CHAPTER 2

Vulnerability Analysis and the Explanation of ‘Natural’ Disasters

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INTRODUCTION

Not very many years ago, most people assumed that the disasters associated with earthquakes, hurricanes, floods and other natural hazards were themselves natural disasters.\(^1\) It was accepted that their impact could be reduced (through attempts at preparedness, mitigation and post-event humanitarian action), but the emphasis – even in much academic and policy work – was on the naturalness of disaster events. There had long been an awareness that some disasters which may resemble those usually blamed on nature, are inherently caused by human action (as with famines triggered by war). But this perception was limited, and it seemed difficult for people to extend such explanations to other types of disaster (especially those linked with sudden-onset hazards like earthquakes) which might have less obvious, more complex, but just as significant links with human causes.\(^2\) Much disaster policy still puts emphasis on the impact of nature, and this has led to the dominance of technical interventions focussed on predicting the hazard or modifying its impact.

This chapter intends to clarify the less obvious human connections between natural hazards and disastrous outcomes. It argues that hazards are natural, but that in general disasters are not, and should not be seen as the inevitable outcome of a hazard’s impact. The stress here is on the condition of the people which makes it possible for a hazard to become a disaster. This includes the extent and types of their vulnerability in combination with the technical issue of how society deals (or does not deal) with the hazard in terms of mitigation and preparedness. To concentrate on preparedness and mitigation of hazards without considering the social and economic systems that both generate vulnerability and determine the type of technical interventions leads to inadequate and potentially dangerous situations. One pioneer of hazards research expressed this well nearly 20 years ago:
[M]odern societies cannot expect to cope effectively with hazards in the environment by relying solely upon technical solutions. A crucial aspect . . . is the skilful, sensitive use of a wide range of adjustments, including engineering devices, land management and social regulation. To depend on only one sort of public action is to court social disaster, environmental deterioration, and enlarged public obligations (White, 1974, p. 13).

The technical interventions which are supposed to reduce hazard intensity or prepare people for them are themselves not socially neutral, and they must not be taken in isolation from the factors that create vulnerability, and should only be implemented with full awareness of their impact on different sections of the people. The chapter argues for the use of vulnerability analysis as a framework for understanding disasters and the development of better policy interventions.  

NATURAL HAZARDS AND THE ENVIRONMENT

Nature presents humankind with a set of opportunities and risks which vary greatly in their spatial distribution. Opportunities include the many different ways in which people utilize nature for production (raw materials, energy sources) and to service their livelihoods (absorbing or recycling waste products). The risks inherent in nature consist of a wide range of hazards that put constraints on production (e.g. frosts affecting agriculture) and on other aspects of livelihoods and safety (earthquakes, floods, droughts, etc).

Conventional analysis of the relationship between humankind and the environment has tended to emphasize nature as a set of determinants, without adequately integrating nature with social and economic systems. I argue that in effect the environment is itself a social construction. Opportunities and risks are fashioned by the varying characteristics of different types of social system, and the differing demands each society puts on nature, combined with the varying impacts that nature may have on varying types of social system.  

This means that there are no really generalized opportunities and risks in nature, but instead there are sets of unequal access to opportunities and unequal exposures to risks which are a consequence of the socio-economic system (see Figure 2.1).

Much conventional analysis of disasters considers a direction of causality that proceeds from hazard through spatial variability to the impact on society (from top to bottom in alternative versions of Figure 2.1). The argument of this chapter is that explanation of disaster causality is only possible by understanding the ways in which social systems themselves generate unequal exposure to risk by making some groups of people, some individuals, and some societies more prone to hazards than others. In other words, disasters are not ‘natural’ (not even sudden ones) because hazards affect people differently within societies, and may have very different impacts on different societies (e.g. earthquakes of equal energy may cause devastation in one country, but not in another).

Inequalities in risk (and opportunity) are largely a function of the principal systems of power operating in all societies, which are normally analysed in terms of class, gender and ethnicity. These in turn may be seen as social structures rooted in (and mutually influencing) the patterns of national and international economic and political
Figure 2.1 The relationship between the environment and social, economic and political systems.

In other words, in order to understand the relationship between humans and nature, it is more important to discern how human systems themselves place people in relation to each other and to the environment than it is to interpret natural systems. Concern here is not with the opportunities provided by the environment, but its risks. This chapter attempts to interpret how social and economic systems place people at
different levels of risk from nature's hazards. The main concept by which this 'social causation' is explained is vulnerability, which is a measure of the degree and type of exposure to risk generated by different societies in relation to hazards. This approach can be termed vulnerability analysis.

DISASTERS ARE NOT NATURAL

Many people now accept that human activity itself has created the conditions for disaster events. This is partly because of growing awareness that through negligence or inappropriate response, the workings of social systems have made a disaster out of a situation which otherwise might not have been so serious. There has also been a growth in understanding that it is hazards that are natural, but that for a hazard to become a disaster it has to affect vulnerable people. The last decade has seen increasing use of various concepts of vulnerability by academics and development practitioners. These are also indicative of how disasters can be analysed as the product of economic and political factors. This shift in opinion is a vital step in the creation of a new international framework of thought and action for avoiding disasters.

Another reason for the shift is the growth in awareness of development problems and the difficulties of improving people's living standards in third world countries. Many 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. There is a realization that explanation of the entire set of problems is required, rather than understanding of the 'natural' disaster in isolation. Another reason for the new awareness is the more widespread recognition of human destruction of the environment, and that natural hazards themselves can be precipitated (or exacerbated) by the pursuit of economic and social goals which hitherto were seen as the normal objectives of economic growth.

But there are two other reasons why attitudes have changed, especially among people in Western countries. First has been the growing critique of international inequalities, including the awareness of the surplus of food in the West contrasted with the dearth in Africa. Although the general public may not be aware that a transfer of this surplus will not solve the problems, its existence (and the international system which gives rise to it) at least showed them that something was wrong with 'nature' as an explanation. Second, and linked with the first, the widespread civil unrest and wars in areas affected by famine (in Mozambique, Ethiopia and Sudan especially) showed, even if in a rather crude manner, that the famines were at least partly man-made. The result is that more people than perhaps ever before are conscious that economic and political factors are causes of disasters, and that (in those instances at least) famines are not simply a result of the lack of rain.

Yet there are gaps in this new awareness, or rather it is patchy and disconnected. Much of it is a product of reactions to single events (e.g. the Ethiopian famines) or particular processes (e.g. deforestation and desertification), and fails to connect a wider range of phenomena. While the new awareness is to be welcomed, it is still incomplete and not yet universally accepted. Even the focus of the 1990s United Nations 'International Decade for Natural Disaster Reduction' (my emphasis) betrays
the strength of the old outlook. Not only does the approach of the UN Decade fail to
distinguish the naturalness of hazards from the human causation of disasters; it also
(by focussing on the behaviour of nature) encourages technical solutions to the
supposed excesses of the as yet untamed side of nature.

This chapter instead develops a framework of factors and processes which explain
how it is vulnerable people who are the victims of disasters. This is no mere tautology:
it is not like saying that the victims of disasters were vulnerable to that hazard, as is
demonstrated by their being its victims. The purpose is to demonstrate that there are
particular characteristics of different groups of people (derived from economic, social
and political processes) which mean that with the impact of a particular type of hazard
of a given intensity, some avoid disaster and others do not. The processes which make
people more or less vulnerable are largely (but not exactly) the same as those which
generate differences in wealth, control over resources, and power, both nationally and
internationally. The vulnerability concept is a means of 'translating' known everyday
processes of the economic and political separation of people into a more specific
identification of those who may be at risk in hazardous environments.

The emphasis which many of those involved in 'disasters work' have placed on
economic and political factors as the 'causes' of disasters seems to be percolating
through to the public, to aid workers, and even to some governments. Something
which has been obvious to many victims of disaster - that their suffering is not simply
the result of an Act of God - is being understood (Wijkman and Timberlake, 1984). It
is easy to identify war and civil disturbance as relevant economic and political factors.
What is more difficult but essential is to identify the processes and conflicts which
generate and maintain vulnerability to disaster in the more general sense. This is more
difficult to substantiate, because it usually involves analysis of the means by which
some people live (and survive hazards better) at the expense of others. While many
will condemn wars, and be critical of desertification, famine and pestilence, or
population growth, there is more reluctance (especially amongst those who have
power) to accept that the conditions which create vulnerability in some people have
as their counterpart a more comfortable life for others.

This conflict of economic interests is one of the most intractable barriers to the
mitigation of disasters. It is evident in widely different circumstances. These include
the enforced marginalizing of people onto less productive land, or the need for those
who earn low wages, have few resources, or are discriminated against, to live in
particular places where hazards strike more harshly.

In the first type of case, the move is often so that superior land can be used for
commercial agriculture or ranching, and the losers are made more vulnerable to drought
and other hazards. In the second, examples include the need for those dispossessed of land
or other income opportunities in Bangladesh to live in extremely flood-prone areas of the
delta, the unemployed and those on low wages having to live in insubstantial housing
located on unstable slopes in many cities (e.g. Rio de Janeiro), and the poor living in
buildings which landlords and governments fail to reinforce against earthquakes.

To see disasters as being natural is about as useful as a doctor signing a death
certificate with the explanation of 'natural causes'. It gives no indication as to whether
the person's life might have been extended by a different social system which allocated resources differently, provided a health care system enabling early diagnosis and treatment of many 'natural' causes of death, regulated risks in a different way or enabled access to scientific knowledge of factors such as diet and toxins. Better allocation of resources, for example, could lead to a better diet, increasing physical and mental ability, longevity and resistance to disease. Social regulation of risks could include reducing health hazards in the workplace and discouraging self-damaging behaviour such as drug use (including smoking and excessive alcohol consumption).

Of course the analogy with disasters is not perfect, but the parallels are there in terms of resource allocations, risk management and the type of science and education. In disasters associated with natural hazards, it is much more useful to understand how the political and economic processes in a society act in various ways to generate varying levels of exposure to risk among different people. The economic system and class structure allocates income and access to resources, and this has an impact in terms of peoples' ability to cope with hazards (their nutritional level, physical resilience and subsequent access to resources, all affecting their potential for recovery). These also affect the degree of preparedness and mitigation through the level of scientific concern, resource allocation and type and extent of technical preparation allocated within society. The manner in which social systems assign resources for the reduction of the impact of hazards is particularly important. It often fails to take account of peoples' needs, just as in medical care preventive work is often neglected and resources spent on expensive curative facilities. The level of scientific knowledge of both hazards themselves and their impact, and the allocation of the resulting technologies as means for intervening to reduce their intensity or impact, are normally determined by the power of private companies and government agencies. These are driven by their own criteria for success, which need not correspond with the needs of people.

Obviously in the death certificate illustration, the people would not die were it not for the factors which are inadequately labelled 'natural causes'. But such information on the death certificate is hardly informative about the underlying reasons for the many medical conditions which can hasten death. Equally in an earthquake, were it not for the ground shaking there would not be the potential for deaths, injuries and disruption. But this is far from being the same thing as saying that the earthquake caused an associated disaster.

The analogy can be extended. For various reasons 'natural causes' can be recorded on death certificates because the medical profession, other interest groups, or even the state wish to suppress knowledge of the underlying cause of death. The reasons may be personal (to protect the feelings of family), social or political (to guard the reputation of the state). Similarly, it has served some political interests to maintain the notion that disasters are natural rather than 'caused' by political and economic processes.

Someone who dies in their nineties might be said without much controversy to have died from natural causes, since there is little likelihood that any modification of lifestyle or medical intervention could have delayed it further. In disasters there are also cases which reach the limits of the analysis presented here, and which are similarly – at least partially – natural. For instance, there may be completely unforeseen
VULNERABILITY ANALYSIS AND 'NATURAL' DISASTERS

or unknown hazards, or a hazard with a return period so long that people are unable to anticipate it at all. With the impact of such hazards, it is difficult to blame human action (or inaction) for any disastrous outcome (although there is an argument that human inaction should be blamed where there is a body of scientific knowledge that could have been used to warn of such occurrences). But, in general, disasters are not natural: they happen to people who are put at risk as a result of their vulnerability.8

DEFINING VULNERABILITY

The vulnerability we are concerned with here is that associated with natural hazards. Vulnerability is a characteristic of individuals and groups of people who inhabit a given natural, social and economic space, within which they are differentiated according to their varying position in society into more or less vulnerable individuals and groups. It is a complex characteristic produced by a combination of factors derived especially (but not entirely) from class, gender and ethnicity.9 Differences in these socio-economic factors result in hazards having a different degree of impact. Secondary factors, such as age, may be important: older people may be generally less robust in recovery from illness or injury (and less able to escape from some hazards), but the elderly from poorer classes or ethnic groups may still be more vulnerable than others.

Vulnerability may be divided into three aspects: the first is the degree of resilience of the particular livelihood system of an individual or group, and their capacity for resisting the impact of a hazard. This reflects economic resilience, including the capacity for recoverability (another measure of economic strength and responsiveness to hazards). This can be called 'livelihood resilience', and has some affinity with Sen's concept of entitlement (Sen, 1981). The second is the 'health component' (medical), which includes both the robustness of individuals (itself largely a function of livelihood strength) and the operation of various social measures (especially preventive medicine). The third component is the degree of preparedness of an individual or group. This is determined by the protection available (for a given hazard), something which depends on people acting on their own behalf and on social factors.

Preparedness is the area which is most recognizable in disaster planning, because it relates to the various technical interventions that are commonly seen as necessary for disaster avoidance (especially warning systems, land zoning and preparedness planning). But it is also clear that people's ability to protect themselves depends on their livelihood strength, and on their relationship to the state or other social and political structures. For instance if living in an earthquake zone, self-protection affects the nature and strength of the building, and is closely related to income and savings capacity; in a flood-prone area livelihood governs the price that can be paid for building plots in different places in relation to expected flood water levels. This 'self-protection' element of vulnerability is in some respects linked to the economic advantages and disadvantages of high or low levels of livelihood (though it is not determined only by income or wealth). The level of protection granted by the activities of the state or other social institutions (such as unions, cooperatives and non-governmental
organizations [NGOs]) can be termed ‘social protection’. It may intervene in determining the level of protection of particular people or groups from a hazard. The two ‘protection’ elements depend on a range of factors which are clearly also linked to the major inequality factors in society (class, gender and ethnicity), but which also relate to the level of scientific and technical knowledge and the manner in which it is used.

These three components can be summarized as in Table 2.1. A hazard may be seen to have a greater or lesser impact on a person or group according to their bundle of these characteristics, by virtue of which they possess a higher or lower level of vulnerability. Whether a disaster happens or not is conventionally related to an emphasis on the hazard itself and on the need for physical protection measures. With this alternative vulnerability approach, the intensity of the hazard (and of protection against it) is not nearly so relevant to explaining disaster as are the social and economic factors that affect overall vulnerability, including technical issues of protection. A highly vulnerable group may be badly affected by a relatively weak earthquake, and a low vulnerability group little affected by a strong one. It is the degree of vulnerability of people in the area of the hazard strike which counts, and the different components of their vulnerability in relation to different types of hazard. The number of people at a level of vulnerability to a hazard of a given intensity will be a measure of the disastrous or non-disastrous impact of that hazard. It is therefore also possible for two earthquakes of the same intensity and characteristics to strike areas with similar population densities, and for one to be a disaster (in terms of mortality, injury, and disruption to livelihoods and future well-being) and the other to be a (relatively minor) disruption with few deaths and injuries and with easy recoverability. The hazard is natural; a disastrous outcome is not, and is in many senses largely caused by the vulnerability conditions generated by human systems.

In areas where people face multiple hazards, the impact of one may be less serious than another. The ‘protection’ element of vulnerability is therefore usually specific to each type of hazard in its interaction with the particular characteristics of the population. For instance, some people may be more vulnerable to an earthquake than to a flood striking the same location. This variability in regard to the type of hazard might result from the places where a person lives or works being better protected against flooding than earthquakes.

**Vulnerability and the Causes of Disaster**

What is it about the condition of the people (rather than the natural hazard) which make it possible for a hazard to become a disaster? Disasters happen when a natural hazard strikes vulnerable people. Thus they involve both the extent and types of vulnerability generated by people’s situations within political and economic systems, and the manner in which society deals with the hazard in terms of mitigation and preparedness. If people can be made less vulnerable or non-vulnerable, then a hazard may still occur, but need not produce a disaster.
VULNERABILITY ANALYSIS AND 'NATURAL' DISASTERS

Table 2.1 Vulnerability and its components

<table>
<thead>
<tr>
<th>Type of vulnerability</th>
<th>Components</th>
<th>Determinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livelihood vulnerability</td>
<td>Income opportunities, Livelihood type, Entry qualifications, Assets and savings, Health status</td>
<td>Class position, Gender, Ethnicity, Age, Action of state</td>
</tr>
<tr>
<td>Self-protection</td>
<td>Building quality, Hazard protection, Location of home/work</td>
<td>Socio-economic: as above, plus technical ability or availability, Hazard-specific: return period, intensity, magnitude</td>
</tr>
<tr>
<td>Social protection</td>
<td>As above plus: Building regulations, Technical interventions</td>
<td>As above, plus: Level of scientific knowledge, Level (and characteristics) of technical practices, Type of science and engineering used by state and dominant groups</td>
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</tbody>
</table>

From this analysis, it is apparent that reducing disasters is possible not only by modifying the hazard, but also by reducing vulnerability. However, most of the efforts of those concerned with disasters are focused either on reducing the impact of the hazard itself (sometimes in expensive and inappropriate ways), or on reducing one rather narrow aspect of vulnerability – social protection through certain forms of technological preparedness. The major determinants which make people vulnerable (i.e. the social, economic and political factors which determine the level of resilience of people’s livelihoods, and their ability to withstand and prepare for hazards) are rarely tackled.

Mitigation of hazards is normally associated with attempts to reduce the intensity of a hazard or to make some other modification which is supposed to lessen its impact. It is often a hazard-centred rather than people-centred approach. As a result it may deal with the hazard threat without taking account of people’s needs, as with the major plans for taming floods in Bangladesh (see Haque and Zaman in this volume, Chapter 5; also the chapter on floods in Blaikie et al., 1994). By contrast, preparedness should aim at reducing the impact of a hazard by improving protection in ways that centre on people and reducing their vulnerability. This may be done by people themselves, for instance in the type of building and its resilience in earthquakes (self-protection). It may be organized at a higher level (social protection) by the state (e.g. through building regulations) or through local groups or NGO activities. However, the state is often unreliable. It may recognize the need to offer social protection to reduce vulnerability, but it is normally a party to the economic and social processes that lead people to be unable to protect themselves in the first place.
The vulnerability of a group can be reduced by changes in the different components of their vulnerability bundle, and improvements in preparedness and mitigation measures are only one aspect. It is dangerous to rely on the development of scientific knowledge and technical means of hazard reduction, because they may have little or no effect, depending how other components of the vulnerability profile are altered. For instance, expensive satellite warning systems for hurricanes (tropical cyclones) may have no impact on people who cannot afford radios, or live in places where the state is unwilling or unable to provide warnings. At present the Government of Bangladesh and major industrialized countries are planning large-scale engineering works to counter river floods (like those that covered much of the country in 1987 and 1988). There is grave uncertainty about the efficacy of these enormously expensive measures, or indeed whether they are even the best way of dealing with the vulnerability of the people affected (Rogers et al., 1989; Boyce, 1990).

In general, many people in most third world countries are vulnerable in both their lack (or the inappropriateness) of preparedness measures (the level of protection), and in their livelihood level and resilience. It is often the case that they are unable to provide themselves with self-protection, and the state is unable or unwilling to offer much relevant social protection. In developed industrialized countries, preparedness levels may be high and in general livelihoods are more secure and insurance makes them more resilient. This has given rise to a perception of disasters in industrialized countries having little impact in terms of deaths, but causing much material damage, while the opposite is believed to be true of disasters in the third world. This is based on a crude and ill-informed understanding of the value of a great deal of property in third world countries for the actual users. While the homes, goods, tools and animals which might be lost by third world disaster victims may have low values when converted into Western currency and culture, they are often of great value and their loss may be devastating for the people concerned.

But vulnerability analysis is not only valid in third world situations. There are sizeable groups of people in the industrialized countries who are economically vulnerable to various hazards. For instance in the United States not everybody enjoys social protection (preparedness and mitigation measures) against hurricanes or earthquakes, and although the state may alleviate their livelihood damage through federal aid, not all are eligible and many poorer people cannot improve their recoverability through insurance.

TRACING THE ROOT CAUSES OF VULNERABILITY

A disaster is the impact of a natural hazard upon vulnerable people, and can be explained only by reference to both of these elements (see left side of Figure 2.2). Where a vulnerable population exists in an area exposed to a known hazard, the disaster is really predetermined and the actual hazard event should be seen as the trigger mechanism. Depending on the intensity and duration of any given hazard event, the depth and extent of the resulting disaster will depend on the number of people who are vulnerable in terms
<table>
<thead>
<tr>
<th>HAZARD (NATURAL)</th>
<th>VULNERABILITY</th>
<th>SOCI-O-ECONOMIC &amp; POLITICAL FACTORS</th>
<th>NATIONAL AND INTERNATIONAL POLITICAL ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>a measure of the person or group's level of</td>
<td>- CLASS: income distribution; asset holding; livelihood qualifications &amp; opportunity</td>
<td>- The manner in which surplus is generated and allocated; social power and control</td>
</tr>
<tr>
<td>Cyclone</td>
<td>PREPAREDNESS: Self-protection</td>
<td>- GENDER: household security; nutrition; health</td>
<td>- Civil security (war)</td>
</tr>
<tr>
<td>Earthquake</td>
<td>+ Social protection in conjunction with RESILIENCE: strength of livelihood (income &amp; assets); recoverability of livelihood;</td>
<td>- ETHNICITY: income; assets; livelihood; discrimination</td>
<td>- Demographic shifts (growth, migration, urbanization)</td>
</tr>
<tr>
<td>Drought</td>
<td>and HEALTH: Social precautions; individual robustness</td>
<td>- STATE: institutional support; training; regional bias;</td>
<td>- Debt crises</td>
</tr>
<tr>
<td>Volcanic eruption</td>
<td></td>
<td></td>
<td>- Environmental degradation</td>
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<td>Biological</td>
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<td>etc</td>
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HUMAN MODIFICATION
May reduce or increase impact of hazards

Figure 2.2 Model illustrating the relationship between hazard and vulnerability (and its root causes) in the causation of disasters
of their lack of self-protection, social protection and the strength of their livelihoods (and differing combinations of these components of vulnerability).

A person or group's livelihood requires (on the consumption side) a certain minimum set ('basic needs') of goods, services and cultural satisfactions to be adequate for survival; its participants normally welcome and seek more than this minimum in order to increase their satisfaction. Livelihoods that provide people with little more than basic needs are unlikely to enable the provision of self-protection, and any associated lack of social protection for such people will result in high levels of vulnerability. Livelihoods include an enormous range of activities, some of which may involve direct production for subsistence, or waged work by means of which basic needs can be purchased.

The success of each person's livelihood (including what is required for supporting non-active dependants) depends on a wide range of qualifications which extend from access to land for food production (and possibly also access to commons for the supply of firewood, grazing or fish) through to physical capacity to earn wages and the availability of employment at a satisfactory wage. Livelihoods therefore require, on the production side, a given and irreducible 'bundle' of resources and rights (in the sense of access to those resources) and/or entitlements (such as selling labour to earn money with which to buy consumption needs). Any disruption of these resources or rights of access lead to hardship for the affected people, and will prompt various coping actions. There is a wide range of such coping mechanisms, including movement to urban centres or encroachment on marginal lands. Many natural hazards have a more severe impact because already-vulnerable people have to cope and survive by engaging in practices which degrade the environment of such lands.

So far, I have suggested that livelihoods (and their associated patterns of income and asset distribution and access entitlements) are largely a function of conventional social and economic systems (and especially of class, gender and ethnicity). These are modified by secondary attributes such as age and are compounded by various factors that distinguish vulnerability from poverty (see below). But it is also useful to recognize that the socio-economic processes that give rise to vulnerability are themselves partly subordinated to larger-scale systems (especially the state within a country, and the international or global economy) and are enmeshed in broader processes that are an expression of international and national politics and economics (in particular urbanization, environmental destruction and debt crises). An attempt to illustrate this chain of causation is given in Figure 2.2, on the right side.11

This analysis might suggest (given the role allocated to class and the global economic system in explaining vulnerability) that blame is being laid at the door of capitalism. It is true that some earlier work which emphasized the non-naturalness of disasters was rather crudely anti-capitalist (see for example O'Keefe et al., 1976; Cannon, 1977). However, this work also laid the basis for the development of the vulnerability concept, and it is now possible to use vulnerability analysis much less dogmatically. It is amenable to the understanding of disasters in all socio-economic systems: the generation of vulnerability to hazards is no respecter of different political regimes.
their livelihoods need certain minimum wage for survival; and to increase certain lack of social well-being include production for that for supporting rich extend from wages and the therefore require, onnd rights (in the are resources or no various coping movement toards have a more survive by engagement in income of conventional activities). These are various factors selfish to recognize themselves partly country, and the dangers that are articulated urban-exist this chain and the global at the door of naturalness of he et al., 1976; development of the analysis much less socio-economic because of different vulnerability analysis and 'natural' disasters

This earlier perspective was linked with ideas of marginalization. It gave rise to what can now be described as a rather narrow concept of vulnerability, which emphasized worsening conditions and the impoverishment of third world peoples. Stress was put on how livelihood systems were being changed by something loosely called 'capitalism' so as to make previous means of existence irrelevant or impossible. Capitalism has certainly generated its own specific forms of vulnerability among the peoples it has touched in its global expansion. Yet it has also to be accepted that it has reduced some other conditions in which vulnerability is generated, and has altered the pattern of disasters, rather than simply having created an entire spectrum of new ones (see for instance Fitzgerald, 1980, on Ethiopian famine).

One of the main faults of this earlier outlook was that it failed to recognize that third world socialist systems (which were widely admired by many who despaired of other developing countries) were generating their own, different patterns of vulnerability. There was an unwillingness to recognize the success of 'capitalism' in its own particular ways in reducing some forms of vulnerability both in the developed capitalist and some third world countries.

The assumption was that somehow socialist states could avoid disasters; this has been shown to be inaccurate, the product of both the idealism of observers and the secrecy practised by communist party governments. Any success that such countries had in dealing with the vulnerability generated by capitalist or pre-capitalist societies was wrongly taken to signify that all disasters could be avoided. But socialism and communist party power itself could generate new and different forms of vulnerability. The world's worst disaster this century was the Chinese famine of 1959-1961, when there were probably 26 million premature deaths (Howett, 1990). These resulted largely from new forms of vulnerability which were consequent upon the introduction of unsustainable new forms of collective ownership and work remuneration in the people's communes, together with the negative impact on work of the mass campaigns of the Great Leap Forward.

On the other hand, some of the successes in communist-led countries may show possible models of vulnerability reduction for use elsewhere. In 1975 a major earthquake (magnitude 7.3) which struck the Haicheng area of Liaoning (northeast China) did not result in many deaths or injuries because of preparations and timely warnings, based on a well-organized system for monitoring precursors (Bennett, 1979). Cuba has also achieved a much better record in dealing with hazards like cyclones than its neighbour Haiti.

Vulnerability and differences between 'rich' and 'poor' countries

Similar extreme hazard events have very different effects on people and property depending on which society or country they strike. This is another insight which illustrates that disasters are not solely 'natural'. The impact of a tropical cyclone on the coastline of India or Bangladesh invariably has far worse effects in terms of loss of life, injury and livelihood disruption than is the case with similar hurricanes in the United States. This is not simply because of lower population densities: the USA has a different level of
preparedness, and individuals' livelihoods are often more robust. A wealthy country (i.e. a country which accumulates a large surplus much of which is publically controllable) like the USA can absorb reconstruction costs. Many individuals are also more resilient because of insurance, and so overall post-event aid is of a different order than that in most of the third world. Likewise, the earthquake risk in California is anticipated in a way which is quite different to that in many poorer parts of the world where the same hazard is faced. In these cases it appears that relative national wealth is crucial in modifying the intensity or impact of hazards so that they are less disastrous.

Nevertheless, disaster vulnerability is not neatly absent in 'rich' countries. In the United States for instance, there is evidence that low paid/unemployed people (especially those who are discriminated against because of their ethnicity) are much more likely to suffer human and material losses in hurricanes or earthquakes. The October 1989 earthquake in central California seems to have been more detrimental for Mexican migrant workers and brought them less relief than other sections of the population. Despite their labour being indispensable to the agricultural economy of the state, their status as 'illegals' means that they are non-existent as far as most of the official response to disasters is concerned.

But the reason for the differential level of impact is more than just the wealth and organizational ability of different countries. It is better to analyse it in terms of the way in which people are made to be vulnerable to environmental hazards. More is needed than looking simply at how much money is spent on meteorological services and cyclone warning networks in different parts of the world, or the surplus available to a country which can be devoted to earthquake-proof buildings and planned relief systems. We need to understand how it is that – even in the wealthy United States – some groups of people are more prone to the impact of hazards than others, and why it is that in third world countries in particular the numbers of victims are so much higher.

What turns a natural hazard into a disaster is not simply a question of money (e.g. how much is available within a given country to spend on precaution and alleviation). It is more a matter of why some people are more vulnerable than others, and of why some countries have more to spend, why known technologies are utilized in some parts of the world but seem more difficult to introduce in others, and why it is that certain topics are regarded as research and action priorities in some societies and not in others.

It requires analysis of the various economic and political systems (the different political economies of the world) and the way they structure societies such that similar hazards lead to very different impacts on one society compared with another. A given hazard may lead to disaster in one society, but produce only a limited interruption in normal life for most people in another. In short, what needs to be analysed is how the structure of a society determines the way in which a hazard is likely to affect it. With varying levels or degrees of vulnerability amongst a population, there will be different intensities of disaster reflecting the number of people with high or low vulnerability affected by a hazard.

In the United States, the vulnerability of people to hurricanes is much less than in Bangladesh (or the countries of the Caribbean) because of both the generally higher
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levels of income (which enable recovery more easily), and the high degree of preparedness: vulnerability has been reduced in both the economic conditions of livelihoods and the economic/social framework of self-protection and social protection. But as already suggested, such reductions in the vulnerability of most people do not prevent the application of the same sort of analysis to discover who and which groups are vulnerable even in the wealthiest parts of the world: class, gender and ethnicity are still likely to be very significant indicators of the variable impact of hazards.

VULNERABILITY IS NOT THE SAME AS POVERTY

The division of vulnerability into its components already indicates that it should not simply be equated with poverty. Vulnerability includes an economic element, dependent on people’s access to resources and income opportunities, and the variable element of protection against specific hazards. If people are in an area prone to tropical cyclones, they may be affected in different ways by virtue of their ‘economic’ vulnerability (produced by their class, ethnic and gender position), but all may be vulnerable to the hazard in more equal terms if there is a lack of warning systems and a more general inadequacy of mitigation measures. This is one sense in which it is clear that vulnerability is not the same thing as poverty.

The livelihood and protection elements of vulnerability are also distinct, and may not always overlap completely. For example middle-class occupants of unsafe housing in an area prone to earthquakes may endure high levels of vulnerability, while the poor may be living in dwellings which are so flimsy that their collapse does not kill or injure so many.

While the livelihood and self-protection elements may strongly relate to level of wealth and income as determined by class, a person’s gender or a group’s ethnicity may significantly alter their self-protection capacity despite their having reasonable livelihoods. The level of social protection they enjoy may differ too, depending for example on the attitude of the state towards women and different ethnic groups, which may be served better or worse in these respects.

There are other reasons not to equate vulnerability with poverty. Poverty is a consequence largely of class and ethnic position, and in itself may not be an adequate explanation of the differential impact of hazards. Although it may be true that most of the suffering in disasters is experienced by poor people, it may not be the case that all the poor suffer. Nor is it only the poor who suffer; the impact of hazards may well be a factor in creating newly impoverished people (in the sense of loss of assets or access to a livelihood) from those who previously had employment or were endowed with at least some resources (including perhaps land, animals and other means of production).

It is probable that those who have higher incomes and control more assets are likely to be less vulnerable physically. They are likely to have a house which is more substantial and less likely to collapse. But this is not always the case. It would be wrong to deal with disaster vulnerability by simply using poverty (measured by both income and assets) as the only factor explaining a disastrous outcome of a hazard. For instance, while the impacts of floods tend to lead to the redistribution of assets in accordance with the pre-existing patterns of unequal ownership, they can also create poverty in
of the population (e.g. by destroying production assets, washing away land or injuring key household members) and not just strike those who are already poor. Different groups of people, possessing or having access to varying "bundles" of resources or entitlements, may be vulnerable to one type of hazard more than another in ways that are not strictly related to their relative wealth.

CONCLUSION

Better awareness about what causes natural hazards is insufficient for reducing their impact unless it is also translated into an understanding of the way economic systems affect people differentially. This is a major difficulty: if one of the obstacles to disaster reduction is the self-interest of some groups in maintaining their position within economic systems, then how useful is it to develop this knowledge? The vulnerability approach to disasters is immediately concerned with political and economic power. It is focussed on people's access to resources, their livelihoods, and on external pressures which may act detrimentally on these. It is concerned with the type of social protection affecting different groups of people (if any, and is therefore concerned with the role of the state, the type of technical interventions used in hazard preparedness, and whether or not self-organization of vulnerable people to improve their own protection is permitted by powerful groups. Does the vulnerability approach involve irreconcilable conflicts, since we have to live with governments and systems (national and international) that maintain the economic inequity which causes vulnerability?

That vulnerability analysis is inherently political is no argument for abandoning it as a superior way of understanding disasters. A combined effort by academics, civil servants, political activists, NGOs, aid workers and others to promote some new thinking about disasters is part of the way in which dominant-interest groups can be changed (see also Maskrey, 1989). There is usually scope for something to be done within existing situations to reduce vulnerability and promote disaster mitigation. It is rare for governments to explicitly support the processes by which some people become more vulnerable than others; there are "spaces" in most societies where the political shift which accompanies this type of disaster analysis can be inserted. In particular I would argue for the need to support and promote organizations of civil society which can provide hazard monitoring and the measurement and analysis of vulnerability, beyond the control of the state. The struggle to make vulnerability analysis available - both to potential victims and to their allies - includes the formation of such institutions and can itself become part of the process by which society is changed to avoid and reduce vulnerability being generated.

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development of the analytical approach used in this paper. Many other colleagues, students and friends have commented on various drafts of work prepared for this book in recent years, and I am grateful to them and hope they will excuse my not mentioning them all by name.

NOTES

1. This situation is reflected in books on disasters that treat them as natural, with very little attention given to the socio-economic system (see for instance Whitow, 1980).
2. A disaster is defined here as an event associated with the impact of a natural hazard, which leads to increased mortality, illness and/or injury, and destroys or disrupts livelihoods, affecting the people of an area such that they (and/or outsiders) perceive it as being exceptional and requiring external assistance for recovery.
3. This framework has been used to analyse a range of specific hazards in Blaikie et al. (1994); there is no space here to provide detailed cases.
4. There is a partial exploration of these ideas in relation to food production systems in Cannon (1990).
5. This is not to say that a study which happened to precede a hazard impact would permit a perfect match between those who are actual victims and the predicted categories. There is great difficulty in determining accurately levels of vulnerability, given for instance that earthquakes vary in power and floods vary in intensity. In theory though this is a data problem rather than an inadequacy of the framework, it is inherently possible to identify the different levels of vulnerability of a population to the impact of earthquakes or floods of varying intensities.
6. It is important that recognition be given to the difference between vulnerability and poverty. This is elaborated later. While most poor may be vulnerable to drought, flood, earthquake, etc., not all vulnerable people are necessarily poor. In addition, some people (poor or not) may be vulnerable to one type of hazard more than another: a poor group in a floodplain may suffer a flood but be exempt from the effects of an earthquake (at least in terms of mortality and injury) by virtue of their type of housing, while a middle-class group in nearby apartments may be victims in large numbers to the earthquakes but not the flood.
7. It is recognized implicitly in the shift in the early 1980s by non-government organisations (NGOs) like Oxfam to an emphasis on development work rather than emergency disaster relief.
8. Differentiated levels of vulnerability may be enhanced by hazard strikes. In other words, the society may already be structured economically according to the manner in which its people have experienced past hazards; those who are relatively less successful in the recovery process are likely to be more vulnerable to the next hazard strike.
9. There may not be much surprise at seeing class and ethnicity mentioned here (although unfortunately there is no space to be more specific about their impact; that is attempted in Blaikie et al., 1994). The argument that gender is a significant factor in generating differential vulnerability is more difficult to support, simply because there are virtually no studies of it. Most disasters work avoids and ignores gender relations, although there is much prima facie evidence for their significance (e.g. the imbalances in the vulnerability of women and men to some hazards, especially drought and related hunger). Earlier 'radical' analyses of disaster tended to regard class as the major factor. Yet gender operates from the level of household politics and economics (as in the allocation of food) right through to the level of the state and the international political economy (as in the overwhelming dominance of the economic growth model as the means of achieving development, a model which allows little space for any redefinition of the objectives of development by women).
10. The Resolution that established the UN Decade for Natural Disaster Reduction makes no mention of vulnerability or indeed even of the possible role of social science in preparing
for disasters. It is overwhelmingly oriented to scientific and engineering approaches (see UNDRO, 1988).

11. This argument is given in more detail in Part 1 of Blaikie et al. (1994).
12. Terry (1986) provides a valuable critique of this problem, and of the ‘dependency’ type of thinking which underlay it.

REFERENCES AND BIBLIOGRAPHY


