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Vulnerability to Disaster and Sustainable Development: A General Framework for Assessing Vulnerability

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Vulnerability has to do with future jeopardy and potential harm. To be vulnerable is to exist with a likelihood that some kind of crisis may occur that will damage one's health, life, or the property and resources on which health and life depend. Everyone is, to some degree, vulnerable. Any of us can suffer a catastrophic personal loss that affects our health, life, or property. We all could be affected by a nuclear accident that spills across geographical borders or by the depletion of essential resources, such as the ozone layer, on which we depend. Many people live in zones that are subject to natural hazards such as earthquakes, windstorms, or floods, and, increasingly, these natural phenomena even affect those of us who live at a distance because they have adverse impacts on the environment, world resources, and markets on which we all depend.

Vulnerability is the subject of this paper. Over recent years, even as progress is made in understanding nature and controlling some of its negative effects, vulnerability appears to be rising. The numbers of disasters have risen, as have the numbers of people affected and the value of property destroyed (many authors assemble data to show these trends; for an overview, see International Federation of Red Cross and Red Crescent Societies 1993b, pp. 33ff). The inauguration of the International Decade for Natural Disaster Reduction (IDNDR) reflects world concern with the suffering and setbacks thus experienced. In its opening session in late 1991, the Special High-Level Council of the IDNDR noted that "Reducing vulnerability to natural disasters is a major goal requiring concerted and coordinated efforts of government, UN-system organizations, the world's scientific and techni-

cal community, volunteer organizations, schools and educational institutions, the private sector, the media, and individuals at risk. Vulnerability assessment . . . [is] essential" (United Nations IDNDR 1992). The council thus alerted the international community to the fact that, if we are ever to control and limit the damage from disasters, we must be able to identify and assess vulnerabilities in different places and times in order to design timely, affordable, and effective strategies for reducing the negative impacts of disasters.

Though essential, assessment of vulnerability has proven to be a complex undertaking. As we have gained more and more experience responding to disasters, we have improved our understanding of vulnerability. But we have also been forced to recognize its complexity and to acknowledge that numerous interconnected, mutually reinforcing, and dynamic factors are involved. In addition, disagreement about which factors are most important has emerged. Different disciplines have developed indexes of vulnerability that incorporate the factors of primary concern within their own fields but overlook or omit factors that other disciplines consider essential for full understanding.

This chapter begins by reviewing the way in which our understanding of vulnerability has shifted and enlarged over time, followed by a discussion of the interrelationships among economic development efforts of the past, trends in vulnerability, and the current concern with defining and achieving sustainable development. This is followed by a section outlining five critical characteristics of vulnerability and, finally, by a framework for vulnerability assessment that reflects the characteristics, factors, and relationships discussed. The purpose of this effort is to suggest a comprehensive, yet usable, framework for understanding vulnerability that can be used by communities to assess their own risk and to decide which courses of action to take to reduce their vulnerability, by planners to mitigate and prevent disasters, by educators to improve the public's understanding of disaster proneness and prevention, and by government and international bodies to discuss and agree on joint responsibilities and cooperative efforts to reduce vulnerability.

Before beginning, however, we must specify something more about the vulnerability we are attempting to assess. Everyone is in some ways and to some degree vulnerable. The purpose of assessing vulnerability is to be able to take appropriate actions to reduce vulnerability before the potential for damage becomes actual. We are, however, interested in understanding more than the simple vulnerability each of us faces as a part of living. We are also interested in recognizing and responding to levels of vulnerability where the potential for damage to health, life, or resources and property is significant—that is, where it is so large that the communities experiencing losses cannot handle them alone and need outside assistance to sustain life and health and to recover resources and property. We are interested in vulnerability that threatens to put people "over the edge" of self-sufficiency where they become dependent, at least for a while, on outside support. This is, in fact, the working definition of a disaster, namely, a crisis event that surpasses the ability of an individual, community, or society to control or survive its consequences (Kreimer and Munasinghe 1990). We are, then, interested in developing a framework to aid in assessing vulnerability to disaster in this sense.

An historical overview: How understanding of vulnerability has shifted and enlarged

The literature on disaster vulnerability and how to assess it is large and growing. Other scholars have reviewed this literature in useful and interesting ways (for an excellent review, see Winchester 1992, especially chapter 2). For our purposes here, we will group the vulnerability literature into three categories that also, to some extent, reflect progress toward the emergence over time of a fuller and more realistic understanding of the concept.

Nature as cause: Scientists, technologists, and engineers respond

Early disaster studies identified natural hazards as the cause of vulnerability. People who lived in zones of seismic activity, along coastlines subject to typhoons or tsunamis, on slopes of active volcanoes, or in areas prone to extensive drought or flood were, by the fact that they lived in these areas, vulnerable. Where the frequency or magnitude of the hazards was great, vulnerability was great. Where such events were infrequent, vulnerability was considered to be low. By avoiding living or working in these areas, humans could, it was thought, avoid vulnerability. The 1979 working understanding of the Office of the United Nations Disaster Relief Coordinator (UNDRO) reflects this definition: vulnerability represented the relationship between hazards (natural events, including their strength, magnitude, and duration) and risk (exposure to the events, measured essentially in terms of proximity; see, for example, UNDRO 1979).

With this understanding of vulnerability, scientists, technologists, and engineers have attempted to predict natural hazard events and to develop technologies that enable human structures and systems to withstand their impacts. The assumption has been that such events, as acts of nature, cannot be prevented. However, vulnerability could be reduced, these researchers believe, if we could more accurately predict where and when and in what magnitude these events will occur and if we could, also, develop technologies that mitigate their negative effects.

The efforts of this group of disaster vulnerability researchers have had significant success over time. Technologies and materials for constructing buildings have been developed that can withstand strong winds, storms, flames, and seismic activity. Water control systems have greatly reduced seasonal damage from flooding in many areas, and some communities have invested in elaborate and expensive control systems to limit damage from even the rare and unusual 50-year or 100-year crises (one example is the massive flood control system built to protect London and its surrounds from floods that occur perhaps every 2,000 years at a cost of £730 million; see Anderson 1990, p. 10). Systems for predicting and tracking storms that originate at sea have greatly improved so that, in most parts of the world, residents of coastal regions now have hours (or even days) of warning to prepare their property and to evacuate for personal safety. Technologies for mapping hazard proneness, down to small specific micro-zones, provide precise scientific assessments of the likelihood of disaster vulnerability that local communities can use to decide whether and how to reduce their risks (see, for example, International Geological Congress 1984; "Welcome to the Future" 1993, to name only a few of the sources of scientific and technological approaches to vulnerability assessment).

Costs as cause: Economists assess how much vulnerability reduction is rational

In spite of the many gains in our scientific and technological capacity to limit vulnerability to natural hazards, people continue to be injured and die, and property and resources continue to be destroyed, in disasters every year. One reason for this is that many of the prediction and mitigation technologies are costly, and individuals and communities are unwilling or unable to afford them. A second body of literature about disaster vulnerability and mitigation focuses on these costs and attempts to develop economically rational criteria for deciding which vulnerability-reduction technologies should be used under what circumstances.

These researchers note that although vulnerability has its costs in terms of losses of life, health, and property, vulnerability reduction entails costs as well. If the elimination of vulnerability were free, then societies would reduce all risks to zero. However, when faced with the actual (often high) costs of the vulnerability-reduction technologies, individuals and societies must make rational choices between buying these technologies or buying something else instead. The fact that hazards are largely unpredictable makes this calculus all the more important and difficult. The choice is whether to invest today to prevent some future, uncertain event or to invest today to produce some certain, needed good.

Economists have developed increasingly sophisticated systems for assessing the value of reducing vulnerability over time. Systems for measuring the cost-benefit ratios of using the various technologies available for reducing vulnerability now recognize indirect and secondary costs as well as the direct costs involved in immediate losses (Anderson 1990) Probability theory has been merged with economic calculations to arrive at appropriate discount rates for comparing current forgone consumption and future reduced losses. Increasingly, researchers are improving their methods for collecting data on losses from disasters and their models for incorporating external and resource-loss costs into their calculations of whether, when, how, and where reducing vulnerability is viable. To be accurate, each of these cost measurement techniques requires, however, an accurate assessment of vulnerability—that is, the ability to know with the highest possible degree of certainty exactly what vulnerability entails in order to put an accurate price on preventing it. If knowing this is not possible, then pricing has to reflect uncertainty itself—a much less satisfactory solution to the problem of economic choice. Thus, as economists have contributed to the literature on vulnerability assessment, they have recognized that the understanding of vulnerability must be expanded to incorporate an increasing number of variables.

Humans as cause: Social scientists, policy reformers, advocates for the poor, and environmentalists enter the scene

Even as the technological/engineering and economic/accounting approaches to assessing and dealing with vulnerability have developed, others who are concerned with the impacts of disasters have criticized these two approaches as too narrow (see, for example, Bruce 1992; Maloney 1990–91; Schramm and Warford 1989; Suhrke 1993). The critics observe that disasters have differential impacts on peoples who live in hazard-prone areas. They note that vulnerability to 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. They conclude that more than just hazard and exposure must be considered in any accurate assessment of vulnerability.

Considering the economists' approaches to establishing rational criteria for deciding on vulnerability reduction, these critics also note that different people appraise the danger of hazards differently. Because people acknowledge and interpret their vulnerability differently—even though they experience the same exposure to the same hazard—they make different decisions about how much vulnerability reduction is worth to them. That is, the benefits side of the cost-benefit ratio varies widely according to factors that go beyond simply avoiding the measurable losses that are captured in the hazard/exposure definition of vulnerability. Thus, this group of critics sees that the price that people are willing to pay, or not willing to pay, to reduce vulnerability to uncertain events incorporates many additional—and some not readily quantifiable—factors (notable for being the first to include these issues in his analysis is White 1973; see Winchester 1992).

Accompanying the growing awareness of the complexity of factors that affect vulnerability assessment is awareness of the role that humans play in creating vulnerability. Whereas previous assessments focused on the acts of nature that come from outside human agency, later assessments acknowledged that it is largely human actions, decisions, and choices that result in people's vulnerability to natural events. Choices about where to live (or, in some cases, the lack of choice due to political, economic, or social position), decisions about where to locate a chemical plant, and acts of cutting forests, farming marginal lands, or evading building codes are examples of how humans cause a "natural" hazard to become a disaster. Humans make themselves—or, quite often, others—vulnerable.

The third category of literature on vulnerability assessment, therefore, includes the criticisms and expanded definitions of the social scientists, policy reformers, advocates for the poor, environmentalists, and others who, having identified the differential character of vulnerability and the central role of humans in creating vulnerability, have incorporated additional variables into their definitions of vulnerability. Included are economic poverty, social and political marginalization, lack of options as well as lack of resources, and other social, political, and economic indicators that, in any given setting, cause people to live in circumstances that put them at high risk from any natural, market, political, social, or other perturbation.

It is now widely recognized, then, that people are vulnerable to a natural event not because of proximity per se, but because of proximity coupled with low economic or social status. For example, poor people often live in weaker houses on less desirable and less stable lands, have fewer income or resource reserves, and are less healthy than people who are better off. People who are socially or politically marginalized usually have restricted employment opportunities, low access to education, or generally few options that would enable them to withstand or recover from a disaster. The coincidence of high death and injury rates in disasters with low national income levels reveals how poverty at the national level also makes some nations more vulnerable to disasters than others. It follows that when personal, community, or national wealth is inadequate even for basic, daily security, few investments are made in the

technologies that can help to ensure survival in the face of a hazard event.

However, having acknowledged the important relationship of poverty to vulnerability, it is also apparent that poverty is not a sufficient proxy for vulnerability. One need only consider the upper-class homes built on the hills of California or on the shores of the eastern seaboard in the United States to know that it is not only the poor who reside in risky, hazard-prone places, nor is it only they who lose their homes or lives when hazards strike.

Vulnerability assessment requires far more contextual analysis of complex and multifaceted factors that cause people to make the decisions and choices and to undertake the actions that increase vulnerability. Increasingly we see that the factors influencing human choices and actions arise from sociopolitical systems, reflect people's status and position within their economies and societies, and are shaped by habits and expectations related to past experience.

The third body of vulnerability investigation, while complicating the analysis immensely, has made two very important contributions to our understanding of vulnerability. First, by lodging responsibility for vulnerability squarely inside human systems, it has removed any justification for the claims that disasters cannot be predicted or prevented. While acknowledging that the exact time, place, or magnitude of an earthquake, for example, cannot be foretold, this group of writers notes that current scientific knowledge can and has identified zones of seismic activity and that this, coupled with awareness of the social and economic factors that cause human habitats to be vulnerable to earthquakes, allows us to predict with a high degree of certainty where seismic activity will result in a disaster.

Second, this group notes that, if human agency is involved in creating or increasing vulnerability, then humans can also make different choices that prevent (or reduce) vulnerability. We can decide not to do the things that increase vulnerability and to do the things that reduce it. We *cannot* overgraze the lands we now deplete, we *cannot* denude hillsides of their forests, we *cannot* build properties that are below code for predictable wind or earth force. To reverse past risk-increasing mistakes, we can replant unstable hillsides, we can retrofit old buildings, we can relocate chemical industries to zones of relative safety. Although, in the extremes, certain disasters will remain unpredictable and unpreventable, the growing awareness of human responsibility for vulnerability opens up a vast range of choices and actions that can be undertaken to reduce vulnerability.

How, then, does this recognition help us to move toward a useful and usable framework for assessing vulnerability? To answer this, we shall next examine in some detail how vulnerability has risen because of past human actions and how this history influences the choices to be made in the future.

Past economic development, increasing disaster vulnerability, and future sustainable development

Given the strong link between poverty and vulnerability, we might assume that economic development is one central strategy for reducing vulnerability. The historical record, however, presents mixed evidence about this relationship. The processes by which human societies pursue economic security and wealth have, very often, increased the vulnerability both for those who have gained and for others as well. Recognition of the negative relation-

ship between development and vulnerability, especially as it is mediated through the environment, has produced a strong and growing concern with defining and pursuing sustainable development, that is, development that meets the needs of the present without compromising the ability of future generations to meet their own needs (this definition was put forth by the World Commission on Environment and Development, created by Resolution 38/161 of the General Assembly of the United Nations in 1983).

To plan and work for sustainable development, however, we have to know what has gone wrong in past development efforts. Why have these efforts to improve welfare also increased the vulnerability of large numbers of people?

Trends associated with development that have increased vulnerability

Ten distinct, though related, trends that are associated with the progress of economic development have also increased vulnerability. They are the transformation of resources, the production of effluents, the production of dangerous substances and invention of dangerous techniques, population growth, use of marginal lands, urbanization, rise in expectations, the attitude that everything can be done and all problems solved, the attitude that rationality can be achieved through pricing, and the widening gap between rich and poor. Many of these are by now familiar and well documented. It is not necessary for us to prove, here, that these trends have occurred since others have done so. Rather, this list of trends in development and vulnerability serves to focus attention on the realities with which we must deal in future development approaches if we are to reduce vulnerability and achieve sustainable development.

TRANSFORMATION OF RESOURCES

Underlying the dominant development paradigm of Europe and North America in the nineteenth and twentieth centuries (and adopted by many of the countries of the East and South) has been the belief, articulated by Sir Frances Bacon, that nature is to be understood in order to be controlled and dominated by mankind. The possibility for humans to transform natural resources into things that provide increasing levels of security and comfort has provoked immense ingenuity and inventiveness on the part of many people. The outcomes have been impressive, and many people live healthier and more secure lives as a result of these efforts. By the late twentieth century, however, we are all aware of the limitations of natural resources and of the negative consequences of their depletion through overuse both for the present and for the future. Even so, the trends of resource use are up, and the rates of use are rising.

As nonrenewable resources are consumed, three types of vulnerability increase. First, human societies face the possibility of scarcities in the things now considered necessary for the good life and of many things that truly are essential for any life, such as food. Second, as some societies exert their power over the limited resources that remain, others suffer shortages and thus become increasingly vulnerable. This may, in turn, produce political challenges that increase the vulnerability of even those who still have control over scarce resources. And third, the loss of some resources poses environmental consequences for all of us. For example, depletion of forests has been linked to loss of ozone, possible global warming, and rising sea levels, with the resultant loss of productive land, reduction in food

availability, and increasing health dangers. There are many other examples of resources whose loss would increase the threat to us all, including nonrenewable sources of energy and certain plant and animal species.

Furthermore, production techniques and the good life associated with economic development of the past have resulted in the destruction of "naturally occurring [disaster] mitigation elements in the ecosystems" (Bender 1993). For example, ocean reefs absorbed wave energy from sea storms, and mangrove stands protected coastal lands from winds and waves. Unrecognized as natural preventers of disasters, these resources have often been destroyed, leaving areas vulnerable now where no vulnerability existed before. Thus the rates of resource use associated with vast economic progress continue to rise, increasing vulnerability.

Effluent Production

Production techniques associated with resource use have also resulted in increasingly dangerous levels of effluents being released into the air, waters, and soils on which present and future production and welfare depend. The so-called free goods of air and water are not free at all because our levels of effluent production outstrip the capacity of nature to cleanse itself and replenish its freshness. And, as is true for the use of resources, the rates of effluent production are, for the most part, rising (see Anderson 1992; Parker 1992; Quarantelli 1992).

Immediate vulnerability from effluents arises from impacts on the health of humans, animals, and plants. Future vulnerability involves also the inability to produce needed things that rely on the resources destroyed through poisons, such as cultivable land or water, which are necessary to sustain life.

Production of Dangerous Substances and Invention of Dangerous Techniques

Economic development has involved the production of substances and the invention of techniques that both serve human ends and, at the same time, present new dangers. For example, central to economic development has been the production and use of a variety of chemicals and chemical processes. The manufacture of these chemicals uses some resources and produces waste materials, but the substances themselves also pose direct dangers to health. Chemical fires, explosions, or leakages represent new hazards to which humans are vulnerable. Similarly, gas storage tanks, nuclear reactors, large dam systems, and other technologies of modern industrial societies, while increasing wealth, also pose new and immediate hazards. When threatened by the natural hazards of storms and earthquakes, these hazards, by their very existence, raise the threat of dangers beyond those produced by the natural events themselves.

Population Growth

Development has resulted in improved public health, cleaner water (up to a point), the discovery of vaccines, and the creation of health care systems and technologies; it has also resulted in improved life expectancy and higher fertility for both humans and animals. These gains represent a reduction in vulnerability in the immediate sense.

Yet, the cumulative impact of these gains has been to increase population, which increases demand on the scarce and depleting resource base, adds to the wastes that are returned to the environment, and forces the overuse of land, water, and energy. Increasing animal herds have resulted in expanding desertification in some regions with concomitant lowering of the water table and rising proneness to

drought. As human and animal populations expand, tensions sometimes increase and, with them, the potential for political conflict, another source of human vulnerability.

USE OF MARGINAL LANDS

Improvements in scientific capacity and technological developments, coupled with population growth, have encouraged societies to move into and rely on lands that, previously, were considered unsafe or unproductive. For example, floodplains have been made "safe" with dams, ditches, and dikes and hillsides have been "stabilized" with reinforcement technologies and, therefore, developed as lands for agriculture, industry, and habitation.

As marginal lands are increasingly used by humans, however, the margin of safety of life and production in these areas is inevitably low. That is, people now are encouraged, by developmental progress, to live in areas that are inevitably more prone to hazards than other lands. The damage caused by the extensive and disastrous flooding in the Midwest of the United States in the summer of 1993 was, to a very large extent, the result of people's decisions to live and work in zones that would never have been settled if "development" had not brought the series of technologies that made these areas appear to be safe. With a false sense of security, many people experienced increased vulnerability. In areas where population pressures are also great, this trend toward settlement of unsafe areas—with the aid of technologies associated with development—proceeds apace.

URBANIZATION

Trends toward urbanization have always been associated with economic and social development. Much progress has been made in science, industry, the arts, and politics as a result of this trend. Developments of science and technology have also made it possible for more and more people to live in cities. Increases in agricultural productivity enable more people to live off the food grown by fewer people. Communication, transport, sewage, electricity, and other complex systems, as well as highly advanced building techniques, enable people to live under conditions of population density that were previously impossible. Population pressures and depletion of rural resources encourage more and more people to move to urban centers in search of employment, security, and lifestyles associated with modernity.

As cities become mega-cities, with populations over 20 million people, however, they become highly vulnerable to a number of hazards and failures: available resources can be inadequate to sustain the number of people, and harmful wastes are produced in numbers that cannot be absorbed in the given space, increasing the potential for hunger and disease (see Kreimer and Munasinghe 1992; Pan American Health Organization 1993). They also include accidents such as explosions of fuel stocks (located for convenience near the population that needs them), leakages of chemical and other toxic wastes used in industrial production, and fire. System failures and breakdowns can also bring extraordinary dangers. When vast numbers of people are linked through telecommunications systems on which they depend for their work, health, or information, a loss of such a system can threaten survival. Urban dwellers are vulnerable to a whole new set of hazards that accompany the very processes that make city life attractive and possible. This vulnerability seems to rise in correlation with the numbers of people accommodated within fixed geographic space.

Three of the ten trends that are associated with economic and social development are trends in attitudes. They represent changes in the ways that people think, and they exacerbate the vulnerabilities just discussed. They are rising expectations, the attitude that everything is possible, and the attitude that rationing can be accomplished through pricing.

Rising Expectations

Worldwide, aspirants to development identify it with increasing access to consumer goods. The Western model of consumer-oriented economics has come to be, by the vast majority of people, synonymous with development. So long as no alternative model of development is equally compelling and appealing, the rising expectations among those who are now poor put strong pressure on all of the above trends.

The Attitude That Everything Is Possible

Historically, progress in achieving economic surplus through the industrial revolution in Western Europe and North America was linked to (and, in part an outcome of) the scientific revolution, which had occurred one century earlier. The way of knowing of the scientific revolution—empirical, pragmatic, experimental—drove and reinforced the technological discoveries on which abundance was gained. Steady progress was apparently made in the economic sphere by drawing on the expanding knowledge available from science and technology for three consecutive centuries.

With the experience of such apparent success, people came to believe that all problems that have to do with the material of science—specifically nature and matter—are solvable. All that is necessary is further scientific or technological discovery. Every problem is viewed as a challenge or a frontier to be conquered, as all the past ones have been, by the application of increasing knowledge. In fact, as we come to the twenty-first century, more and more problems are not susceptible to the scientific solutions we have come to expect. We can, indeed, analyze and understand some of the new problems we face—such as depletion of nonrenewable resources—but the easy discovery of ways to reproduce these resources, or of alternatives that can substitute for what has been lost, eludes us. Believing that such solutions exist and can be found with sufficient effort has, however, seduced human societies into pursuing costly, irreversible patterns of resource use and effluent production. Unless solutions are found, these patterns, as we know, increase vulnerability on a broad scale.[1]

The Attitude That Rationality Can Be Achieved Through Pricing

Concomitant with the attitude that all problems can be solved, the attitude that rationing of scarce resources can be rationally handled though the pricing mechanism of the free market system has also been widely accepted through the experience of the past two to three centuries. According to this view, even though we cannot always replace overused resources, we can apply a price to their use that accurately reflects not only their use but also the loss of their future availability. Thus, even though some resources are depleted, we can make rational (hence, good) decisions about when, how, and where to use them and thus safeguard ourselves from wasting, or in a fundamental sense, misusing scarce resources.

Increasingly, this belief is under attack. Many now note that systems of pricing and of applying discount rates do not adequately incorporate the loss of resources. Criticisms center on the impossibility of putting a reasonable price on

irreversible losses, on the fact that future generations are not present to negotiate the price that they pay for current misuse of resources, and on the fact that, even in the present, those who pay for the misuse of resources often do not benefit from their use.

So long as decisionmakers believe that all things can be accurately priced as a way of making rational choices among alternatives, however, the pace of resource use and of effluent discharges will not fundamentally alter. Thus, this attitude reinforces the other trends that are now increasing our vulnerability to disaster.

Finally, a tenth trend and an attendant coda to all the trends remains to be discussed: the widening gap between rich and poor.

The widening gap between rich and poor

Worldwide, and within countries as well, a significant gap persists between those who are well off and those who are or are becoming poor. Previously it was believed that development would inevitably produce an enlarged middle class and that gains at the top would trickle down, finally benefiting everyone and reducing the gap between rich and poor. This did, in fact, occur in some places over some decades. However, the gap between income and welfare is not only persisting but widening as an adjunct to the patterns of development currently being pursued. For example, the consumption of resources is distributed extremely unevenly across the world. While the 16 percent of the world's population that lives in India has less than 2 percent of the world's income, the fewer than 5 percent of the world's population that lives in the United States has about 36 percent of the income. Almost 1 billion people or almost one-fifth of all humans live in absolute poverty and hunger today (Ministry of Environment, Norway 1988–89).[2]

Given the trends of resource depletion, environmental degradation, population growth, and urbanization, the tendency is for the gap between rich and poor to grow and for the absolute numbers of those who are counted among the poor to grow. Some people are becoming more vulnerable, and their vulnerability will have greater impacts worldwide. These may show up in the form of costs of humanitarian assistance to those who are unable to sustain their own lives or in the form of social and political tensions that erupt in localized violence or expanding conflicts.

Attendant to the trends toward increasing vulnerability that have arisen from and been furthered by the very processes of development is another tendency related to people's capacities to recover from crises. Even as people move from their traditional life patterns toward modern lifestyles, which expose them to new and greater hazards, they leave behind a number of the social, familial, economic production, and moral/ethical structures and modes that helped them to cope with crises in the past. The processes of development they seek and continue to pursue increase their exposure to hazard and erode their capacity for resistance and recovery.

If these ten trends and one coda toward increasing vulnerability have accompanied the very processes of development—previously viewed by human societies as central to any strategy for reducing vulnerability—then what does this tell us about assessing vulnerability? And how does this relate to current efforts to find a new approach to development that corrects these trends and is sustainable over the long run?