

Vulnerability as a Measure of Change in Society

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Assessing risk and evaluating crises—be they financial, social, political or environmental—have come increasingly to preoccupy the interests and concerns of analysts around the globe. In developed countries or what until recently was usually referred to as the First World, such considerations involve the re-conceptualization of post-industrial societies as ones in which the rise of “manufactured uncertainties” have undermined the state’s established safety systems and its conventional calculus of security (Giddens 1991). Yet to the billions of humanity who continue to live in the less developed countries of the Third or Fourth Worlds and whose peoples still have faith in the benefits of development or have seen that promise come and go in a single lifetime¹, these finer considerations of risk may seem less important. The threats posed by dumping industrial wastes, unsafe chemical production and the pollution of air and water, though real and graphically manifest on occasion, often pale in comparison to the daily risks posed by natural hazards and human-induced calamities that recent decades have only intensified². Rather than the “risk society” proposed by Ulrich Beck and others (1992), it is the need to understand the historical evolution of vulnerability and the degree to which different social classes are differently placed at risk that require more urgent consideration for most communities (Susman et al. 1983)³.

Vulnerability, social security and sustainable livelihood

Vulnerability has been proposed as the key to understanding a novel conceptualization of risk that attempts to break with the more causal, mechanistic attitudes that have characterized the relationship between human societies and their environments over past centuries and that has often been associated with western cultural norms (O'Keefe et al. 1976; Hewitt 1983). Rather than regarding disasters as purely physical happenings requiring largely technological solutions, such events are now viewed primarily as the result of human actions (Lewis 1999: 8). Terry Cannon persuasively argues that while hazards are natural, disasters are not. Social systems generate unequal exposure to risk by making some people more prone to disaster than others and that these inequalities in risk and opportunity are largely a function of the power relations operative in every society. Critical to discerning the nature of disasters, then, is an appreciation of the ways in which human systems place people at risk in relation to each other and to their environment, a causal relationship that can best be understood in terms of an individual's, household's, community's or society's *vulnerability*. Vulnerability is itself a "complex characteristic produced by a combination of factors derived especially (but not entirely) from class, gender and ethnicity" (Cannon 1994: 14-15, 19; Wisner 1993: 131-133). Since the 1980s, the dominance of technical interventions focused on predicting hazard or modifying its impact has increasingly given ground to an alternative approach that seeks to combine the risk to which people and communities are exposed with their abilities to cope with its consequences. Nor is this a static relationship but rather one that expresses changing social and economic conditions relative to the nature of hazard in terms of dynamic, evolutionary and accretive processes (Lewis 1999: 14). It is also useful to recognize that the same socio-economic processes that give rise to vulnerability are themselves partly subordinate to larger-scale systems and are enmeshed in broader processes that are expressions of international and national political and economic considerations (Cannon 1994: 24).

Employing vulnerability as a conceptual framework in this manner, disasters often appear more as the consequence of unsolved developmental problems rather than natural events; as the product of the deficient relation between the physical and organizational structures of society rather than as a break with its "normal" lineal expansion. Instead of a unitary stairway to development, the emerging new world order has

also created a system of specialized global inequality, “ghettos of capitalism” characterized by decline and disinvestment where the whole project of development “stands like a ruin in the intellectual landscape”, a disastrous failure made “obsolete” and “outdated by history” (Ferguson 1999: 236-241; Sachs 1992: 1). Here lies, too, the social, economic and political responsibility for a major part of the processes that give rise to the conditions that make disasters happen. Through linking disasters to development, moreover, vulnerability shares many issues with the overlapping discourses of social security and sustainable livelihoods: all three are primarily engaged with the means by which individuals and the communities they constitute attempt to cope with risk, uncertainty and insecurity in their lives. Such common concerns, in fact, can lead to a fruitful intellectual interchange that has important theoretical and practical implications for how vulnerability as a concept can be applied in novel ways to determine the extent to which societies are successful in protecting people against the effects of disasters.

Social security is usually defined as the totality of public measures that provide some form of protection for the members of a particular society in specified situations of need and distress⁴. The main issue of debate concerns those institutions established by the state to fulfill these public services and pays only scant attention to the sets of customary practices that also operate, though not exclusively, in this sphere (Swaan 1988). State provision is regarded as “modern” and progressive, a function of specialized agencies in the “formal” sector of the economy. Provision, however, based on indigenous cultural mechanisms that obligate individuals, groups or communities to provide assistance is seen as “traditional” and regressive to capital formation, ill-defined and part of the “informal” sector of the economy (Midgley 1984). Accordingly, the latter is supposed to gradually give way to the former as societies become more urbanized, their economies more industrialized and an increasingly larger percentage of the population is included within the provision of the state sector. Despite the manifest failure of such a process to eventuate in many non-western societies over recent decades, attention has still largely been focused on the shortcomings of the former rather than on the potentialities of the latter (Benda-Beckmann 2000). Yet not only do customary practices extend the only form of social security coverage that most of the world’s rural populations actually experience, indigenous welfare systems may actively contribute to realizing the so far elusive goal of universal provision. James Midgley suggests how customary and state systems can be inte-

grated through an approach that strengthens traditional familial responsibilities, enhances community obligations and encourages communities to form cooperatives, mutual benefit societies and rotating credit associations⁵. Rather than seeking to replace them, states should attempt to incorporate existing local practices into national strategies through elaborating complex mixes of policies that might better serve as protection against the perennial insecurities of daily living (Midgley 2000: 224-225).

How to deal with the uncertainties posed by increasing pressures upon the human and physical environment is also the primary concern underlying the concept of (“sustainable”) livelihood. It is an individual, household or group’s access to resources, their entitlements and endowments according to Amartya Sen, that determine their ability to maintain an adequate level of living (Sen 1981). Access, in turn, depends on the nature of the linkage between people’s differential capabilities, assets and activities and their options as sanctioned by laws, rules and societal norms and delimited through social relations such as class or gender (Chambers and Conway 1992: 7; Ellis 2000: 7). The strategies ultimately adopted to maintain or enhance livelihood are the consequences of this correlation, one that is also dynamic in that it changes according to circumstances (De Haan and van Ufford 2001: 286). Usually a distinction is made between longer-term strategies that anticipate gradual and structurally determined changes and shorter-term strategies that are more reactions to sudden disruptions to livelihood systems caused by natural hazards or human-induced crises. Over time, these strategies may even prove to be adaptive in that the ways people respond to adverse events can either improve their capacity to withstand future shocks or, alternatively, render them more vulnerable by reducing their resilience (Davies 1993). People’s vulnerability, therefore, is determined not only by identifying the environmental or economic factors involved but also the social and political dimensions of risk that detract from their capacity to withstand and recover from adverse events.

Clearly these considerations are pertinent to how people experience and deal with crises in their lives. The concept of vulnerability encompasses both the notions inherent in social security systems as well as the concerns associated with sustainable livelihoods and the discussion of all three would benefit substantially from wider inter-perspective analyses and comparisons. In particular, they share a common lexicon when it comes to exploring people’s intrinsic resilience to the uncertainties of daily living and an appreciation of the significance multi-faceted coping strategies have in managing risk and dealing with

crises of all types. Just as people's exposure to hazard is currently assessed in light of their vulnerability, so too is their resilience to deal with its effects increasingly regarded as dependent upon what is termed their capacity. The strategies adopted by communities to reduce the impact of hazard or avoid the occurrence of disaster are known as coping practices (or mechanisms) and include the specialized knowledge of skilled individuals as well as the social knowledge held by communities at large. They comprise an enormous variety of recourses, including land utilization and conservation strategies, crop husbandry and diversification practices, exploitation of geographical complementarities in ecosystems, symbiotic exchanges between communities, the development of patronage relationships, migration, the redeployment of household labor and complex dietary adjustments (Drèze and Sen 1989: 71–75).

The current emphasis on the importance of this local knowledge is a belated recognition that non-western peoples have historically developed sophisticated strategies and complex institutions to reduce the constant insecurity of their lives. The previous assumption that a community's own methods of coping with risk were too primitive, too inefficient or too ineffectual to deal with the situation only reinforced belief in the power of the technical fix: the ability of external expertise to correctly identify the problems and introduce the appropriate solutions. The respect now accorded to coping practices forms part of a wider attempt to broaden local participation in the entire development process through bottom-up planning and to empower local people through encouraging community participation. Local knowledge is seen as the key to success as it is the only resource controlled by the most vulnerable, is already present at a potential disaster site, and in many cases constitutes a viable operational strategy. All that is required is to find the proper balance between the need for external assistance and the capacity of local people to deal with the situation.

At present, however, any greater theoretical exchange between vulnerability analysis, social security systems and sustainable livelihoods seems to be hampered by a serious underestimation of the usefulness of the former as a concept for understanding people's exposure to all forms of insecurity and its application instead to events seen as largely random and/or the product of inequitable social structures. David Alexander argues that this is the inevitable result of practitioners of all persuasions constantly reinventing the wheel of "disasterology" because of their ignorance of previous work outside their own specialized fields of expertise (1997: 297). In fact, neither of these conditions is neces-

sarily the case. Vulnerability is a useful analytical tool for determining how long-term adaptation to risk may not always be beneficial to a community but may actually leave individuals further disadvantaged (Cohen 1968: 41). Nor should disasters caused by natural hazard be regarded as mainly unpredictable given the frequency and magnitude of their occurrence in many parts of the globe. Rather than an abnormal rupture with some preconceived notion of a balanced state of nature, they should be considered as *frequent life-experiences* for many people and the “normalization of risk” as a part of daily existence (Bankoff 2003a: 179-183). Moreover, the analytical approach proposed by Franz and Keebet von Benda-Beckmann that conceptualizes social security as a field of problems operative at different layers of the social organization may provide a useful addition to the methodological framework for understanding how communities perceive vulnerability and realize their capacity to deal with disaster⁶. Vulnerability has proven to be a difficult concept to grasp at the local level and other terms and ways are required to help people understand how and why they are regularly exposed to calamity (Heijmans and Victoria 2001: 15). Working with vulnerability means working as much in the conceptual realms and policy implications of social security and sustainable livelihoods as it does with disaster preparedness and response.

Vulnerability and historical causality

Vulnerability, however, is not just concerned with the present or the future but is equally and intimately a product of the past. A proper appreciation of the construction of vulnerability is still often hampered by the lack of an adequate historical perspective from which to understand the contexts and roots of disaster causality (Oliver-Smith 1986a: 18 and Lees and Bates 1984: 146)⁷. It is not simply the occurrence, frequency and intensity of environmental events that are significant but their sequence that is of critical importance (Winterhaler 1980). The insights that referred to the 1970 disaster in Peru as a “500-year-earthquake” (Oliver-Smith 1994) or the 1975 earthquake in Guatemala City as a “classquake” (Susman et al. 1983: 277) had their origins in an appreciation of the structural role played by external and internal colonialism as factors in determining those disasters⁸. Similarly, the condition of dependency created by colonialism and cash-cropping along with climate were credited by some French Marxist economic anthropologists as the principal causes for drought and famine in the Sahel (Copans 1975; Meillassoux 1974). Certain segments of a population are often situated in more per-

ilous settings than others due to the historical consequences of political, economic and/or social forces. History reveals that vulnerability may take centuries in the making. Social security is also implicitly about historical causality in that the potentiality of its arrangements constitutes promises made in the past whose fulfillment is to be invoked at some time in the future (Benda-Beckmann 2000: 13). At the root of the notion of livelihoods, too, is recognition that social and economic institutional arrangements through which human beings access and alter the physical environment in their quest for sustenance and shelter evolve over time. Resource use, the striving of individuals and groups to meet their various consumption and economic necessities through coping with uncertainties, responding to new opportunities and choosing between different values positions are also key elements in the evolution of disasters (Oliver-Smith 1999: 30; Long 2000: 196). In all respects, societies and destructive agents are mutually constituted and embedded in natural and social systems as unfolding processes over time. As Anthony Oliver-Smith so eloquently states: “a disaster is a historical event—and the aftermath of disaster is process coming to grips with history” (1979: 96).

Asking why disasters happen is essentially a political question but understanding how they occur is a fundamentally historical one. Attributing causality is largely an ideational construct dependent on respective worldviews but comprehension of its unfolding requires a diachronic appreciation of events. Above all, it is the present condition, the outcome of past factors that transforms a hazard into a calamity and determines whether people have the resilience to withstand its effects or are rendered vulnerable to its consequences. The sequence of causality now widely accepted as underlying risk is the model given expression by Piers Blaikie et al that identifies certain types of pressures that give rise to vulnerability (1994: 21-45). In this Pressure and Release Model, the latter is understood to arise when unsafe local conditions, themselves the product of both dynamic processes and root causes at the intermediate and global level, intersect with a physical hazard, the trigger event, to create a disaster⁹. The “chain of explanation” articulated here gives recognition to the significance of temporality, a dimension that achieves further elaboration with the acknowledgement that “these pressures are all subject to change” and “are probably changing faster than in the past” (Blaikie et al 1994: 26). The importance of history is also strongly present in the other accepted model of disaster causation or what is sometimes referred to as the Access Model proposed by Sen in *Poverty and Famines: An Essay on Entitlement and Deprivation* (1981). Here vulnerability is regarded as generated by the difficulties

some social groups or families have in accessing certain resources over time, a condition that is determined by identifying both the limitations and facilities through which accumulation is achieved and capacity is decreased when faced with disasters. Risks are different for everyone even in the face of the same hazard and depend on the capacity of each family (and even its individual members) to absorb its impact or, that is to say, the circumstances (their pasts) that have brought them to that state at that particular time and place. Oliver-Smith refers to this as a historically produced pattern of vulnerability and argues that “the life-history of a disaster begins prior to the appearance of a specific event-focused agent” (1999: 29-30).

Disasters as agents of change

Most studies treat disasters solely as agents of destruction, as banes to the human condition that are, at best, to be prepared for as well as possible and, at worst, simply endured in whatever way. This fixation with the destructive qualities of the event is understandable from a human viewpoint in that what is mainly lost or damaged are lives, buildings and property. While there is no denying the destructive consequences of disasters in terms of human suffering, they are also simply agents of change in the broadest perspective. The earthquake that struck the upland city of Baguio on 16 July 1990, the largest seismic disturbance of this nature to affect the Philippine archipelago during the 20th century, caused massive losses: 1,666 dead, a thousand missing, three thousand injured, over a million homeless and an estimated PhP12.2 to PhP16 billion (US \$488 to US\$640 million) in damages—an enormous human and financial loss to a medium level developed country. The earthquake, however, also caused unprecedented slope failures in central and north-western Luzon resulting in an estimated 100,000 landslides that transformed affected areas, particularly in the Cordillera Central and Caballo Mountains (Bankoff 2003a: 63-66). In other words, the event was also a significant agent of geomorphology: altering the landscape, soil density, vegetation cover, wildlife and even, ultimately, the potential for human activity. In the longer term, the earthquake was as much an agent of change as it was an agent of destruction. Without trying to diminish the human cost, perhaps it is possible to view the long-term effects of disasters on society in much the same way? Certainly Oliver-Smith’s study on the aftermath of the earthquake that struck the Peruvian town of Yungay on 31 May 1970 suggests just such an outcome in terms of socio-economic and class

changes experienced in the communities most directly affected by that event (1979 and 1986b).

The linear nature implied by any causal explanation of vulnerability, what Charles Perrow calls “tight-coupling”—a term used to denote relationships between items when what happens in one directly affects what happens in another according to a specific sequence and without any temporal delay (1984: 89-94)—is complicated here by the operation of choice. The Human Development Index elaborated by the United Nations Development Program recognizes the significance of choice and even defines human development as a process of enlarging people’s choices (UNDP 1990). The actuality of people faced with a hazard, whether they can avail themselves of many options with which to respond to present circumstances or whether they are restricted to little or no choice, can be taken as a measure of their exposure to risk. Those who have many stratagems or “coping practices” from which to attempt to find an appropriate response can be said to enjoy a degree of “layered resilience”, a state that endows them with a greater likelihood of successfully overcoming present difficulties. Even though the choice of action actually made may not be the “right” one in the event, they have the capacity to sample from among many fallbacks or “options” to find another more appropriate to their immediate circumstances and the nature of the hazard encountered. Those, however, with few options, even though they may be fully cognizant of the dangerous situation in which they find themselves, can be seen as “inherently vulnerable”¹⁰. That is, they have no choice but to accept the risk in which they find themselves because the nature of their vulnerability proves to be intractable. Their vulnerability is so interwoven into the socio-economic, political, environmental and even cultural fabric of daily life that it is, to all extent and purposes, unsolvable under the existing order of society.

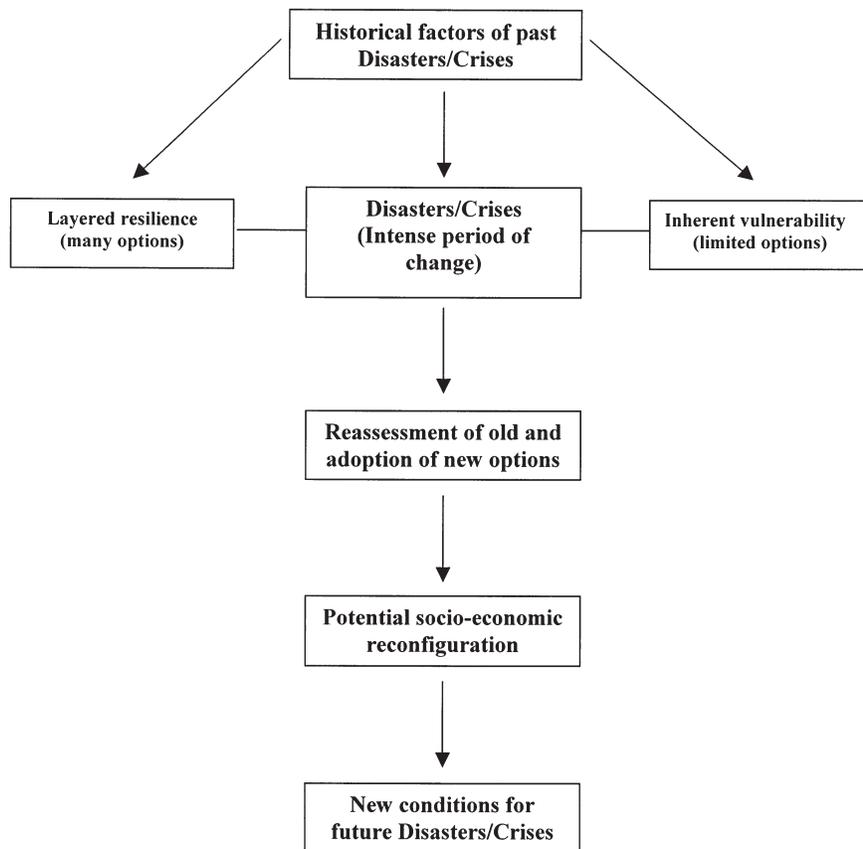
In this context, a disaster can also be defined as an intense period of change whereby the magnitude, scope and/or intensity of external agents, be they natural or human-induced or a combination of the two, are such as to cause the people affected to take stock of their present condition, reassess their normal behavior and either choose to continue much as before or to adopt new stratagems that they hope might better meet the challenges that they now confront¹¹. Though it may appear on the surface for some that nothing has altered, the conduct of others will undergo transformation either through relocation, the implementation of alternate livelihoods, adjustment in their relative social standing in the community or some other visible indication. The defining condition, however, that identifies the moment as one of disaster or crisis is

that all those affected will be forced to review their current activities in the light of the emergent situation. As a consequence, changes may take place as a disaster acts as a catalyst to facilitate socio-economic reconfiguration through occasioning loss and generating opportunity.

Figure 1 to go about here

Most people, of course, will endure privation and deterioration in their standard of living as a consequence of the disaster but a surprising number will also experience greater opportunities and a lowering of societal barriers based on race, ethnicity, class, gender or even age that permits upward social mobility¹². The net result, however, is a possible

Figure 1: Disaster/Crises as Agents of Change



change in the socio-economic composition of society as some groups are able to profit from the situation while others lose out. Shifts in the power balance between groups may also occur as a result of disasters, an underrated and under-researched aspect of historical development. In the process of this reconfiguration, though, new conditions of both layered resilience and inherent vulnerability are created (Figure 1). People seldom become either resilient or vulnerable as such but more or less so in different ways. It is the changed nature of their capacity that establishes the circumstances that turns a subsequent natural or human-induced hazard into the next disaster and so perpetuates the cycle.

This understanding of vulnerability in terms of limited choices and of disasters as agents of change emphasizes the pivotal role of historical causality in the construction of risk while, at the same time, retains the importance of personal volition and eschews the notion of determinacy. Above all, it is the historical antecedents that give rise to the availability of options from which to choose. As such, it perhaps comes closest to the ideas inherent in the *total environment concept* first formulated by Rene Dubos to explain the global relationship between humanity and infectious agents that he characterized as so complex as to require consideration of everything “that makes up an organism’s internal environment and all the living and inanimate things with which it comes into contact” (Dubos 1959). Here, a level of ecological thinking is required that comprehends the broadest possible formulation of causality and encompasses the whole system of relationships (Susser 1973). In particular, responsibility for disease causation is placed on human agency as a result of both behavioral and environmental changes that lead to the emergence of new viruses and that favor their rapid dissemination (Morse 1992: 389-409). In terms of disasters, this relationship is more commonly characterized as one of “mutuality” (Hoffman and Oliver-Smith 1999: 6) as integrative approaches have gained acceptance for hazard research (Possekel 1999: 41). The structure and development of a system can only be understood by an analysis of the dynamic interactions between environment and all aspects of society, including unexpected events (Emel and Peet 1989: 51-73). More specifically, Allan Lavell refers to a form of everyday risk that is so embedded in people’s lifestyles that it constitutes a more or less permanent condition of disaster. The hazards related to environmental extremes, then, are only one more impermanent and irregular component of a threat to general human physical and psychological security represented by health problems, malnutrition, un- or underemployment, income-deficit, illiteracy, substance abuse and endemic violence.

Moreover, the exceptional losses associated with environmental extremes attain the category of a disaster precisely because people were in a previous state of near destitution and not necessarily because of the absolute size of the losses incurred (Lavell 2003).

It is this appreciation of the significance of historical causality and the multi-relational nature of society to environment, that is to say, of simultaneously both the diachronic and the synchronic that underlies the concept of inherent vulnerability. "Many people" writes Cannon, "now realize that the impact of disasters in the Third World often produces only a more acute, more extreme form of the general chronic daily suffering of many of the people" (Cannon 1994:16). In fact, exposure to hazard may actually be chosen as the lesser of two evils given its greater relative infrequency compared to the more pressing day to day problems of homelessness, lack of income or inaccessibility. Poor people especially are vulnerable to hazards as a result of processes that have deprived them of any power to affect their own physical, social or economic environment and often their only remaining freedom is to choose between different hazards (Maskrey 1989: 25). Inherent vulnerability attempts to express the experience of many people for whom all types of hazard are compounded by such an aggravating combination of socio-economic, political, environmental and cultural problems that it effectively renders their plight irredeemable under the existing social order. Even though, individual aspects of their condition might be ameliorated, collectively the interrelated nature of their situation renders such problems almost intractable. Not only does this include systemic problems with historical origins but also those that arise from the development process, "development aggression", and even others that might be the direct result of disaster mitigation and rehabilitation operations or what can be termed "relief aggression"¹³. The International Federation of the Red Cross and Red Crescent Societies acknowledges this process in their *World Disaster Report 2002* when it refers to "flawed development" or how certain forms of economic growth actually exacerbate people's physical, economic, political and social vulnerability (Walter 2002: 11-12). Examples of the inter-relatedness of such factors might include malnutrition to landlessness, limited capacity to earn income to lack of education, living in unsafe dwellings to lack of choice, and poverty to not receiving a fair return on one's labor. The current preoccupation in practice and literature with "local knowledge" stems from the realization that for many people this is the only remaining asset or capacity that they possess (Bankoff 2003b). Any attempt to fundamentally address the root causes of this vulnera-

bility must necessarily have a political agenda and be either a direct or, at the very least, an implied call to social revolution.

Vulnerability as a measure of change

The realization that historical causality underlies people's vulnerability to disaster also leads to a re-consideration of the role such disturbances play in society. Most social and physical science literature is premised on the assumption that the "normal" state of affairs in both the human and natural sphere is one of stability from which there are temporary, if aberrant and usually violent periods of deviation. Such a model pervades the western conceptualization of the world and is embodied in the paradigm that people often refer to as "the balance of nature". The implied assumption is that the product of biotic interactions necessarily leads to a form of equilibrium that has been variously expressed in concepts such as *carrying capacity*, *steady state economy* or *climax community* among others¹⁴. According to Seith Reice, however, "the nature of nature is change" and the disturbances produced by non-equilibrium are important agents facilitating change. Disturbance should not be regarded as simply destructive but as a valuable experience: the real danger is its absence not its presence. It is human attempts to establish static societies that really represent the principal hazard and the normal state of a community can be thought of as one of recovering from the last disturbance (Reice 2001: 15-17)¹⁵. While the many millions in the Third World usually on the receiving end of such "disturbances" may not exactly share Reice's optimistic evaluation of the wider significance of disasters, modern hazard research has increasingly come to focus on these inter-relational aspects as a starting point to understand such events and their significance.

The importance of non-linearity and mutualism in exploring the state of dynamic tension that exists between disturbances and society is captured through the concept of complexity. Complexity theory focuses on how new structures emerge, become and evolve (Possekkel 1999: 17). As individual components interact with each other, they necessarily generate processes that in turn affect their original behavior (Langton 1989)¹⁶. Though these emergent systems may appear to be in a stationary state, the apparent surface stability only serves to disguise the underlying tensions that exist and which even the smallest variation in energy can upset. Far from being in equilibrium, they operate in a manner that can best be described as one of imbalance, what Ilya Prigogine calls a state of *far-from-equilibrium* (Prigogine 1980).

Complexity is inherent to these systems in that interacting components have a certain degree of local influence and information but no one agent is ever in a position to determine the structure of the whole system. In fact, there are so many elements at work that a system's dynamics can never be completely discerned and any attempt to do so must inevitably be reductive and lead to misunderstanding and/or incomprehensibility (Perrow 1994: 72-86). Moreover, the diversity of interactions is such that they can be defined in a variety of different ways, each of which corresponds to a distinct subsystem that requires its own separate description (Schneider and Kay 1994)¹⁷.

This sense of complexity is important to the way in which disasters are increasingly conceptualized. The notion that hazards are mere physical phenomena slowly gave way to one that also incorporated consideration of those that were the products of modern technology—that were not simply “natural”. Recognition of human agency as a contributing factor led to a considerable extension of what is thought to constitute a disaster. War and conflict, the resultant immiseration, displacement and death, and their interaction with climatic and seismic events gave rise to the idea of *complex emergencies*; ones where the root causes of vulnerability lie in a variety of relational exchanges (Alexander 1997: 297)¹⁸. The definition of these events has more recently begun to include activities that were previously categorized as developmental such as mining, logging and fishing when these are carried out in a non-environmentally sustainable manner. It is the dynamics between stakeholders (human agency and animal behavior), ecosystem (the specifics of the environment) and nature (extreme physical phenomena) that determines the increasing interrelated complexity of these events. War precipitates environmental crisis, environmental problems precipitate conflict, and natural hazard triggers developmental aggression that, in turn, leads to environmental degradation and further violence. The interactions are both simultaneously synchronic and diachronic and the permutations endless¹⁹.

While its origins may be increasingly complex, people's vulnerability is very real. The total number of reported disasters in the world is rising rapidly from 368 in 1992 to 712 in 2001, an increase of over 93 per cent in a decade. More telling is the doubling in the number of people affected over the same period, rising from 78,292,000 to 170,478,000 and peaking at 344,873,000 in 1998 (Walter 2002: 185, 187). While the accuracy and comparability of such figures are certainly debatable, more people are certainly at risk than ever before. They are more vulnerable to disasters through a combination of urbanization and migration,

resource depletion and competition, and population growth. Vulnerability analysis, however, is more than simply a means of gauging the degree of exposure to these disasters; it is also a much more instructive way of measuring change, of determining a particular society's "success" in providing for its members, both historically and in the present, than any form of current economic or technology-based indices.

In the first instance, vulnerability is a much more precise measurement of people's exposure to risk and, conversely, of their well-being than other conceptualizations. In western perceptions, so strong is the correlation between economic and technological development and the degree of civilization that one has become equated with the other, one has become the measure of the other. When US President Harry Truman coined the term "underdeveloped" in his inaugural speech before Congress on 20 January 1949 to refer to the less developed countries that he sought to assist through the transfer of capital and technology, he effectively elevated per capita income to become the yardstick by which to measure how countries fared. Gross National Product as a scale, however, correlates the level of production with a society's health and comfort, an unfounded assumption that ignores the patent inequality between people's differing access and entitlement to resources. Hazard, accordingly, is then mainly conceived of in terms of the appropriate technology and management structures, while disasters are regarded as largely a matter of probability analyses and feasibility studies. Vulnerability, on the other hand, as a measure of people's welfare recognizes their strengths as well as their weaknesses in determining that status. It lays less stress on technology and, instead, places a premium on the organizational capacity of vulnerable sectors through the formation of grassroots organizations that it considers as essential to effective disaster management. Moreover, in the form of *community-based disaster management* (CBDM) practices, vulnerability analysis implies that the developed world has something to learn from developing countries, that it is more of a two-way traffic and not simply a question of the appropriate technology transfer from the former to the latter²⁰.

Secondly, vulnerability is a much more accurate concept than wealth or poverty in understanding the link between disasters and development. Not all poor people are vulnerable to disasters, nor are the poor vulnerable in the same way, and some people who are not poor are also vulnerable. Employing vulnerability as a conceptual framework, disasters appear more as a consequence of unsolved developmental problems rather than simply natural events. Development renders many

people vulnerable: of the 712 disasters recorded by the Red Cross in 2001, 56 per cent occurred in “medium human development countries” (that is countries undergoing rapid development) compared to 19 per cent in the “low” and 25 per cent in the “high” categories (Walter 2002: 185). Vulnerability, as a measure of well-being, implicitly leads to a reconsideration of the nature of the development being undertaken or sponsored and to an appreciation of the need for more sustainable development practices. As is palpably obvious, out-and-out economic development does not necessarily improve a population’s welfare.

As a basis of assessing societies, finally, vulnerability is not simply concerned with the present or the future but is equally and intimately a product of the past. It recognizes that certain people may be situated in a more perilous setting than others as a result of a particular configuration of political, economic and/or social processes over time. By drawing attention to the processes that put these people at risk in the first place, vulnerability provides a “natural” indicator that something may not be “quite right” and that the tensions between a society and its environment may have gone beyond the latter’s ability to absorb. At the same time, it places emphasis on the significant role disasters may play as transformative agents, calling into question the mainly western viewpoint that regards them as simply abnormal events, deviations from a sense of normalcy to which a society will return on recovery (Bankoff 2003a: 3-4). In fact, disasters may not only be hazardous events but also significant catalysts of change in their own right, causing political, economic and social adjustments, triggering needed adaptations in human behavior and modification to structures, and even contributing to the overthrow of civilizations at times (Davis 2001; Fagan 1999). Vulnerability analysis emphasizes the need to understand the increasingly complex inter-relationship between a society and its changing environment over time by focusing on the degree of mutualism that exists between the two at any moment in time.

In the end, societies in which a higher percentage of people are less vulnerable to the onslaught of disasters display a more mature relationship between human and physical forces than those that simply build bigger or dig deeper: complexity may be just as much a source of vulnerability as it is an answer to risk. Moreover, vulnerability has important implications for the manner in which disasters are “managed”: attempts to control the environment need to be replaced by approaches that emphasize ways of dealing with unexpected events, ones that stress flexibility, adaptability, resilience and capacity. Nor are such attributes the reserve of modern science or western technology but are equally to be found

among the know-how and organizational aptitude of all peoples. As the modern world becomes an increasingly complex one that necessitates a more holistic understanding of the inter-relational aspects between environment and society over time, the application of vulnerability as a concept not only reveals the multi-faceted construction of disaster but can also serve to determine its historical development. Vulnerability may be as much a measure of people's well-being and an indication of their successful adaptation to environment as it is a simple condition of exposure and it may be more meaningful to rank or index societies accordingly²¹.

Note

1. According to James Ferguson, the current construction of a new world order not only continues to marginalize and exclude large numbers of people but actually robs them of even the promise of development (Ferguson 1999: 237-8).

2. United Nations experts calculate that disasters affected an average of 200 million people each year during the 1990s, a fourfold increase from the late 1960s (Walker and Walter 2000: 188; Smith 1996: 39). Such figures, however, should be regarded more as indicative of trends rather than precise data as there are no universally agreed definitions of what constitutes a disaster or standard methodologies for the collection of information on them. Ulrich Beck argues that productive risks are now increasingly overshadowing any gains in power from techno-economic "progress". While he argues that these risks are no longer localized as they were in "classical" industrial societies but exhibit a tendency towards the creation of globalized hazards, he is still primarily concerned with the "immanent contradictions between modernity and counter-modernity" within industrial societies and with the process of "reflexive modernization" that has only limited application to the populations of the developing world.

3. Such a statement is not meant to preclude consideration of "risk societies" as clearly the notion has application in all societies but is rather a question of the degree of importance it is accorded. For more recent critiques of Ulrich Beck's idea and his rebuttal, see Barbara Adam et al *The Risk Society and Beyond* (2000).

4. The International Labor Organization defines social security as "the protection which society provides for its members, through a series of public measures against the economic and social distress that otherwise would be caused by the stoppage or substantial reduction of earnings resulting from sickness, maternity, employment injury, unemployment,

invalidity, old age and death; the provision of medical care; and the provision of subsidies for families with children” (ILO 1984: 2-3).

5. On the role of the state, see Abram de Swaan *In the Care of the State* (1988); on mutual benefit societies, see Marcel van de Linden *Social Security Mutualism* (1996); and on rotating credit associations, see Shirley Ardener *The Comparative Study of Rotating Credit Associations* (1964) and Clifford Geertz *The Rotating Credit Association* (1962). The latter two, though dated in some respects, are still seminal works.

6. What the Benda-Beckmanns call a functional approach involves analyzing the provision of social security at the level of culture and religion, institutional provision, individual perception, actual social relations, and through social and economic consequences (Benda-Beckmann 2000: 13-15). It actually has much in common with the typology employed by Piers Blaikie et al in formulating their Disaster Pressure and Release Model (1994: 21-45).

7. The absence of an historical perspective has not gone completely unnoticed and there have been persuasive calls for a more diachronic approach most recently by Kenneth Hewitt in *Regions of Risk* (1997) and Anthony Oliver-Smith and Susana Hoffman in *The Angry Earth* (1999).

8. The concept of internal colonialism has its origins in the dependency theory first popularized by Raúl Prebisch (1967) and André Gunder Frank (1967) in the 1960s that apportioned the world into developed cores and underdeveloped peripheries in which the latter were as much a feature of the modern capitalist system as were the former. The nature of this relationship is held to exist both between states as well as within them, with underdeveloped hinterlands dependent on certain comparatively developed regions, often primate cities and/or coastal enclaves.

9. Global level pressures called “root causes” are equated with political, economic and social pressures; intermediate level pressures known as “dynamic pressures” include population growth, urban development, environmental degradation, the absence of ethics, etc; and local level pressures referred to as “unsafe conditions” equate with social fragility, potential harm and poverty.

10. Oliver-Smith uses the expression to indicate the degree to which all systems are unable to guard against every threat completely (1999: 26) and a similar term, “persistent vulnerability”, is sometimes applied to suggest the combined effect of all the social, economic and political conditions that people experience though without the same implied sense of historical causality (Grunewald et al. 2000: 2).

11. Debate over what is a disaster has been both energetic and heated and definitions vary considerably (Quarantelli 1985 and 1995). Differences

are apparent in definitional emphasis between geographers and sociologists as to whether a disaster is primarily a physical event or a social phenomenon. On the one hand, geographers perceive disasters to be the product of natural phenomena such as earthquakes, volcanoes, typhoons and the like that are rendered hazardous precisely because human societies have failed to sufficiently adapt to them (Smith 1996; Chapman 1994; and Alexander 1993). Populations are subsequently assessed as to whether they are “at risk”, a notion determined by the degree of hazard and their level of vulnerability (Alexander 1997: 291). Sociologists, on the other hand, are concerned almost exclusively with the structures, functions and activities of formal human organizations and the impact of disasters upon them and generally accord the environment only a minor role (Quarantelli and Dynes 1977). They eschew the idea of vulnerability and favor instead definitions that frame disasters in terms of human behavior at a spatially specific moment and location. In this context, disasters are often reduced to “an array of socially derived effects” (Oliver-Smith 1999: 24). In contrast, anthropologists take a more holistic approach to defining hazards and disasters, viewing them as integral parts of both environmental and human systems. Rather than an aberrant act of nature, disasters are seen as the consequence of a process that involves a potentially destructive agent and a population in a socially produced condition of vulnerability (Hoffman and Oliver-Smith 1999: 4). Disasters are seen as a measure of a society’s successful adaptation to certain features of its natural and socially constructed environment in a sustainable fashion (Oliver-Smith 1996: 303). As distinct from geographers and sociologists, anthropologists regard disasters as embedded in the daily human condition and define them in terms of a seamless web of relations that link society to environment to culture. Many of these distinctions have become blurred in recent years as the need to confer greater recognition on the interplay between environmental and social systems has been more widely accepted by practitioners from all disciplinary backgrounds. The debate is now more often to do with the relative weight accorded the various key social and environmental factors rather than to substantive divergence over what constitutes the definitional nature of disasters (Oliver-Smith 1999: 22).

12. Approximately 20 per cent of the Russian population reportedly fell into poverty during the financial crisis of 1998 but this figure disguises the fact that 42 per cent of people actually experienced an increase in family expenditure while 61 per cent endured a decrease (World Bank 2001: 161-76).

13. Development can be called development aggression when projects are implemented against the will of the people, directly cause

damage and/or negatively affect the livelihood of already poor sectors of the community, result in the forced displacement of communities and cause environmental damage (Caspale 1996 and Brand 2001). See also Annelies Heijmans and Lorna Victoria (2001: 87). Similarly, relief aggression can be defined as the negative social, economic, political, cultural and environmental effects of programs implemented to assist communities to recover from hazards, especially in relation to resettlement, relocation and loss of livelihood.

14. Carrying capacity refers to a nominal limit to growth, a norm in the ratio between population and the physical environment that allows maximum productivity without depletion of the resource base available to a society. The concept is not new: John Stuart Mill expounded his vision of what he called a “stationary state” in his *Principles of Political Economy* published in 1857. More recently, Mill’s concept has found widespread acceptance in H. Daly’s version of the “steady state economy” (1973), T. Roszak’s idea of a “visionary commonwealth” (1973) and I. Illich’s notion of a “convivial community” (1974). A climax community signifies the concept that nature, when left to its own devices, will inevitably climax in a biotic community based on maximum diversity and harmonious balance such as in a tropical rainforest.

15. There is much in Reice’s approach that closely parallels Buddhist conceptualizations of reality, especially the emphasis on the constancy of change and the impermanence of everything. See David Kalupahana, *Man and Nature: Toward a Middle Path of Survival* (1986).

16. For a more popular explanation of complexity theory, see Roger Lewin *Complexity; Life at the Edge of Chaos* (1999) and M. Mitchell Waldrop *Complexity; The Emerging Science at the Edge of Chaos* (1992).

17. Langton refers to this continual state of tension as “the edge of chaos” but argues that it is actually an extremely productive one, characterized by an adaptability of functions and maximized efficiency (Langton 1989).

18. Complex emergencies have no common etymology with complexity theory as such only that both emphasize the interrelatedness of factors that lie behind disasters.

19. According to Per Bak, in fact, the dynamics at work in these systems naturally result in such conditions or in “states of criticality” (Bak 1991).

20. CBDM refers to an alternative approach that emphasizes people’s participation in strengthening their own capabilities and reducing their vulnerabilities, and removing the structures that generate inequality and underdevelopment through partnership with less vulnerable

sectors of the population. See Annelies Heijmans and Lorna Victoria *Citizenry-Based and Development-Oriented Disaster Response* (2001).

21. On the difficulties faced in creating even just an econometric version of such an index, see the excellent discussion by Charlotte Benson, *Macro-economic Concepts of Vulnerability: Dynamics, Complexity and Public Policy* (2003).

References

- Adam, B. U. Beck and J. van Loon. (eds.) 2000. *The Risk Society and Beyond: Critical Issues for Social Theory*. London, Thousand Oaks and New Delhi: Sage.
- Alexander, D. 1993. *Natural Disasters*. London: UCL Press.
- . 1997. “The Study of Natural Disasters, 1977-1997; Some Reflections on a Changing Field of Knowledge.” *Disasters* 21 (4): 283-304.
- Ardener, S. 1964. “A Comparative Study of Rotating Credit Associations.” *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 94 (1-2): 201-229.
- Bak, P. 1991. “Self-organized Criticality.” *Scientific American*. January: 46-53.
- Bankoff, G. 2003a. *Cultures of Disaster: Society and Natural Hazard in the Philippines*. London: Routledge Curzon.
- . 2003b. “The Historical Geography of Disaster: ‘Vulnerability’ and ‘Local Knowledge’ in Western Discourse.” In *Mapping Vulnerability: Disasters, Development and People*, edited by G. Bankoff, G. Frerks and D. Hilhorst. London: Earthscan.
- Beck, U. 1992. *Risk Society: Towards a New Modernity*. London: Sage.
- Benda-Beckmann, F. and K. von. 2000. “Coping with Insecurity.” Pp. 7-31 in *Coping with Insecurity: An ‘Underall’ Perspective on Social Security in the Third World*, edited by F. von Benda-Beckmann, K. von Benda-Beckmann and H. Marks. Yogyakarta: Postaka Pelajar.
- Benson, C. 2003. “Macro-economic Concepts of Vulnerability: Dynamics, Complexity and Public Policy”. Pp. 159-173 in *Mapping Vulnerability: Disasters, Development and People*, edited by G. Bankoff, G. Frerks and D. Hilhorst. London: Earthscan.
- Blaikie, P., T. Cannon, I. Davis and B. Wisner 1994. *At Risk: Natural Hazards, People’s Vulnerability and Disaster*. London and New York: Routledge.
- Brand, L. 2001. “Displacement For Development? The Impact of Changing State-Society Relations.” *World Development*, 29 (6): 961-76.

- Cannon, T. 1994. "Vulnerability Analysis and the Explanation of 'Natural' Disasters." Pp. 13-29 in *Disasters, Development and Environment*, edited by A. Varley. Chichester, New York, Brisbane, Toronto and Singapore: John Wiley & Sons.
- Caspile, R. 1996. "Human Rights vs Development Aggression; Can Development Violate Human Rights?" *Human Rights Forum – Journal For Human Rights Defenders* 6 (1): 37-43.
- Chambers, R. and R. Conway 1992. *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. Falmer, Sussex: University of Sussex, IDS Discussion Paper 296.
- Chapman, D. 1994. *Natural Hazards*. Melbourne: Oxford University Press.
- Cohen, Y. 1968. *Man in Adaptation: The Cultural Present*. Chicago: Aldine.
- Copans, J. 1975. *Secheresses et Famines du Sahel*. Paris: Maspéro.
- Daly, H. 1973. *Towards A Steady State Economy*. San Francisco: Freeman.
- Davies, S. 1993. "Are Coping Strategies A Cop Out?" *Institute of Development Studies Bulletin* 24 (4): 60-72.
- Davis, M. 2001. *Late Victorian Holocausts: El Niño Famines and the Making of the Third World*. London and New York: Verso.
- Drèze, J. and A. Sen. 1989. *Hunger and Public Action*. Oxford: Clarendon Press.
- Dubos, R. 1959. *Mirage of Health: Utopias, Progress, and Biological Change*. New Jersey: New Brunswick.
- Ellis, F. 2000. *Rural Livelihoods and Diversity in Developing Countries*. Oxford: Oxford University Press
- Emel, J. and R. Peet. 1989. "Resource Management and Natural Hazards." Pp. 51-73 in *New Models in Geography: The Political-Economy Perspective*, edited by R. Peet and N. Thrift London: Unwin Hyman.
- Fagan, B. 1999. *Floods, Famines and Emperors: El Niño and the Fate of Civilizations*. New York: Basic Books.
- Ferguson, J. 1999. *Expectations of Modernity; Myths and Meanings of Urban Life on the Zambian Copperbelt*. Berkeley, Los Angeles and London: University of California Press.
- Frank, A. G. 1967. *Capitalism and Underdevelopment in Latin America: Historical Studies of Chile and Brazil*. New York: Monthly Review Press.
- Geertz, C. 1962. "The Rotating Credit Association: A "Middle Rung" in Development." *Economic Development and Cultural Change* 10 (2): 241-263.
- Giddens, A. 1991. *Modernity and Self-Identity: Self and Society in the Late-Modern Age*. Cambridge: Polity.

- Grunewald, F., V. De Geoffroy and S. Lister. 2000. *NGO Responses to Hurricane Mitch: Evaluations for Accountability and Learning*. HPN Network Paper, ODI.
- Haan, L. de and P. van Ufford 2001. "The Role of Livelihood, Social Capital, and Market Organisation in Shaping Rural-Urban Interactions." Pp. 283-308 in *Re-aligning Government, Civil Society and the Market: New Challenges in Urban and Regional Development*, edited by J. Post, I. Baud, L. de Haan and T. Dietz. Amsterdam: AGIDS, University of Amsterdam.
- Heijmans, A. and L. Victoria. 2001. *Citizenry-Based and Development-Oriented Disaster Response: Experience and Practice in Disaster Management of the Citizens' Disaster Response Network in the Philippines*. Manila: Center for Disaster Preparedness.
- Hewitt, K. 1983. "The Idea of Calamity in a Technocratic Age." Pp. 3-32 in *Interpretations of Calamity from the Viewpoint of Human Ecology*, edited by K. Hewitt. Boston: Allen and Unwin.
- _____. 1997. *Regions of Risk; A Geographical Introduction to Disasters*. Edinburgh: Longman.
- Hoffman, S and A. Oliver-Smith. 1999. "Anthropology and the Angry Earth: An Overview." Pp. 1-15 in *The Angry Earth: Disaster in Anthropological Perspectives*, edited by A. Smith and S. Hoffman. New York and London: Routledge.
- ILO. 1984. *Introduction to Social Security*. Geneva: International Labour Office.
- Illich, I. 1974. *Tools For Conviviality*. New York: Harper & Row.
- Kalupahana, D. 1986. "Man and Nature: Toward a Middle Path of Survival." *Environmental Ethics*, 8: 371-380.
- Langton, C. 1989. *Artificial Life*. Santa Fe Institute in the Science of Complexity, Redwood City: Addison-Wesley.
- Lavell, A. 2003. "The Lower Lempa River Valley, El Salvador: From Risk to Sustainability: Experience with a Risk Reduction and Development Project." Pp. 67-82 in *Mapping Vulnerability: Disasters, Development and People*, edited by G. Bankoff, G. Frerks and D. Hilhorst. London: Earthscan.
- Lees, S. and D. Bates. 1984. "Environmental Events and the Ecology of Cumulative Change." Pp. 133-159 in *The Ecosystem Concept in Anthropology*, edited by E. Moran. Boulder, Colorado: Westview Press.
- Lewin, R. 1999. *Complexity: Life at the Edge of Chaos*. Chicago and London: University of Chicago Press.
- Lewis, J. 1999. *Development in Disaster-Prone Places: Studies of Vulnerability*. London: Intermediate Technology Publications.

- Linden, M. van. (ed.) 1996. *Social Security Mutualism; The Comparative History of Mutual Benefit Societies*. Bern, Berlin, Frankfurt, New York, Paris, Wien: Peter Lang.
- Long, N. 2000. "Exploring Local/global Transformations: A View From Anthropology." Pp. 184-201 in *Anthropology, Development and Modernities: Exploring Discourses, Counter-tendencies and Violence*, edited by A. Arce and N. Long. London and New York: Routledge.
- Maskrey, A. 1989. *Disaster Mitigation; A Community Based Approach*. Development Guidelines No.3. Oxford: Oxfam.
- Meillassoux, C. 1974. "Development or Exploitation: Is the Sahel Famine Good Business?" *Review of African Political Economy* 1: 27-33.
- Midgley, J. 1984. "Social Assistance: An Alternative Form of Social Protection in Developing Countries." *International Social Security Review* 84: 247-264.
- . 2000. "Social Security Policy in Developing Countries: Integrating State and Traditional Systems." Pp. 219-29 in *Coping with Insecurity: An 'Underall' Perspective on Social Security in the Third World*, edited by F. von Benda-Beckmann, K. von Benda-Beckmann and H. Marks. Yogyakarta: Postaka Pelajar.
- Mill, J. S. 1857. *Principles of Political Economy*. Volume 2. London: John W. Parker & Son.
- Morse, S. 1992. "AIDS and Beyond: Defining the Rules for Viral Traffic." Pp. 389-409 in *AIDS: The Making of a Chronic Disease*, edited by E. Fee and D. Fox. Berkeley: University of California Press.
- O'Keefe, P., Westgate, K. and Wisner, B. 1976. "Taking the 'Naturalness' Out of 'Natural Disaster'." *Nature* 260 (15 April): 566-7.
- Oliver-Smith, A. 1979. "The Yungay Avalanche of 1970: Anthropological Perspectives on Disaster and Social Change." *Disasters* 3 (1): 95-101.
- . 1986a. "Disaster Context and Causation: An Overview of Changing Perspectives in Disaster Research." Pp. 1-38 in *Natural Disasters and Cultural Responses*, edited by A. Oliver-Smith. Williamsburg, VA: College of William and Mary.
- . 1986b. *The Martyred City: Death and Rebirth in the Andes*. Albuquerque: University of New Mexico Press.
- . 1994. "Peru's Five-Hundred-Year Earthquake: Vulnerability in Historical Context." Pp. 3-48 in *Disasters, Development, and Environment*, edited by A. Varley. Chichester: John Wiley and Sons.

- . 1996. "Anthropological Research on Hazards and Disasters." *Annual Review of Anthropology* 25: 303-328.
- . 1999. "What is a Disaster?" Anthropological Perspectives on a Persistent Question." Pp. 18-34 in *The Angry Earth: Disaster in Anthropological Perspectives*, edited by A. Oliver-Smith and S. Hoffman. New York and London: Routledge.
- Oliver-Smith, A. and S. Hoffman. (eds.) 1999. *The Angry Earth: Disaster in Anthropological Perspectives*. Routledge, New York and London.
- Perrow, C. 1984. *Normal Accidents; Living With High-Risk Technologies*. New York: Basic Books.
- Possekkel, A. 1999. *Living With the Unexpected: Linking Disaster Recovery to Sustainable Development in Montserrat*. Heidelberg: Springer.
- Prebisch, R. 1967. *Hacia un Dinámica del Desarrollo Latinoamericano*. Montevideo, Uruguay: Ediciones de la Banda Oriental.
- Prigogine, I. 1980. *From Being to Becoming: Time and Complexity in the Physical Sciences*. San Francisco: Freeman.
- Quarantelli, E. 1985. "What is a Disaster? The Need for Clarification in Definition and Conceptualization in Research." Pp. 41-73 in *Disasters and Mental Health: Selected Contemporary Perspectives*, edited by S. Solomon. Washington, DC: US Government Printing Office
- . 1995. "What is a Disaster?" *International Journal of Mass Emergencies* 13(3): 221-230.
- Quarantelli E. and R. Dynes. 1977. "Response to Social Crisis and Disaster." *Annual Review of Sociology* 3: 23-49.
- Reice, S. 2001. *The Silver Lining: The Benefits of Natural Disasters*. Princeton and Oxford: Princeton University Press.
- World Bank. 2001. "Managing Economic Crises and Natural Disasters." Chapter 9, pp. 161-76 in *World Development Report 2000/2001: Attacking Poverty*. Oxford University Press and World Bank.
- Roszak, T. 1973. *Where The Wasteland Ends*. New York: Anchor Books.
- Sachs, W. (ed.) 1992. *The Development Dictionary: A Guide to Knowledge as Power*. London: Zed Books.
- Schneider, E and J. Kay. 1994. "Complexity and Thermodynamics: Towards a New Ecology." *Futures* 26 (6): 626-647.
- Sen, A. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Oxford University Press.
- Smith, K. 1996. *Environmental Hazards, Assessing Risks and Reducing Disaster*. London and New York: Routledge.

- Susman, P., P. O'Keefe and B. Wisner. 1983. "Global Disasters: A Radical Interpretation." Pp. 264-83 in *Interpretations of Calamity from the Viewpoint of Human Ecology*, edited by K. Hewitt. Boston: Allen and Unwin.
- Susser, M. 1973. *Causal Thinking in the Health Science: Concepts and Strategies in Epidemiology*. New York: Oxford University Press
- Swaan, A. de. 1988. *In the Care of the State: Health Care, Education and Welfare in Europe and the USA in the Modern Era*. Oxford: Polity Press.
- UNDP. 1990. *Human Development Report: Concept and Measurement of Human Development*. United Nations Development Programme: <www.hdr.undp.org/reports/global/1990/en>
- Waldrop, M. 1992. *Complexity: The Emerging Science at the Edge of Chaos*. New York, London, Toronto, Sydney, Tokyo and Singapore: Touchstone Books.
- Walker, P. and J. Walter. (eds.) 2000. *World Disasters Report 2000: Focus on Public Health*. Switzerland, Geneva: International Federation of Red Cross and Red Crescent Societies.
- Walter, J. (ed.) 2002. *World Disasters Report 2002: Focus on Reducing Risk*. Switzerland, Geneva: International Federation of the Red Cross and Red Crescent Societies.
- Winterhaler, B. 1980. "Environmental Analysis in Human Evolution and Adaptation Research." *Human Ecology* 8: 137-170.
- Wisner, B. 1993. "Disaster Vulnerability: Scale, Power and Daily Life." *GeoJournal* 30 (2): 127-140.