for natural disasters, analysts of the problem have increasingly noted that there is a something of a faddish element as to what is stressed. For example, even 15 years ago Cuny observed that:

> In recent years there has been some debate among the experts
> about which activity to emphasize. In the 1950s, most of the
> emphasis was on preparedness . . . In the 1960s, there was
> intense interest in prevention . . . In the 1970s, there was a shift
> toward mitigation . . . The pendulum seems to be moving back
> toward preparedness, though on a much more sophisticated
> level (Cuny, 1983: 206; see also Dynes, forthcoming).

This is not an argument against mitigation but a call to be aware that there are often nonscientific factors operative in what is accepted as national policies that should be followed. As students of the sociology of knowledge and science have long recognized, the intrinsic merits or lack of merit

of advocated positions have often little to do with what becomes public policy. There are good social structural reasons for this happening (see Sperber 1990).

6. As noted earlier, there is need for greater cooperation between the government and the private sector, even at the local community level (a weakness that has even surfaced in the United States with respect to Project Impact, the effort to improve local mitigation planning, see Tierney and Nigg 2000). The private sector, and probably increasingly so given trends in developing countries, needs to be linked to disaster planning. This is largely related to the industrialization process which at least in the modern world, is usually spearheaded by the private sector. This involves not only domestic operations but transnational corporations as well. There must be insistence that relevant industries and particular establishments, that is those handling in some way dangerous materials, are required to submit planning for approval. While it is very important to avoid paper requirements for bureaucratic gratification, it is possible in different ways to provide economic incentives and decentives to plan. While in some cases a socially responsible corporate culture about safety and accidents may be operative in the instance of particular companies, it is not something that cannot be depended upon to be a significant factor. We would want to emphasize that it is necessary to get the private sector involved in a major way for all disaster planning and managing, natural as well as technological. In the current world, the private sector has such an important role in everyday life that suggests that it needs to be given an equivalent role with respect to disasters. But as also noted earlier there are important aspects about any proposed public/private partnership that needs to be looked at carefully.

7. As said earlier, it is very important that disaster planning of any kind should be part of developmental planning. This should exist both at the local and national levels. This idea has been expressed over and over again by most disaster researchers and planners, and also by many in the developmental planning area (for an unusual and different point of view that argues that most disasters are "not normally a problem for development," see Albala-Bertrand 1993: 203). And contrary to what is sometime implied at the present time, it is far from a new idea. For example, more than two decades ago Long (1978) argued that disaster planning should be linked to national development planning). But as Mitchell correctly notes that in general: "Until recently, disaster relief and long-term development tended to be seen as distinct entities" (1998: 14). Thus, perhaps equally as important might be to look at those developing countries where such a link has been made. Success cases can sometime be very useful even for policy matters.

8. There needs to be an overall national policy with respect to disasters and the planning for them. With a policy, a system then can be put in place. In almost all cases in developing countries, there is need to strengthen national-local links and relationships with respect to disaster planning. In some cases the national disaster system needs to be activated to handle the problems affecting a number of different communities at the same time in the country, when the crisis occasion is regional if not national in scope. Thus, national planning has to spell out which organizations have what responsibilities when disasters cut across all kinds of local and regional boundaries. The evidence suggests that the best models put emphasis on coordination by and not control by the national level (Dynes 1990). The more the occasion is catastrophic, as we have characterized such happenings in the future, the more there will be a need not only to plan but to implement a national policy in developing societies for both disasters and catastrophes.

9. There are some organizational aspects of disaster planning and managing which cannot usually be handled well at the local community level. Thus, needs to be some kind of national level center or agency whose major responsibilities would be disasters generally. A simplified model might be derived for a developing country by looking at the different systems in existence, perhaps less those in developed societies such as the US Federal Emergency Management Agency (FEMA) or in Japan, but more at some of those that have been recently established in developing countries. Such a central point should have, for example, a monitoring system to keep track of all disasters as well as technological accidents and mishaps, draw up model plans for local communities, provide guidance documents, maintain a data bank with information which

would include the special problems of recovering when the disaster has polluted land or perhaps left latent medical problems for survivors in the future, etc. Such a center or agency could also provide training, courses and workshops and other educational activities (such as a lending library of audio-visual materials) for disaster purposes, similar to the activities undertaken by the US National Training Center at Emmitsburg run by FEMA. Developing countries should not have to depend for these kinds of activities on outside consultants or experts. Such societies ought to train and develop their own professionals to create disaster resistant communities (for ideas on how to proceed see Wachtendorf 2000; Wachtendorf and Tierney 2001).

10. Finally, more attention needs to be paid to the extreme disaster in two senses of the term. First, as said above when we discussed the need for policy in item eight, there is a need to plan for a catastrophic disaster which could massively impacts a society and is truly national in scope. Some developing countries have of course experienced such catastrophic occasions. The impact of Hurricane Mitch on Honduras, by any reasonable criteria that would be used, was also certainly a catastrophe, far over and above a typical disaster. The same is true of the 1988 earthquake in Armenia (for reasons why the official statistics on casualties and property losses even though very high, were still probably underestimates see Poghosyan 2000:26-29). Likewise at the time of the writing of this report, monsoon rains India in August 2000 left millions of people left homeless in three eastern states, and wiped out whole villages (Farooq 2000). In addition, as we also indicated and illustrated earlier, there will increasingly be those kinds of major disasters whose origins will be quite distant from where they eventually spatially impact. In both cases, such occasions present very difficult problems for planning and managing. They need to be at least thought about by some relevant officials and agencies in each country around the world. Setting policy on such matters is not enough. Concrete steps have to be at least thought about, if not actually incorporated into preparedness and response planning.

C. Recommendations For the World Bank.

The World Bank has taken many important and significant steps with respect to its approach to disasters especially in the last decade. These improvements range from establishing an environmental department, to explicitly building in mitigation requirements in the recovery loans it makes to developing countries, to markedly raising the disaster consciousness of its own personnel. These and other related steps and measures taken have been in the right direction. To suggest other things which might be done, should not obscure what has already been achieved by the Bank. In fact, along some lines what we recommend can build upon what is already in place.

Now we could make a case that every new idea or modification in implementation of disaster planning and managing for cities in developing countries which have been set forth in this report, should be taken up by the World Bank or at least considered. In that sense, we have already indicated what that organization ought to be attentive to, at least with respect to the topics discussed. So anything that follows here will merely reemphasize some of the more important steps that might be taken if the goal is to improve urban disaster planning and managing in developing countries. We start out with the notion that as a matter of general policy, the World Bank ought to be a lead organization in this area.

1. Taking a lead can involve different things. For example, relevant officials in developing countries ought to be made aware of the issues involved. While that might be a necessary initial step, equally as important is that the Bank ought to provide suggestions and advice on how to implement whatever is talked about with respect to disasters. In certain cases that would also mean providing moral as well as financial support to get developing countries to implement whatever measures, programs or policies are necessary. This does not mean that the World Bank should be the only social actor in the situation. In fact, a case could be made that would be

bad along several lines, including the fact that negative results or outcomes could lead the Bank to becoming the sole or major target for criticisms. But certainly it should take a lead role.

2. Of course if any organization is to take the lead role on trying to influence other groups, or in the case here even societies, its own personnel must understand the thinking behind what is being advocated by way of policy or programs. As we wrote in our earlier report, Bank personnel necessarily will reflect the training and background of its personnel (Quarantelli 1992). This means that in the great majority of cases, a Westernized view of the world (Meyer, Boli and Thomas 1987). Unfortunately this almost insures that there will be differences of opinion if not downright disagreements with others from rather different cultural backgrounds. Such opposition will not easily be dealt with, if the proponents of the Bank's position do not fully understand the logic and "evidence" behind the programs or policies that they advocate. So a necessary first step is that the relevant Bank personnel, in whatever way is meaningful, be educated about the assumptions and research evidence that is supportive of the policies and programs that are being advocated.

3. All levels of governments in the developing world are not fully aware of the problem that disasters will create. This is not as negative a criticism as it might seem, because the same could be said about some disaster researchers as well as disaster managers, both in this country and elsewhere. Even more unlikely is that many in the developing world have even remotely considered, as we discussed earlier, that there will be more and worse disasters in their cities in the future. Without any such awareness, no actions, be it programs or disaster planning and managing issues, will even be considered. The World Bank ought to, by all of the means it has available, to try to raise national and local governmental "consciousness" of the risks and threats involved. Sensitivity training may be somewhat of a cliché but the basic idea underlying the concept has considerable validity.

4. Identifying a problem is worthwhile, but indicating what can be done about it is even more important. Research has shown that warning people about a danger if it is not in some way accompanied with information about what to do to avoid the negative effects of a disaster impact (Perry, Greene and Lindell 1980). The same is true with respect to the technological and natural disasters discussed earlier. In the previous section we indicated some of the general and specific disaster planning principles which should be implemented given the nature of the risks involved. What is needed is that the World Bank helps to circulate the ideas that not only are their particular problems, but that there are also research-derived ways of dealing with them.

A concrete way for the World Bank to proceed on this matter is to sponsor or cosponsor (perhaps with UN agencies) conferences and workshops to be held in the developing world on the matter of disasters in cities in developing countries (such as the conference it held in Washington on the future of disaster risk for cities; see Kreimer, Arnold and Carlin 2002). In itself that would send a message to societies that do attend to the World Bank because of its importance in their economic and social well being, that the problem is an important one, which at the moment is not the case. The imprimatur of the Bank on a problem will communicate far more than multitudes of researchers talking about the problem and its importance.

5. The World Bank should through incentives and decentives in it various programs to insist that disaster planning should not be completely divorced from and that it should be linked in appropriate ways to developmental planning. The latter are what would give the Bank entry to make the point about the necessary linkages. This approach is partly necessary to get national political commitment and to strengthen political will in the governments of the developing world. In addition, this should be stressed for otherwise the planning for different types of disasters may continue to evolve somewhat separately from one another as they have tended to do in the West. For example, the Seveso Directive which focused for the European community on problems that might result from dangerous chemicals and other risks is not as completely linked to other kinds of planning as might be desired. Developing countries should be encouraged to avoid this seeming weakness in the evolution of disaster planning and managing in Europe.

6. One of the very major problems in the general area of disaster planning is the poor data bases that exist. As said earlier, time, effort, and resources ought to be expended to develop adequate data bases. Counter arguments of why should efforts be expanded on such activities when people are dying and suffering, etc. miss the point. At one level it is like those who argue against the use of placebos to evaluate new drugs and medical treatments. The World Bank should take the lead in pushing for the collection, analysis and storing of standardized data on relevant losses from future disasters. This will establish baselines which could be used to evaluate many aspects of disaster planning and managing. Of course the data should not only be collected with respect to crisis time phenomena but also, for example, with respect to mitigation measures, their costs, etc.

In addition there is the problem that a number of data banks around the globe are available to only a handful of countries. For example, there exist computerized, major data bases on nuclear power and toxic chemicals, management of hazardous waste, emergency planning, etc. The World Bank could assist developing countries by providing support for the linking of national disaster systems into the larger networks around. If the Bank can support as part of its disaster reconstruction programs, strengthening the civil defense system in Rio de Janeiro, Brazil, it should be able to even better justify helping national disaster systems linking into international informational networks, since the overall payoff could be substantially higher for disaster planning and managing as a whole. Examination ought to be made of the recent institution of the Global Disaster Information Network **(GDIN)**. We have written elsewhere of some of the problems that might be involved in the operation of a **GDIN** (Quarantelli 1998b, but in principle the idea is a worthwhile one, and even if the present **GDIN** does not work out, something like it is so needed that sooner or later one will become a permanent part of the disaster scene.

7. The World Bank should consider the implications of the fact that many disaster problems and ways of dealing with them are increasingly cutting across national boundaries. Earlier we illustrated this by discussing the importation of potentially dangerous technologies or the fact that impacted areas of a disaster may be quite distant from its initial source. In addition, much of the private sector, especially transnational corporations, also operates across national boundaries. A policy and strategy which assume that disaster planning can be fully and adequately dealt with inside only one social system, may become increasingly unrealistic. Perhaps the World Bank ought to examine internally (or with the assistance of outside experts) the implications for its disaster associated and related activities of the increasing internationalization of technological risks and disasters (and probably even of natural disasters). Whatever is found would almost certainly force some changes in present policies.

8. Certain general perspectives ought to be made explicit in whatever specific policies and programs the World Bank might have with respect to disasters. One is that more explicit consideration should be given to the idea that if the sources of disaster related problems is social, they must primarily be dealt with by changing or altering social factors. Physical or technological solutions are inherently limited for such matters even in the instance of technological disasters for the reasons indicated earlier. There also needs to be more explicit emphasis on people rather than things, increasing knowledge and skills, providing more information and training, and building on indigenous traditions and strengths with respect to all risks. Whether phase of the planning process is involved, more explicit attention needs to be given to the human resources and social infrastructures that should be put in place.

9. There is the necessity of follow-up assessments, several years after the disaster policies, programs and plans have been put in place with respect to risks and disasters. Without the obtaining of such feedback, which should be gathered in a very systematic way, there is no real way of knowing both the negative and positive consequences of the policy, program and planning processes and what has been fully institutionalized. Even better would be a field examination of later situations where actual disasters have impacted localities where disaster planning and other

activities have been undertaken under World Bank guidance. Did the planning make a difference and in what way?

It should go without saying that any such assessments absolutely require improvements in disaster statistics and how disasters are conceptualized (Quarantelli 2001). This point has been made several times in this report so it will not be further detailed here. But there can be no ignoring the fact that without better statistics and more consensus on relevant concepts and definitions, any evaluation or assessment that would be made, will not be worth much. Sophisticated methodologies or use of computer-assisted analyses will not improve the end result for as the common saying goes: garbage in, garbage out.

10. The World Bank ought to consider the implications also of the fact as stated earlier that the image of natural and technological disasters is mostly provided by mass media or journalistic accounts. What a developing society expects about natural and technological disasters, what it comes to know of such ongoing disasters, and what it learns in a general sense from the disasters it has, are greatly although not exclusively learned from stories produced by mass communication systems, both domestic and international ones (and the globalization of culture discussed earlier should be taken into account). Although there are exceptions in a few societies that are very heavily disaster prone such as Bangladesh, elsewhere relatively few people directly experience more than one major disaster in their lives. The bulk of organizations, other than some crisis time oriented ones, and the great majority of communities can go decades without being specifically impacted by significant disasters. Thus, what image exists is mostly derived from news reports (Kreps 1980), although deeply rooted cultural beliefs and values about the nature of society and reality undoubtedly are also a factor (see Wilkins 1987, for an exposition about the cultural myths coming out of technological disasters). The symbolism of specific disasters recognized world wide (a Bhopal, Three Mile Island, Chernobyl, Love Canal) can particularly be attributed to mass media treatment (Patterson and Wilkins 1988). A major disaster is mostly socially constructed by the mass communication system. An examination ought to be made of what and how the picture World Bank officials and national disaster planners in developing countries have of disasters is influenced by this social construction of the phenomena by reporters and journalists.

In advancing these ideas, we do not assume that the Bank has unlimited resources. It does not. Furthermore, there are other social actors on the world scene that should play important roles.

D. Three Concluding Observations.

First, there is a need to be realistic about what can or cannot be achieved. There are limits. A risk and disaster free society is a chimerical dream. As someone once said, if the production of mushrooms were invented today, there would be those that would urge their total prohibition. The notion that risks and disasters can be completely eliminated is not borne out by history. In fact, historians who have examined past attempts to deal with cholera, hazardous aspects of electricity, and the Dust Bowl in the United States, have written that beliefs that advance in science and technology could:

> control and guarantee . . . almost no risk proved illusory . . .
> Society is no longer sure that "magic bullets" exist for every
> problem of risk, and new values questioning the earlier
> assumptions have gained increasing strength (Tarr 1990: 95-96).

To the extent that some risks cannot be eliminated, future disasters of some kind are a certainty.

Second, apart from what can realistically be done, is the question of what should or ought to be done. The disaster area does not lend itself to a nice, neat adding of pluses and minuses, or purely economic cost-benefit analyses. In fact, at a fundamental level, trying to prove that because certain steps have been taken, certain disasters have not happened, is an impossibility

Put in other words, many aspects of disaster planning and managing do not eventuate in tangible benefits. Something that does not happen is an intangible matter.

In addition, most social science disaster researchers would probably agree with the following. Even though the discussion is about developed societies and crisis time planning, the argument is relevant to developing societies in that it is said such planning:

> cannot be designed or implemented on a benefit/cost basis for two reasons. First, the benefits of planning are not readily quantifiable. Second, even if they were, the benefits are not comparable to the costs of responding or not responding. Establishing a plan is a value-laden activity and is done for humanitarian, not for fiscal, reasons (Sorensen 1990: 253).

As implied in this comment, scientific research has limits. It cannot really deal with ethical and value issues. Issues of equity, fairness and justice certainly vary considerably across different societies and cultures. As a recent book has noted, India through Hindu categories projects a different cultural reality than that obtained through Western scientific categories (Marriott 1990; see also Nisbett 2003). Given the focus of this report and given that the social values and cultural categories of thinking of many developing countries are rather different from those in the West (and as we have written elsewhere, the Western view is embodied in the general World Bank view of social reality), this is not an unimportant matter.

It is also perhaps not accidental that social philosophers have increasingly started to examine the ethical issues involved in disaster planning (Bentley 1989; Jackson and Janssen 1990; Rankin and Herkert 1992; Dunfee and Strudler 2000). Among other things, it might suggest that enough is known about different planning and managing methods that could be attempted with respect to disasters that it becomes increasingly important to consider the various criteria that can be used to consider different options and alternatives (Mitchell 1990: 152). These kinds of possibilities will necessarily be presented more by philosophers than by scientists.

Finally, we should note that we have extrapolated and projected existing trends to the future. It is a reasonable thing to do. Nevertheless, we should also be reasonably cautious. In fact, as Konvitz has noted past predictions about urban vulnerability have not been very accurate:

> . . . Since World War II the study of tornadoes, fires, floods, hurricanes, earthquakes, typhoons, pollution disasters, epidemics, plane crashes, blackouts, and other emergencies has led to a far better understanding of how cities recover from disaster. If there has been a central lesson, it is that the processes at work in cities during and after disasters are the same as those that account for concentrated social and economic development in less stressful times . . . The ability of cities to recover from disasters, once thought to be very limited, now appears to be broadly based on a variety of mutually reinforcing conditions and factors. For all their technological infrastructure and complexity, cities remain, above all, great concentrations of human energy and resourcefulness. Indeed Eric Jones, an economic historian, has argued that the rise of the West since the Middle Ages can be explained in part by the ease with which Western societies have recovered from disaster, as compared with African and Asian societies. Yet the myth of terrible urban vulnerability endures (1990: 59).

We can probably assume that the future will not necessarily be all that we have forecast; it may be somewhat better or somewhat worse. Who would have predicted the current political state of the world, even just a decade ago? For as Toffler has written:

> Most people--including many futurists--conceive of tomorrow as
> a mere extension of today, forgetting that trends, no matter how
> seemingly powerful, do not merely continue in a linear fashion.
> They reverse direction. They stop and start. Because
> something is happening now, or has been happening for three
> hundred years, is no guarantee that it will continue (1980: 129).

Nevertheless, we do think we have projected a realistic picture of what we might expect in the 21st Century. Whatever variations and deviations there might be in the basic trends we have discussed, the general outcome is very unlikely to be markedly different from what has been depicted. Therefore, if forewarned is to be forearmed, we hope that we have provided some armor.

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