

2 Theoretical Framing of Worldviews, Values, and Structural Dimensions of Disasters

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CONTENTS

2.1	Chapter Purpose	27
2.2	Objectives	28
2.3	Introduction	28
2.4	What Is Theory?	29
2.5	Hazards and Disasters: The Dominant View	32
2.6	Challenging the Dominant View: Social Vulnerability	34
2.7	Conflict and Critical Theory	36
2.8	Structure and Agency	37
2.8.1	Understanding Vulnerability	38
2.9	Systems Theory and Social Vulnerability	40
2.9.1	What Is a System?	41
2.9.2	Ecological Systems	41
2.9.3	Critique of Ecological Systems: Political Ecology	42
2.10	What Are Worldviews?	43
2.11	Worldviews and Values	44
2.12	Community-Based Approaches and Social and Environmental Justice	45
2.12	Summary	46
2.13	Discussion Questions	46
	References	47
	Resources	49

2.1 CHAPTER PURPOSE

This chapter explores the fundamental and significant ways that our worldviews—our representations and assumptions about the world—frame our understanding of and response to hazards and disasters. We begin by defining theory, the formal, explicit, and systematic worldviews that provide the foundation for the scientific analysis of hazards and disasters and for disaster planning and mitigation. This is followed by a discussion of the shift in theory from framing hazards and disasters as primarily natural and unexpected events to framing them as expected outcomes of human and environment interaction. This theoretical shift has led to a focus on social vulnerability: why some individuals, groups, communities, and nations are more vulnerable to hazards and disasters than

others. We then discuss how critical and conflict theories contribute to a comprehensive understanding and analysis of vulnerability at multiple levels of analysis. Because these theories focus primarily on social structure, the structure and agency perspective is introduced to examine how vulnerable individuals and communities view and respond to hazards and disasters within a given social structure. Finally, systems theory, specifically, political ecology theory, provides a practical analytic framework to understand and evaluate social vulnerability and reduce vulnerability by linking it to sustainable development and social justice.

2.2 OBJECTIVES

At the conclusion of this chapter, readers should be able to:

1. Understand what theory is and how it contributes to framing social vulnerability in a way that illuminates the critical elements of this complex issue.
2. Define critical and conflict theories and explain how they contribute to understanding vulnerability in a more comprehensive fashion.
3. Appreciate how structure and agency interplay in the creation of vulnerability.
4. Explain how theory leads to an explanation of worldviews and values that in turn influence how disasters are viewed by disaster planners and by individuals and communities who are vulnerable to hazards and disasters.
5. Appreciate how the theoretical framing of structure and agency illuminate how worldviews and values affect our approaches to tackling disaster reduction.
6. Discuss how systems theory guides a mechanism for understanding and evaluating vulnerability, also linking to sustainable development.

2.3 INTRODUCTION

On February 19, 2002, a severe rainstorm "pummeled" La Paz, the capital of Bolivia, "killing 60, injuring 100 and leaving over 500 homeless. Hailstorms, heavy rains and flash floods tore through the region, destroying homes, washing away bridges and ripping up road surfaces and brick walls." The mayor of La Paz, Juan del Granado, estimated damages at \$60 million (Steen 2002). Bolivia's president, Jorge Quiroga, declared a state of emergency, and volunteers joined the city's emergency staff and the Bolivian Red Cross to provide relief to the injured and homeless, stabilize buildings, and search for missing persons (Enever 2002; Steen 2002).

Why include a chapter on theory in a book about vulnerability to natural disasters? What role can theory possibly play in understanding or responding to a disaster such as the flood that occurred in La Paz in 2002? In this account of a flood disaster, which is presented as a simple recounting of a current event, theory plays a critical, though unstated role. It identifies the agents or actors in the story, explains the results of their actions, provides direction for appropriate response, and predicts what will happen if appropriate responses are (or are not) made. Theories help us to understand the world around us, but they can also limit what we see and how we perceive it. Consequently, if we want to minimize the human, environmental, and social losses from hazards and disasters, it is critical that we are aware of, and deliberate in, our use of theory. Like formalized scientific theories, worldviews also provide us with explanations of how the world works and what motivates and directs human behavior—explanations that are based in shared assumptions and values about human character and our relationship with the natural environment. As much or more than the scientific theories espoused by disaster managers and planners, our various worldviews and values, shaped by history, the physical environment, and social institutions, affect our responses to hazards and disasters.

This chapter defines theory and the role it plays in framing social vulnerability to identify and illuminate the various dimensions of this complex issue. We then discuss the emerging focus on

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social vulnerability and the two major theories—conflict and systems theory—that have been used to understand hazards and disasters from this perspective. Critical and conflict theory explain how differential access to resources and power, embedded in social institutions or social structure, and the actions or agency of individuals and groups interact to create vulnerability (Box 2.1). In addition, these theories explain why some groups are more vulnerable to hazards and disasters than others and also contribute to understanding the worldviews and values that direct how disasters and hazards are viewed in various communities. Systems theory is valuable in analyzing the interaction of critical variables, e.g., the physical environment, human societies and institutions, and animal and plant species. Because systems theory makes it possible to view these phenomena as interdependent components of an encompassing world system, it permits the integration and application of theory and knowledge from many disciplines, including geography, geology, sociology, engineering, biology, political science, among numerous others.

2.4 WHAT IS THEORY?

"At a basic level, though, theory is just a version of some aspect of reality" (Perry 2003, 2). In science, theory is elaborated, can be explicitly stated, and is frequently associated with an individual who first set it out in a formal manner, for example, Darwin's theory of natural selection or Einstein's theory of relativity. Scientific theories are rarely the product of one person's thought or work; they emerge from a body of observation and experiment and scholarly exchange that has accumulated over time. For example, contemporary geologists use plate tectonic theory to understand earthquakes, volcanoes, and other changes in the earth's surface. Plate tectonics theory defines the relevant agents of geologic events: magma, oceanic crust, ocean ridges and trenches, and tectonic plates. It defines the processes that drive the movement of plates: radioactive decay at the earth's core that creates convection currents in the molten magma beneath the earth's surface that move the plates in different directions. And it explains and predicts what results from the interaction of plates: earthquakes, volcanoes, and mountain ranges. Understanding the characteristics and movements of tectonic plates and their boundaries allows geologists to explain past events such as the formation of the Himalayas in Asia and the Great Rift Valley in Africa and to predict, at least to some extent, where earthquakes and volcanic eruptions are likely to occur in the future. This theory, which was formulated in the 1960s and 1970s, transformed geology by bringing together findings from studies of fossils, the earth's magnetism, and the distribution of earthquakes and volcanoes and explaining them with one set of unified concepts and principles. Plate tectonics is an excellent example of scientific theory.

Plate tectonic theory and others like it form the foundation of scientific inquiry. Because they define the relevant agents, conditions, and relationships of a given aspect of reality, they determine the questions that we ask, how we ask them, and how we interpret the answers we obtain. Consider the case of earthquakes. Because plate tectonics is so powerful in explaining geologic events, investigations into the causes and processes of natural disasters are framed by that theory. After the tsunami in Southeast Asia in 2005, scientists focused their attention on how the earthquake generated the tsunami, the pattern of where it struck land, and how to augment and improve warning systems to prevent loss of life from tsunamis in the future. In other words, many scientists assumed that the cause of the disaster was a natural event and that plate tectonics could explain its occurrence. Many did not consider as readily the patterns of human settlement and land use that placed people, animals, and property in the wave's path as equally significant causes.

Not all theories are as well developed or explicitly stated as plate tectonics. We use theory, in the more informal sense of worldview, to understand and respond to common events in our everyday lives. For example, there are theories about who is safe (friends and family) and who is potentially or actually dangerous (strangers and enemies). Although not usually labeled "theory," these worldviews or common sense theories, like formal theories, are nonetheless versions of reality that contain the same elements—assumptions, concepts, and propositions—as scientific theory. Like

BOX 2.1 CASE STUDY: POLITICS AND PUBLIC IMAGE IN DISASTER RELIEF

Cyclone Nargis, which passed over the Irrawaddy Delta region of Myanmar (Burma) on May 2, 2008, illustrates how disasters can highlight internal and external political conflicts. It also demonstrates the importance of considering individual and collective agency in providing resilience to hazards and disasters.

The cyclone, a category 4 storm, affected over 10,000 square kilometers and 2.4 million people (Figure 2.1). The UN estimates deaths at 63,000–101,000 with 220,000 persons missing (<http://www.iht.com/articles/2008/06/17/asia/myanmar.php>). Myanmar is one of the poorest countries in Southeast Asia. Although it has reduced child mortality since 1990, it ranks 40th among nations for under-5 child mortality, life expectancy is 59 years for men and 61 for women, and 32% of children under 5 are moderately or severely underweight (UNICEF 2008). Malnutrition and food security are major concerns for the entire population. Consequently, Myanmar's population is vulnerable to a host of potential problems in the face of an event like Cyclone Nargis: measles outbreaks among children who have not been adequately vaccinated, diarrhea and other waterborne diseases from damaged sewage and potable water systems, and outbreaks of malaria and dengue fever from increased exposure to mosquitoes as homes are damaged and people must spend more time outdoors. As a press release from Johns Hopkins' Bloomberg School of Public Health observes, "Disease outbreaks have not occurred following the majority of tropical cyclones in the past several decades, primarily because of timely humanitarian response ..." (Beyrer, Doocy, and Robinson 2008, 3).

Myanmar has been under military rule since 1962 under Senior General Than Shwe since 1992. In the fall of 2007 Buddhist monks led a series of protests against the military government's decision to double the price of fuel; the government responded with a violent suppression of monasteries that evoked strong international censure. The military government responded with increased control over the media and isolation (<http://news.bbc.co.uk/2/hi/asia-pacific/7016608.stm>). Government statistics on the scale of deaths and destruction from Cyclone Nargis reflect the government's desire to control foreign perceptions of the emergency. In contrast to UN statistics, official sources in Myanmar listed the death toll at 29,000 with 42,000 persons missing and 1.5 million persons displaced (Beyrer, Doocy, and Robinson 2008). Several days passed before General Shwe agreed to allow foreign aid agencies to provide relief and initially restricted relief to supplies and food, but not personnel. Journalist Gavin Hewett, reported from Myanmar:

Among the senior officers there is a fear that foreigners will undermine their power. The military regime hopes, bizarrely, that this crisis might even enhance their prestige. Much of the aid is transferred to army trucks. They want the people to see Burmese soldiers saving the people (<http://news.bbc.co.uk/2/hi/asia-pacific/7416952.stm>).

International aid workers feared that the delay in providing aid, both supplies and skilled personnel, would lead to widespread deaths from infectious diseases and starvation and were publicly critical of the government's response.

Despite these fears, an article in the International Herald Tribune six weeks after the storm reported that survivors were recovering slowly. "The Burmese people are used to getting nothing. They just did the best they could," said Shari Villarosa, the highest-ranking U.S. diplomat in Myanmar, formerly known as Burma. "I'm not getting the sense that there have been a lot of deaths as a result of the delay" (<http://www.iht.com/articles/2008/06/17/asia/myanmar.php>). In the face of widespread poverty and a government slow to respond, the people of Myanmar demonstrated resilience, providing food and shelter to survivors and some actively protesting for allowing more foreign aid workers to enter the country. Yet, how much additional mortality, illness, and economic loss occurred because of a tightly controlled and slow response?

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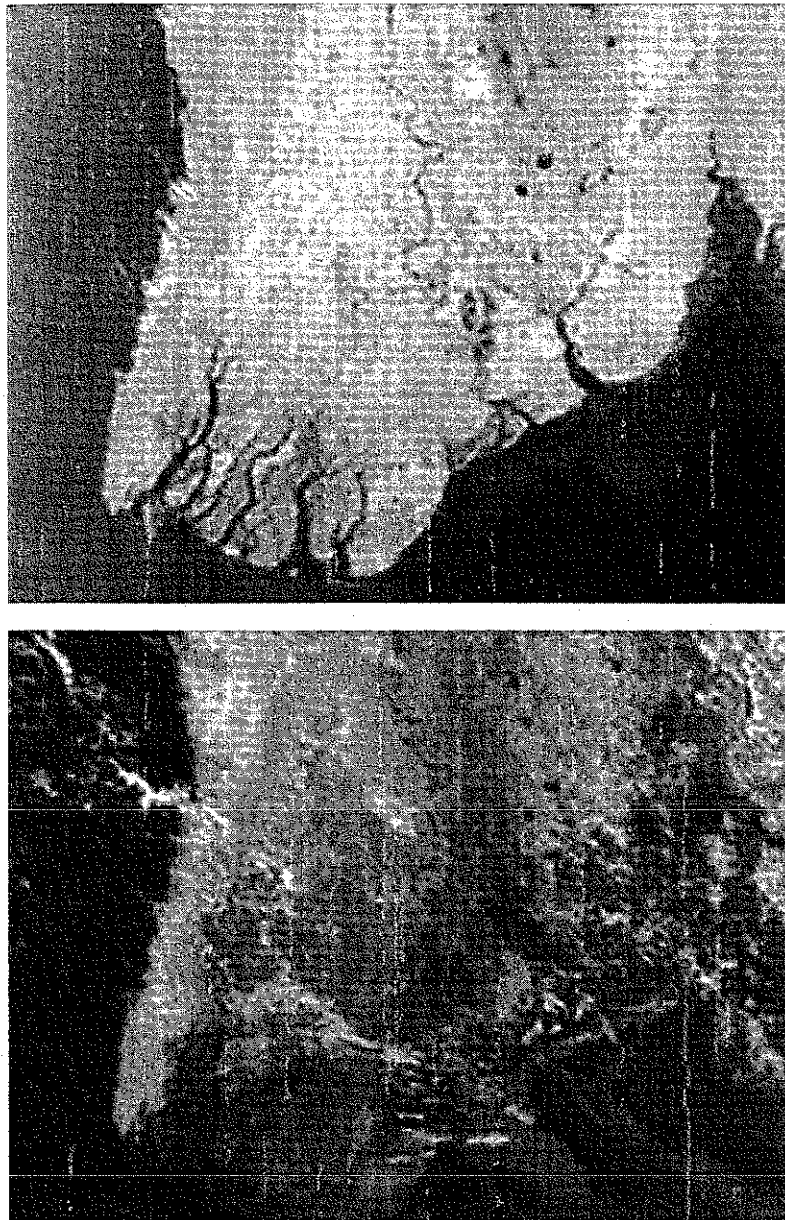


FIGURE 2.1 The top image is the Burma coast on April 15, 2008, prior to Tropical Cyclone Nargis and the bottom image is the same coastline on May 5, 2008, showing the extensive flooding caused by the cyclone. Source: NASA/MODIS Rapid Response Team. http://www.nasa.gov/topics/earth/features/nargis_floods.html.

scientific theories, worldviews offer shared explanations and predictions about the world around us. For the most part our experience supports these theories (or we ignore it when it does not), which we learn as part of our cultural and historical heritage, and they remain largely unstated and unconscious. Unlike formal theory, worldviews are not subjected to rigorous and systematic testing, and their assumptions, concepts, and propositions may contain contradictions and logical inconsistencies not present (at least not intentionally) in scientific theories. But occasionally events contradict our theories in ways that we cannot ignore or easily dismiss. For example, an enemy performs an act of kindness, a stranger says "hello," or a family member betrays or hurts us. This may cause us to revise our theories or to reject the evidence as an outlier to the general theory, the "exception that proves the rule."

2.5 HAZARDS AND DISASTERS: THE DOMINANT VIEW

Returning to the case of the flood in La Paz, in the immediate aftermath of an event like this, we rely on the commonly shared theory that disasters are "natural events," the result of "extremes of nature." Media accounts of the flood in La Paz depict the rainstorm as the active agent of the disaster: it "pummels" the city, kills 60 people, and destroys property. It is an unusual event that disrupts the normal order. Reporting on the flood in La Paz, Steen (2002) noted that "[t]he Bolivian National Meteorological Service said that the city has not had such an intense rain in the 50 years it has kept records." Humans are passive victims swept away by the rushing torrents of water despite their efforts to cling to branches and other fixed objects. Responses to the disaster are technological, dictated by accommodating natural forces: removing people from the rushing water, repairing buildings, and restoring damaged systems. Prevention of future disasters requires shoring up structures to withstand the pressure of the water, or, as noted in a UN report issued after the flood in La Paz, creating a system to warn people when water levels rise rapidly and dangerously (UN/ISDR 2007).

The way the story of the 2002 flood in La Paz is told illustrates what Hewitt (1983) calls the dominant or scientific view of hazards as described at length in Chapter 1. Scholars who approach the study of hazards and disasters from the perspective of social vulnerability criticize the dominant view as being based in common sense theories or worldview. The following quotation by Quarantelli illustrates the unconsciously accepted character of this theory:

The earliest workers in the area, including myself, with little conscious thought and accepting common sense views, initially accepted as a prototype model the notion that disasters were an outside attack upon social systems that "broke down" in the face of such an assault from outside (Quarantelli 1998, 266) [emphasis added].

Tobin and Montz criticize the dominant view for failing to incorporate human action as a root cause of hazards and disasters:

The traditional view of natural hazards has ascribed all or almost all responsibility for them to the processes of the geophysical world. The approach has meant that the root cause of large-scale death and destruction has been attributed to the extremes of nature rather than encompassing the human world. Frequently, disaster victims have been viewed as unfortunates who could do little but react to physical processes. The physical world, then, has been seen as an external force, separate from human forces. For example Burton and Kates (1964), defined natural hazards as those elements of the physical environment harmful to man and caused by forces external to him (Tobin and Montz 1997, 8) [emphasis added].

Although scientific theory is supposed to be a model of universal and timeless laws and processes, and therefore objective and impartial, in reality theory arises within specific historical and cultural contexts. McEnaney (2000) argues that the dominant approach to disasters formed during the Cold War, a time when the nation focused on having a strong civil defense system to protect

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against attack from external enemies. This civil defense model, argues McEnaney, was applied to disasters and hazards, which were conceived of as attacks by natural forces. Watts (1983) traces the dominant approach to hazards and disasters to the positivist science of the Enlightenment in which nature can be studied and observed empirically and objectively, but human behavior and society are vague and metaphysical and therefore outside the domain of science (1983, 233). Thus logically, a scientific and technological approach to hazards and disasters must examine their natural rather than human causes.

Scientific theories, especially those that involve human beings and social phenomena, are also shaped by the social position and power of those who propound them (see discussion of Gramsci's concept of hegemony and Foucault's ideas of knowledge and power in section 2.8.1). To view natural disasters as isolated events or accidents of nature keeps us from recognizing both the regularity with which they occur and the human decisions and actions that place some, but not all, people in the way of natural forces or create changes in the environment that place them at risk. For example, a United Nations environment report on the flood in La Paz notes:

Floods and mudslides are recurrent disasters in La Paz. The Bolivian city lies along a narrow valley crossed by more than two hundred rivers, including subterranean rivers, and suffers from unstable geological conditions. The rapid growth of the city has forced many people to live in flood plains and high slope hills, making them particularly vulnerable to floods and mudslides during the rainy season (December to March) (UN/ISDR 2007).

This statement challenges the dominant model in several ways and raises many important questions. First, floods and mudslides are not uncommon in La Paz; the area is geologically unstable with major water drainage (Figure 2.2). Second, people as much as nature are in the center of this situation of risk and vulnerability (Figure 2.3).

This description raises a series of important questions about the social causes of the "natural" hazard of floods in La Paz. Why is Bolivia's capital built in a geologically unstable area? Who in La Paz is most at risk from floods and mudslides? Who or what "forces" or requires that people live in flood plains and on high, unstable slopes?

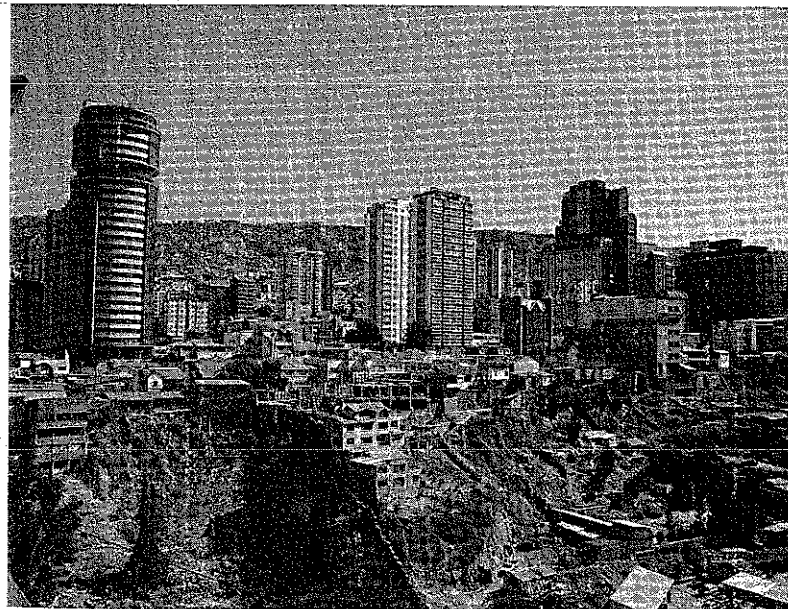


FIGURE 2.2 La Paz, Bolivia, showing development and building practices with flood and landslide risk. *Source:* Photo by John Brett, with permission.

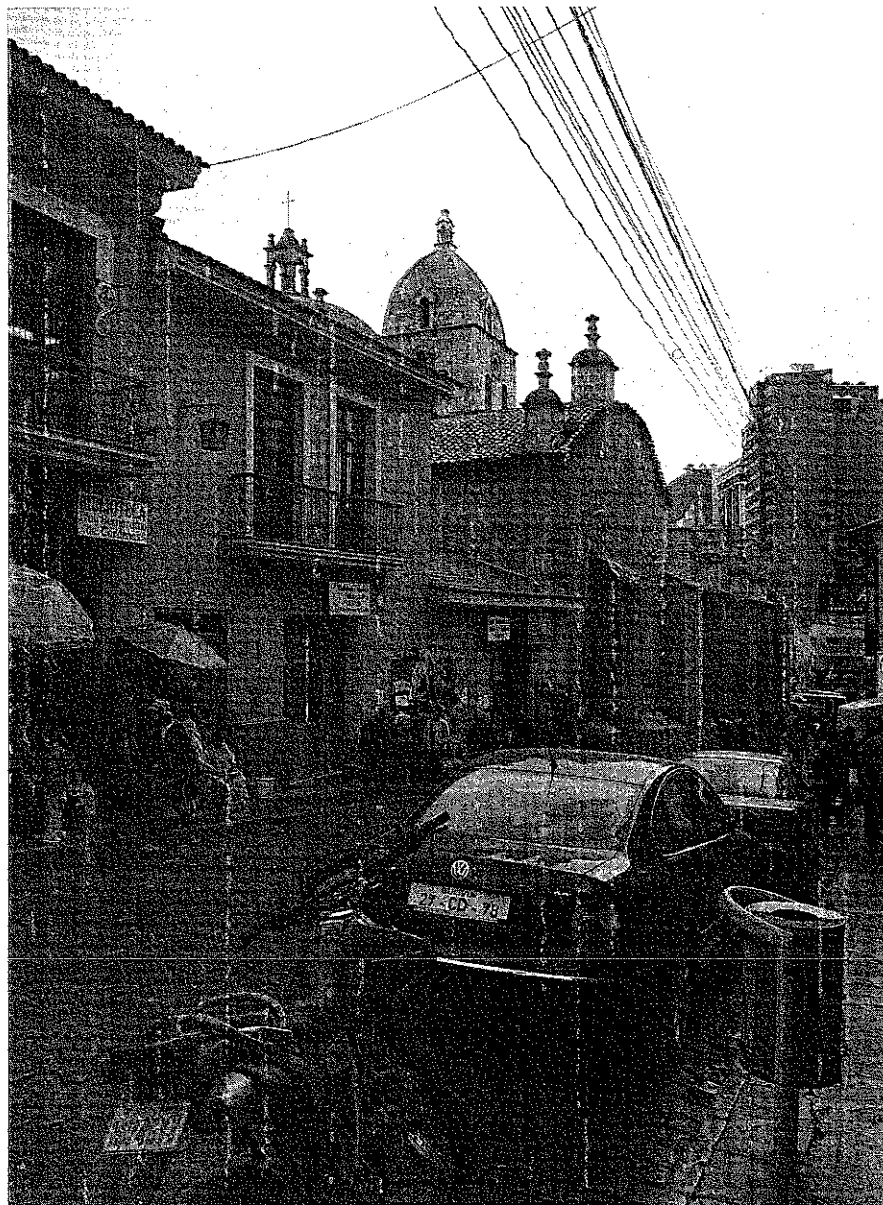


FIGURE 2.3 Street vendors along a shopping street in La Paz, Bolivia. *Source:* Photo by Jean Scandlyn, with permission.

2.6 CHALLENGING THE DOMINANT VIEW: SOCIAL VULNERABILITY

In the 1960s and 1970s, the Civil Rights Movement, the War on Poverty, and the emerging environmental movement provided conditions that stimulated emergency managers, social scientists, and those affected by disasters and hazards to question the assumptions of the dominant view (see Chapter 1). Additionally, fieldwork in disaster research beginning in the 1970s revealed complex social structural factors contributing to disasters. For example, agricultural development in northeastern Honduras provides an illustrative case. During the early to mid 20th century, many subsistence farmers in this region sold their land in valley bottoms to companies that used the land for large-scale commercial banana plantations. The displaced farmers subsequently cleared land

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on hillside plots above the valleys for their subsistence farming, a process that destabilized the soil on these steep slopes. In 1974, when Hurricane Fifi struck Honduras, heavy rains produced major landslides and the collapse of an irrigation dam in which 8000 people died and the banana crop was largely destroyed (Pielke et al. 2003). Was this only a natural disaster?

In the 1980s and 1990s technological approaches to disaster and hazard mitigation in the United States failed to prevent widespread destruction from events such as Hurricane Hugo in 1989, the Loma Prieta earthquake also in 1989, the Northridge earthquake in 1994, Hurricane Andrew in 1992, and floods in Mississippi in 1993. Despite the world's most advanced structural engineering, in the earthquake in Kobe, Japan, in 1995, 6000 people died and many buildings collapsed. At the same time, increasing recognition of the differential effect of disasters on populations based on race, class, age, disability, and gender raised questions of unequal exposure to risks and hazards.

During the same period, anthropologists and other social scientists accumulated evidence that people were usually very knowledgeable about recurrent risks and hazards in their environment and had often developed means to mitigate their risk. An important feature of the human species is its ability to adapt to a wide variety of physical and social environments. Successful adaptation requires balancing competing needs, e.g., the need to be close to sources of water and food and the need to minimize risk from floods (Oliver-Smith 1999). For example, rice farmers in Bangladesh deliberately live concentrated in the floodplain of the Ganges and depend upon predictable annual floods to replenish rice crops and fish harvests. Moving from flooded land; obtaining assistance from extended kin; selling land, livestock, and belongings; and spending savings are all regular, accepted ways that Bangladeshis mitigate risks from floods (Zaman 1999). Yet social changes, especially those that increase poverty or undermine local power, may make it difficult for people to act on their knowledge of hazards and disasters and usual patterns of response. After a particularly severe flood in Bangladesh in 1998, the initial proposals of aid agencies such as the United Nations Development Program (UNDP) and South Asian Association for Regional Cooperation (SAARC) to permanently reduce risks from floods included "expensive structural engineering 'megaplans' that called for construction of massive embankments on major rivers throughout the country and the dredging of rivers to obtain lower water levels" (Zaman 1999, 203). Following evaluation of the plans these technological solutions were replaced with programs to improve long-term economic development and welfare to enhance residents' ability to recover from flood damage and losses.

These historical and intellectual developments stimulated the search for new perspectives and theories about hazards and disasters that would take social factors, local knowledge, and inequity in exposure to risk into account. Vulnerability or social vulnerability was the concept that emerged to redirect research and analysis. The United Nations International Strategy for Disaster Reduction defines vulnerability as "[t]he conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards." Wisner, Blaikie, and Cannon expand the definition to include "... capacity to anticipate, cope with, resist and recover" (2004, 11). There are many definitions of this term, but they all include considerations of individual and collective susceptibility to natural events and the capacity to respond to those events, often linked to the concept of resilience. Drawing from a number of sources, Birkmann provides the following definition of resilience: "Generally, a common ground can be seen in the understanding that resilience describes the capability of a system to maintain its basic functions and structures in a time of shocks and perturbations" (2006, 15-16). Resilience is closely related to the concept of adaptation, mentioned previously and discussed in relation to systems theory later in this chapter: the ability to adjust material culture to varying environments, both physical and social, and to changes in those environments over time.

Those working within the framework of vulnerability further recognize that vulnerability occurs on many levels of analysis, i.e., individual, community, regional, national, and global, and that vulnerability is determined by a host of social as well as physical factors such as gender, race, ethnicity, age, and social class. As Hewitt (1983) notes, one of the most important developments of the social vulnerability approach is to view disasters not as exceptional events, but as the product of normal or

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Finally, the concept of social vulnerability raises questions of social justice. With few exceptions, the poor and marginalized are most vulnerable to disasters, whether they occur in rich or poor nations, and are less able to act upon their knowledge and awareness of risks and hazards. A notable example is coastal real estate development. Although both types of property owners are exposed to risk from hurricanes, the meaning and implications of risk for a wealthy individual who builds a second home on beachfront property are quite different from those of the individual from a commercial fishing village whose family has lived and worked there for several generations.

This discussion underscores not only the importance of theory in understanding and responding to disasters and hazards, but the need to make the theories we use explicit if we are to:

- Understand the differential effects of hazards and disasters on individuals, communities, regions, and nations
- Understand how human actions, knowledge, and beliefs affect vulnerability and resilience to hazards and disasters
- Decrease inequities in risk and exposure within and across populations and increase capacity and resilience in all kinds of communities (social justice)
- Develop more flexible, locally adaptable interventions and approaches

2.7 CONFLICT AND CRITICAL THEORY

Why are some people more vulnerable to hazards and disasters than others? In the case of the 2002 street floods in La Paz, street vendors, the majority of whom were women, bore the highest risk and exposure. Although that particular flood was a relatively rare event, those women who survived the flood returned to sell their goods in the same locations. How do we understand this response and the processes that created it? Social scientists have applied two major theoretical perspectives to understanding social vulnerability: political economy and systems theory and their combination in political ecology.

Strictly speaking, political economy is not a theory, but a perspective from which several distinct social theories have developed. During the European Enlightenment, social philosophers began to investigate the origin, nature, and relationships between nation-states and their colonial holdings. Swiss philosopher Jean-Jacques Rousseau was the first to use the phrase "political economy" in his *A Discourse on Political Economy* published in 1755. Rousseau defined the general or "political economy" as an extension of the "particular economy," that is, "the wise and legitimate government of the house for the common good of the whole family" to "that great family, the State" (Rousseau 1973, 128). Just as in a household, the state had an *economy*, the production and exchange of goods and services, and *politics*, the just (ideally) use of power and legitimate authority to allocate goods and benefits, set policy, protect rights, and resolve disputes. A key aspect of this perspective is the link between politics and economics. Although often separated into distinct areas of study in subsequent eras, i.e., political science and economics, Enlightenment era theorists saw them as inextricably linked. Political power and processes supported the national economy through the creation and protection of institutions such as private property and taxation. The economy, through tax revenues, enabled the state to establish its authority internally and expand it externally through wars of conquest and colonization, setting domestic and foreign policies favorable to economic development and supporting them by force when necessary.

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expanded and applied to a critical assessment of and need for reform of government, law, and other social institutions to improve the human condition (Therborn 1996). The convergence of political economy and the critical tradition yielded conflict theory, expressed most fundamentally in Karl Marx' critique of political economy in *Capital* (1990 [1867]). Conflict theory rests on the assumption that conflict and contradiction are inherent in human social life and that this conflict produces historical changes, sometimes violent and revolutionary, that generate progress in social organization and life. For example, in the capitalist political economy or mode of production, conflict and contradiction are inherent in control over the means of production: those physical resources, e.g., raw materials, electricity, or machinery, necessary for the production of goods and services by a given class of people. Those who control or own the means of production, the capitalist class, are in conflict with those who do not, the laboring or working class, who must sell their labor to sustain themselves and their families. Whereas Marx acknowledged that capitalism is a powerful engine of production and technological innovation that could benefit the state and that would ultimately become the dominant form of political economy globally, he also argued that class conflict inevitably creates inequality, exploitation, and oppression both within and among nations.

Within capitalist societies, inequality becomes institutionalized through various forms of capital: human, social, cultural, institutional, financial, and political. For example, human capital is the attainment of valued skills and knowledge by individuals through training and education. In the United States, lawyers, doctors, and engineers have high human capital; they speak English and perhaps other languages, are literate, and have mastery and expertise of a professional body of knowledge and related skills that are highly valued in the society and the market. A CEO of a large corporation, if she or he owns stock in the company, may have a great deal of financial capital as well as institutional capital, the power that comes from holding an official position of leadership in an established financial entity supported by the laws of the state. These forms of capital can be translated into power to affect the social and physical environment, power that is often subtly exercised to maintain prestige and wealth. But not everyone has an equal chance of obtaining various forms of capital, nor do all forms of capital provide the same kinds of resources for responding to hazards and disasters. Opportunity is highly structured, even in a nation like the United States that values equality, freedom, and self-determination.

Globally, the division between capitalists and laborers was recreated among nations and regions of the world through colonialism. European nations extracted raw materials from their colonies using slave labor from Africa or the forced labor of indigenous people in South America and Asia, but retained a monopoly on manufacturing and processing of those raw materials in Europe. Investment in all kinds of infrastructure, from courts of law to schools to roads and railways, was concentrated in Europe, with only those resources necessary to meet the needs of extracting raw materials invested in the colonies. As Rodney (1982) noted in Africa over 30 years ago, "African economies are integrated in the very structure of the developed capitalist economies; and they are integrated in a manner that is unfavorable to Africa and insures that Africa is dependent on the big capitalist countries" (1982, 25). Postcolonial nations still lack the infrastructure and wealth to prepare for and mitigate the effects of disasters and suffer higher losses of life when disasters occur (Dilley et al. 2005; Wisner, Blaikie, and Cannon 2004).

2.8 STRUCTURE AND AGENCY

In conflict theory, inequality is viewed as an inherent part of the social *structure*. Elements of social structure include the institutions that form the context of our daily lives: schools, religions, courts of law, financial markets, professions, government agencies, the police and military, businesses and corporations and their regulation, hospitals and clinics, and marriage and the family. This structure largely determines the conditions within which an individual lives his or her life and the resources available to her or him. Schools in poor neighborhoods receive less funding, have larger average class sizes, have higher rates of absenteeism and change in their student populations, and

have a harder time recruiting and retaining high quality teachers than those in affluent suburbs. Thus, children growing up in poor neighborhoods and attending these schools are at an educational disadvantage from the day they enter kindergarten (Kozol 1991). The result of the institutionalization of inequality results in *structural violence*. As Farmer notes, "Structural violence is violence exerted systematically—that is, indirectly—by everyone who belongs to a certain social order ..." (2005, 307). For example, the systematic neglect of levees that protected poor neighborhoods of New Orleans left African Americans disproportionately vulnerable to loss of life and property from Hurricane Katrina. Their vulnerability was compounded by their reliance on public transportation to leave the city and their mistrust of public institutions' willingness to help them or to provide accurate information about evacuation based on long-standing racism (Elder et al. 2007).

Some social observers view globalization as a process that can reduce inequality within and among nations and regions by increasing "transnational flows of capital/goods, information/ideas, and people" (Kalb 2000, cited in Lewellen 2002, 8). As more of the world's people participate in the production and exchange of goods and services, ideas and values, standards of living, life expectancy, and quality of life will improve everywhere. Rapley argues that the economic policies of neoliberalism underlying globalization "have had the effect of raising aggregate income but skewing its distribution" (2004, 6). In other words, average incomes have risen but the gap between rich and poor has widened. Whereas there is greater economic integration globally at the macro level of nations and regions, at the local level of families and communities inequalities in the ability to participate in global processes persist (Lewellen 2002). Although cell phones have increased access to global communication for many people in poorer countries, computers and the Internet remain beyond the reach of the majority of the world's population (Chinn and Fairlie 2007). In the 1960s and 1970s, large multinational banks actively marketed loans to governments in Africa and Latin America for economic development—loans that those governments readily secured. When they could not keep up with repayment, the IMF and World Bank mandated restructuring of the loans and demanded "austerity measures" to ensure their adherence to the terms of restructuring. Many of these measures required that governments of debtor nations make massive cuts in spending on health care, infrastructure, education, agricultural development, and other social programs that increased the vulnerability of their citizens to a variety of hazards and disasters and eroded the state's ability to provide assistance in times of need (Gill 2000; von Braun, Teklue, and Webb 1998).

2.8.1 UNDERSTANDING VULNERABILITY

How does this theory help us to understand social vulnerability to disasters? Various forms and amounts of capital affect where people live, work, travel, how many children they have, the resources in their social networks, and thus both their exposure to risk and their ability to respond to a hazard or disaster. Although wealthy individuals who own waterfront or coastal property (high financial capital) are at high risk from floods and storms, they usually have the means to leave the area when conditions threaten and can purchase insurance to protect them against some if not all of the damage to their property. They have the social connections (social capital) and skills (human capital) to ensure that their claims are processed quickly and successfully and that their livelihoods are less likely to be fully at risk (Wisner, Blaikie, and Cannon 2004). The purchase of insurance is evidence that those individuals who purchase it understand that their property is at risk. Those who are poor (low financial capital) may be just as aware of the risks they face from storms and floods, but they usually have fewer choices of where they can live and the quality of their housing, and may not be able to afford insurance or feel that more personal forms of insurance, such as sharing resources among family members, are more reliable. The family whose livelihood depends on commercial or subsistence fishing needs to live on the coast, where both their homes and their business are at risk from storms, flooding, and other hazards. Furthermore, residents in a fishing village in Southeast Asia are more vulnerable to loss of life and property than those living in coastal villages in Australia or Europe. Although the concepts and principles of conflict theory are relatively simple,

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their application suggests the complex interplay of social, economic, and historical factors that contribute to differences in risk and vulnerability to disasters and hazards for different populations within countries and for different countries and regions globally.

So far we have considered the *material* aspects of social structure and power as discussed by conflict theorists. Material aspects include, among others, control over natural resources; the accumulation of wealth; investment in roads, buildings, and manufacturing capacity; the creation of universities and research facilities; and the development of technology and science. Other theorists working within this paradigm have focused on how *nonmaterial* elements of social structure—symbols, beliefs, values, and knowledge itself—play a critical role in maintaining and reproducing inequality and exercising power. One of the key questions that conflict theorists must answer is how one class of people can not only be exploited and dominated by a much smaller class of people without the constant use or threat of force and violence, but may actively embrace and uphold the structures of power that dominate them. Most contemporary capitalist societies do not rely primarily on organized religion to support the power of the state and many actively espouse values such as freedom, individual rights and civil liberties, and popular participation in government. Gramsci (1971), discussed aspects of the role of ideology in social structure through his development of the concept of hegemony. Hegemony, Gramsci argues, is the exercise of power indirectly by the use of ideas, ideology, and a view of life that supports the social structure and those in power. This process is complex and contradictory, with various groups vying to dominate popular thought and media. Nonetheless, an overarching set of values becomes those that the majority of a society's members internalize.

The dominant view of disasters may be viewed as having hegemonic aspects or qualities. By viewing disasters as events caused by natural forces and processes outside human history and beyond human control, governments and other powerful organizations can deflect criticism for inadequate enforcement of building codes, lack of investment in warning systems and disaster planning, and for allowing some communities to suffer higher costs than others when disasters occur. Because this view also infuses media accounts of disasters and hazards and appears in disaster management literature and courses, it is accepted as "common sense" and is therefore sometimes difficult to effectively challenge. Thus, the focus in the accounts of the flood in La Paz focus on its rarity and unusual strength rather than on the social and economic structure that compels many people to live on unstable hillsides every day and sit literally in the streets trying to sell something to provide income to feed and clothe their families.

Foucault examined the ways in which we internalize the dominant views of the powerful both in social institutions and in our bodies through scientific discourse and knowledge. Under capitalism, Foucault argues, science supplants religion as the primary means of determining truth in most societies. "Truth is linked in a circular relation with systems of power which produce and sustain it, and to effects of power which it induces and which extend it. A "régime" of truth" (1980, 133). Consequently, those who control the production of scientific knowledge and its applications through technology also control our conversations or discourse and thus can affect in important ways how we view, study, and respond to phenomena such as disasters and hazards. Jason Corburn (2005) describes how discourse can affect planning for development:

For example, Tauxe (1995), in a study of a development process in western North Dakota, shows how community voices were marginalized by planners who attended more closely to technical styles of discourse. Community voices were marginalized despite public efforts to involve residents. Even when local residents managed to gain an audience, they had little impact on development decisions in part because planners and residents did not speak the same language and understand each other's politics (Tauxe quoted in Corburn 2005, 147–48).

Charts, tables, and lengthy written documents often carry more weight in such public conversations than do the evidence of what Corburn calls "street science" or what anthropologists call "local knowledge," which may be presented in the form of stories or oral history that

appears anecdotal even if it condenses years of accumulated empirical observation and experience (Corburn 2005). Control of discourse reinforces inequalities among and within nations in understanding and responding to disasters and hazards. Because the dominant view of disasters sees them as products of nature, natural and earth sciences have, until recently, received the majority of funding for research and the focus of mitigation has been on technology instead of social issues.

According to Foucault, an important aspect of the power of truth through science is how it internalizes social control within the individual members of a society. Biology and psychology, applied through organized medicine and psychiatry and communicated through schools and mass media, define what is considered normal behavior or a normal body. We internalize these standards of normality and discipline our behavior to achieve them. Bourdieu (1998) called this embodiment of social standards and scientific knowledge "habitus." Habitus is internalized social structure: an individual's habitus consists of the largely unconscious patterns of thinking, feeling, and acting that she or he exhibits in daily life. According to Bourdieu, habitus not only incorporates mainstream or dominant standards of behavior and physical qualities and values, but those that are particular to an individual's location in the social structure, i.e., his or her class status. Because local knowledge is so frequently dismissed as unscientific or anecdotal, community members, particularly those with little formal education, may dismiss the authority of their own knowledge and experience at least in discussions with those identified as experts. At the same time, when internalized shared worldviews or habitus include a sense of futility or powerlessness in the face of social injustice, it can represent a barrier to effective social and political action to mitigate hazards and disasters.

Just as those working within the dominant view of hazards can focus too much attention on natural causes of disasters, so conflict theorists can focus too much on the constraints and dominance of social structure and fail to recognize the role of individual and human action to generate change that can affect social life and the physical environment. For Foucault and Bourdieu, structure, external and internalized, does not completely determine individual and collective behavior and action. Individual and collective action or agency also affects social structure. Foucault acknowledged that alternative sources of knowledge and understanding and models for action exist outside mainstream images and institutions (Moore and Sanders 2006, 13), for example, in the coded opposition to power of the Brer Rabbit stories of rural blacks in the United States (Kushnick 1998) or in local forms of resistance such as seasonal workers in Malaysia delaying the harvest of crops of landowners who have overly exploited or mistreated them (Scott 1985). For Bourdieu, habitus is not only the product of what we receive and are taught, but also of our everyday actions and social encounters or practice, and thus is subject to innovation and change.

2.9 SYSTEMS THEORY AND SOCIAL VULNERABILITY

The whole is more than the sum of its parts.

—Aristotle (384–322 BC)

General systems theory is another major theory, also frequently implicit, that underlies social vulnerability approaches to understanding hazards and disasters. As we will discuss later in the chapter, it is often combined with political economy in *political ecology* and with culture in *cultural ecology*. Historically, the scientific approach that developed during the Enlightenment in Western Europe was based on the assumption that a phenomenon (whole) consisted only as a sum of its smallest identifiable parts. To understand a phenomenon, for example, the human body, it is necessary to determine its smallest parts, i.e., the cell, and understand their characteristics and behavior. Once these are understood, individual organs and whole bodies could be understood as well. This breaking down, or reductionism, is evident in different scientific

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disciplines: biologists break down living organisms into their smallest units, cells; chemists break down matter into atoms and molecules; and physicists break atoms further into subatomic particles and waves. By the early 20th century the various scientific disciplines worked largely independently of each other, each examining the parts of the world that formed the object of their study.

In the 1930s, biologist Ludwig von Bertalanffy (1950) reacted against scientific fragmentation and reductionism, arguing that a more holistic approach was needed. Understanding the genetic basis of a particular cancer is important, but by itself this knowledge is insufficient to design interventions to prevent cancer. Instead, to combat cancer, the disease must be understood at the genetic, cellular, biological, economic, and social levels. Writing in 1956, Boulding described the consequences of reductionism: "[T]he more science breaks into sub-groups, and the less communication is possible among the disciplines, however, the greater chance there is that the total growth of knowledge is being slowed down by the loss of relevant communications" (1956, 198–99). General systems theory provides a way to increase communication among scientific disciplines through the concept of the system. Though the origin of the fundamental idea behind systems theory can be traced to scientists and philosophers such as Aristotle, Descartes, and Galileo, its contemporary incorporation into general systems theory is generally credited to Ludwig von Bertalanffy (1972).

2.9.1 WHAT IS A SYSTEM?

Although the definition of system might seem obvious, it is important to examine its elements. By definition a system is composed of at least two interrelated parts or elements (Kast and Rosenzweig 1972). A more applicable definition is "a collection of interacting or independent entities that produces a unified functional whole, whose properties or behaviors cannot be predicted from a separate understanding of each individual level component" (Dale et al. 2004). Systems theory is based on the assumption that wholes are not merely a collection of different parts, but are organized, distinct phenomena that have characteristics, qualities, and behavior unique to them and different from the qualities of their component parts. This principle, known as *emergentism* (the character of the whole *emerges* from its parts) is fundamental to systems theory and distinguishes it from reductive approaches. What makes the whole unique is how the parts are linked to one another through organizing functions, the tasks or jobs that various parts of the system perform. Whereas some parts may perform more than one job, and many systems have redundant parts, the whole is dependent upon its parts working together in unity. Changes in one part of system generate responses and changes in other parts of the system.

An important feature of systems is whether they are open or closed. Closed systems have impermeable boundaries and so do not exchange energy or materials from their surrounding environment but must regulate themselves internally. Open systems, on the other hand, have permeable boundaries and freely exchange energy and materials with other systems in their environment. These are relative qualities: most systems are more or less open or closed. Culture, for example, is a relatively open system that exchanges materials and energy through human interactions with the physical environment, plants, and animals. In turn, those systems are also altered by the exchange.

2.9.2 ECOLOGICAL SYSTEMS

An ecosystem is greater than the sum of its parts.

—Eugene P. Odum (1913–2002)

Von Bertalanffy applied general systems theory to biological organisms such as the human body, but in the 1970s it was adopted by the emerging science of ecology. Odum presented the idea of the

"new ecology" in 1964 in an article by that title in which he links ecology, the study of the interaction between organisms and their environment, with general systems theory. Because it identifies the similarities among phenomena of different disciplines, general systems theory provided a common ground to link the study of physical geography with biology and human geography, particularly the interaction between human individuals and communities and their environment, both living and nonliving. The new ecology recognized that explaining structure and function at only one level of analysis could not explain the whole picture. For example, understanding the effect of building a dam on the price and availability of electricity will not explain its effects on human communities displaced by the dam or the increased burden of parasitic, waterborne diseases in humans who live above the dam. In addition, the new ecology acknowledged that descriptive research is not enough to link the layers of scientific research. For example, studying the descriptive nature of plant growth and nutrient cycling will not produce larger crop yields. However, if the functions of these two phenomena are studied together, common denominators can be determined leading to an understanding of their interactions. Odum describes the ecosystem concept as a basic unit of structure and function that must be dealt with: "The new ecology is thus a systems ecology" (Odum 1964).

The power of systems theory lies in its ability to examine complex interrelationships at multiple levels and thus analyze vulnerability to disasters and hazards as well as identifying ways to mitigate them. In the case of the flood disaster in La Paz, for example, multiple systems were affected by the rushing water: transportation systems in the city, sewer systems that contain waste and keep it from contaminating drinking water, communication systems where utility and phone lines are damaged, power systems that supply electricity to homes and businesses, but also to police, fire, and rescue departments, and health care systems that must cope with multiple victims during the flood and patients who present with waterborne diseases from contaminated drinking water after the waters subside. Additionally, the political and economic system means that many poor Bolivians, particularly women, must sit on city streets to sell their goods and remain with those goods even as flood waters rush down the streets. The failure of the government to build and maintain roads, drainage ditches, and enforce building codes, coupled with migration of the rural poor to the city's unstable hillsides, all increase the vulnerability of the poor to flood disasters. With few options and resources, and low value placed on public safety by the state, La Paz's poor street vendors have little choice but to adopt the worldview that a flood disaster is "God's will" and to return to the streets.

The emergence of ecological systems perspective was a significant scientific and theoretical development that arose from increasing awareness of environmental pollution and its effect on health, increasing human population and the demand on natural resources, and the extinction of plants and animals resulting from human actions (Holling and Chambers 1973). Within this context, ecological systems theory represents a shift in scientific and popular (in those areas of the world where Western science is dominant) conceptions of the relationship between humans and nature.

2.9.3 CRITIQUE OF ECOLOGICAL SYSTEMS: POLITICAL ECOLOGY

Although ecological systems theory provides an excellent framework for describing the "what's" and "how's" of these relationships and the social vulnerabilities that exist within these systems, they tend to focus on equilibrium and balance instead of conflict and change. Within the ecological systems view it is hard to see disasters as anything other than extreme natural events or disturbances to the system with resilience as a systems' ability to recover from external forces (Wilcox and Horwitz 2005). Political ecology, which combines ecological systems theory with political economy perspectives, most notably those of conflict theorists such as Wolf (1982), Frank (1969), and Wallerstein (1974), became an important framework for examining the role of power, inequalities and inequities in the distribution of resources, and global capitalism on ecological changes at local, regional, and global levels of analysis (Walker 2005). "Whereas cultural ecology and systems theory emphasized

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adaptation and homeostasis, political ecology emphasized the role of political economy as a force of maladaptation and instability (Walker 2005, 74).

The creation of large dams to harness hydroelectric power in many developing countries in the 1960s and 1970s are a case in point. The dams did generate power, but in creating large freshwater lakes they also greatly increased the habitat for freshwater snails and altered patterns of human agriculture, fishing, transportation to increase settlement near the lakes, and human contact with the water. Thus, the stage was set for the rapid spread of schistosomiasis, a debilitating, chronic parasitic infection, throughout the world's tropical regions (Desowitz 1976). In India, despite decades-long protests from people threatened with displacement from dam projects, the government has built 4300 large dams that "have submerged about 37,500 square kilometers—an area almost the size of Switzerland—and displaced tens of millions of people" (International Rivers 2008). Underlying the decisions to build these dams and the responses to their construction and the changes they brought were several competing worldviews and values.

2.10 WHAT ARE WORLDVIEWS?

Worldview, from the German *weltanschauung*, refers to ways of thinking about the world and its events that are more or less shared by a group of people. Worldviews provide answers to questions about the meaning of life and death and what the appropriate human response to those events should be. Implied in the concept of worldview is a direct relationship between the way an individual or group views the world and their behavior. Worldviews are learned through social interactions with parents, friends, and others in one's community from early childhood. They may be expressed through religion or philosophy, or they may be implicit in the structure, norms, and values of institutions such as public schools or medical clinics. Worldviews are largely unconscious and may guide our actions without our awareness. The concept of worldview is conceptually problematic in that worldviews are only "more or less" shared among members of a society or social group; like habitus, worldviews vary by an individual's or a community's position within the social structure and by their unique experiences. The world may look very different if you are a small landholder working to produce food your family than if you are a commercial fisherman who supplies fish for sushi on the global market or an investment banker on Wall Street. For this reason, many contemporary anthropologists prefer ideology or habitus to worldview.

Worldviews respond to questions about human relationship with nature, and thus to understand vulnerability and response to hazards and disasters it is critical to take worldviews into account. Broadly speaking, there are three ways of understanding the society-nature relation:

- People under nature (nature's theory): humans are at nature's mercy
- People with nature: humans live their collective lives in harmony with nature
- People over nature (human's theory): humans dominate nature through manipulation of the natural world

Under the first worldview, an earthquake or tornado might be seen as an "act of nature" or as an "act of God" if God is accepted as the creator of nature. The response might be to accept it as an unavoidable though unfortunate event and to rebuild damaged structures. Under the second worldview, the same event might be viewed as something to which human society must adapt and for which it must plan by understanding weather patterns, building structures and locating cities on stable ground and away from common tornado pathways, and using knowledge and cooperation to provide safe places of refuge. Under the third worldview, damage to structures or lives lost result from human failure to master nature and the response is to design and build structures that can better withstand the forces of earthquakes or learn to predict and warn against tornados.

The relationship between a society's political, economic, and social structure and its view of the relationship between humans and nature has been a subject of debate among anthropologists. Some,

like Harris (1979), argue that a society's material, economic bases, i.e., how its members obtain their needs from nature or mode of production, determines their worldview. Thus, a society based on hunting and gathering in which success depends on an intimate knowledge of the local environment and its plants and animals will tend to have a worldview of people with nature. A society based on industrial technology where most people live far removed from nature will tend to have a worldview of people over nature. And a society or community that has few resources and whose members have little control over where they live and how they make a living are likely to adopt the worldview of people under nature. Most social scientists would agree the relationship between environment, mode of production, and view of nature is complex and can work in both directions: our view of nature can change.

2.11 WORLDVIEWS AND VALUES

Values are guidelines for action (behavior) and decisions that are generally consistent with and derived from worldviews. For example, in the general worldview of human over nature, life is valued over that of other species. The human need or desire to increase crop yields through the application of pesticides is justified through this value, even though it may never be stated unless someone challenges that decision and its underlying value. Values address questions of morality, of right and wrong action, and what is good and desirable. Like worldviews, they may be explicitly stated or unconscious and implicit in the form of "gut feelings" that a given action or decision is the "right" or "wrong" thing to do.

Values express equity or fairness, justice, and the relationship of the individual to society. What do I owe a stranger simply because that person is a human being in need? How much should my individual opinion or need or desire count in society? What is "consent," and how should it be expressed? Philosophers distinguish between intrinsic values, those things that are good, desirable, or important in and of themselves without relation to any other thing, and extrinsic values, those things that are valuable because they are a means to obtaining, enjoying, or protecting something that is intrinsically good (Flew 1979, 365). Intrinsic and extrinsic values are considered when we invoke the sacredness of the earth as part of creation (Hayden 1995; Khalid with O'Brien 1992) or assign monetary value to a unique geological feature or to preserving remote areas so that humans can experience wilderness (Foster 1997). Values also guide discussions of which risks can be mitigated and for whom, and which risks are acceptable and at what level. For example, are the risks from landslides and earthquakes viewed as impossible to manage, whereas nuclear power accidents or terrorist attacks must be prevented at any cost?

Values exist and affect decisions and behaviors at various levels and through various systems, and they often come into conflict with one another. For instance, disaster managers and economic planners in a city may believe that they should provide protection from disasters equally across the entire population; thus, equality is valued. They probably also want to achieve this by using scarce or limited resources wisely; thus, efficiency is valued. If there is a small population of the city that is very hard to protect, it may not be efficient to spend 90% of the resources to protect only 10% of the population. The issue becomes more problematic if that small group is also an ethnic, racial, or occupational minority group. Many planners and officials believe that historically marginalized or deprived groups should receive assistance in greater proportion than their strictly equal share—the value of equity.

Returning to the example of dams in India, the worldview embraced by the Indian government is one of humans over nature, expressed in its willingness to use technical solutions—dams—to solve human needs for energy. The government also values economic development more than the possible harm or disruption caused to the millions of people displaced by the dams. The worldview embraced by the protestors, in contrast, is one of nature with humans, expressed in the desire for economic development that values environmentally sustainable solutions to the need for power and that value local community needs over national needs or special interests.

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2.12 COMMUNITY-BASED APPROACHES AND SOCIAL AND ENVIRONMENTAL JUSTICE

Conflict theory forces us to acknowledge social inequity as a source of vulnerability to disasters and to redefine hazards to include not only extreme events such as earthquakes and volcanic eruptions, but conditions that millions of people live with daily: contaminated water, lack of sanitary facilities, unsafe roads, and inadequate food and nutrition. These theories also direct us to consider different approaches to mitigating hazards and disasters that incorporate social justice and participatory approaches to research and planning.

Freire (1970) examined how individuals and groups could challenge structures of power and inequality through literacy and *conscientização* or critical consciousness. Freire observed that becoming literate, i.e., learning to read and write especially as taught in schools, is a process whereby society inculcates dominant values and views. It is thus dehumanizing and oppressive for poor and marginalized members of society. Learning to read and write can, however, be a process of humanization and liberation if it is taught in a way that demonstrates the power embedded in language and if teachers work in equal partnership with the person learning to read to control that power her- or himself (Freire 1970).

Analogously, research on hazards and disasters can be a process that empowers residents of communities at high risk. Participatory Rural Appraisal or Assessment (PRA) and Community Based Participatory Research (CBPR) (Israel 2005) rest on principles that emphasize the knowledge and strengths of local communities and their members and strive to equalize the power between researchers or technical experts and those they are studying:

PRA depends on facilitators acting as convenors and catalysts, but without dominating the process. Many find this difficult. They must take time, show respect, be open and self-critical, and learn not to interrupt. They need to have confidence that local people, whether they are literate or not, women or men, rich or poor, are capable of carrying out their own analysis (Weiss 2000, 4).

The sustainable livelihoods approach (SLA), described in Chapter 3, uses PRA in assessing a community's vulnerability and resilience to hazards and disasters.

These are lofty ideals, and PRA and CBPR projects often fall short of truly equal partnership and collaboration. Nonetheless, these models offer an approach that values local knowledge of the physical and social environment and has the potential to recognize and incorporate indigenous ways of living with hazards and disasters that may prove more sustainable than purely technological approaches (Zaman 1999). Although this knowledge and participation could be extracted and used for top-down programs and interventions imposed by government or civic agencies and institutions outside the community, these approaches are guided by the view that community members must be equal partners in all aspects of research, program design, implementation, and evaluation and that this process should be used to empower local communities. Consequently, PRA and CBPR have been used to directly respond to issues of social and environmental justice (Shepard et al. 2002) such as pesticide exposure among farm workers (Arcury, Quandt, and Dearth 2001). "Fundamentally, *street science* is about the pursuit of environmental-health justice. Mobilizing local knowledge helps disadvantaged communities organize and educate themselves, as well as increases control over the decisions that impact their lives" (emphasis original) (Corburn 2005, 216). Thus, these frameworks support the position that communities have the right to know about local hazards and a right to protection from disasters.

Discussion of human rights and social justice returns us to the power of conflict and critical theory in analyzing inequities in social vulnerability. Conflict and critical theory proposes that a society's dominant or hegemonic worldview and underlying values, and its institutions and policies regarding those factors that govern human and environmental interactions are mutually reinforcing. In other words, if a society's economic system of production is based on exploiting natural resources and human labor and exchanging its products in a free market, its social structure will incorporate unequal access to and control over productive resources. Its worldview will be one of humans over

nature; its core values will support efficiency over equity; and the view that hazards and disasters are uncontrollable natural events will predominate. These structures and values will generate policies that result in differential social vulnerability to hazards and disasters based on a variety of factors including race, gender, age, ethnicity, and social class.

But to focus solely on structure and hegemony denies the power of individual and collective agents to change their interaction with the environment and the values and worldview that guide those interactions. Through concerted action in a variety of scientific disciplines, in social policy, and in hazard and disaster management, the dominant view of hazards and disasters is slowly being transformed. The application of conflict and critical theory forces attention on the role of social structure, worldview, and values on social vulnerability. The concept of sustainability forces us to consider the real costs of the inequalities and inequities that result from a worldview of humans over nature and points to the value of local knowledge in creating sustainable interactions with the environment. As Oliver-Smith notes, "In effect, if a society cannot withstand without major damage and destruction a predictable feature of its environment, that society has not developed in a sustainable way" (1996, 2). Finally, attention to agency through participatory research and planning offers the promise of empowering those who are disproportionately at risk to demand equity in mitigation and planning.

2.12 SUMMARY

Theory is critical to our scientific approach to hazards and disasters. To view hazards and disasters as extraordinary natural events or as basic features of human environmental systems is more than a matter of semantics; it represents critical choices in how we study and respond to these events that affect our environment and millions of lives every day. Disasters such as Hurricane Katrina and the La Paz flooding demonstrate that risk and vulnerability are not distributed equally within a society. Critical and conflict theory explain these inequalities and inequities as the product of social structure, worldviews, and values. Combined with systems theory, the political ecology framework provides a powerful mechanism to analyze the complex interplay of variables that result in disasters like the earthquake in Sichuan, China (2008), in which 69,000 people perished (IFRCS 2008). Adding the concept of human agency and using participatory approaches to research creates the possibility of changes in hazard and disaster planning, mitigation, and prevention that can decrease social vulnerability and promote sustainable human-environment interactions.

2.13 DISCUSSION QUESTIONS

1. Using a conflict and critical theory approach, how do the zoning policies and building codes in your local community affect social vulnerability to hazards and disasters?
2. What individuals or organizations can you identify at the local, national, and international level that have succeeded in changing worldviews and values that directly affect disaster planning and mitigation? How have they achieved these changes?
3. How do you see institutions responsible for disaster planning and mitigation responding to the use of participatory approaches to research and planning in your community? Should community members and organizations be full and equal partners? Why or why not? How do you determine who should be included and which voices should be heard?
4. Analyze media reports for a disaster or hazard. What values and worldview guide how the event is reported? What is the view of hazards and disasters they present? How might you go about informing journalists and media representatives about alternative ways of viewing these events?
5. How does the concept of sustainability challenge the view of hazards and disasters as natural events? What does it tell us about the costs of social vulnerability? What worldview of the relationship of humans to nature does it support?
6. Is protection from hazards and disasters a human right?

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