PART V

Global Challenges

CHAPTER 13

The Global Environment and Its Inhabitants

It is possible to analyze global politics from a viewpoint that emphasizes the extent to which a global community, as opposed to a set of interrelated but still separate states, exists. Such a viewpoint has become increasingly relevant partly because a set of interrelated problems, continually threatening to reach crisis proportions, has served to highlight the extent to which people everywhere, of whatever nationality, are connected by the global environmental system. Food and natural resource shortages, dramatic population growth, deterioration of the ozone layer in the upper atmosphere, and global warming resulting from the greenhouse effect all seem to be problems that cannot be solved on a state-by-state basis, and they all make the common fate of people in the global community dramatically visible.

This chapter focuses on these challenges to the global community. It describes some of the most important problems facing the community and analyzes the debates over how serious the problems will become in the next few decades. The debates often pit optimists against pessimists over the severity of the problems and involve further disagreements over workable solutions. Even when most in the global community agree on the challenge and it seems in the interest of all to cooperate to address the problem, political and economic interests complicate global efforts. This chapter discusses these interests as obstacles to cooperation on collective goods, such as clean air and biodiversity, as well as how different theoretical perspectives view global environmental politics.

Environmental Challenges

The international environment has always been an interdependent system. The rain that falls in one part of the globe, for example, evaporated from lakes in another part of the globe. But it was not until the 1960s that the connections among states through the international environment were seriously recognized. "While individual environmental treaties date back more than a century, the environment is a relatively new field of international law,"[1] and a fairly new issue in international politics.

Atmospheric Conditions and Climate Change

Air pollution was one of the first environmental challenges to reach the international agenda. "As countries industrialized in the first half of the century, environmental pollution issues became more prevalent. . . . Perhaps the most famous international environmental dispute . . . began in the 1930s when the United States complained that sulfur dioxide emissions from a smelter located across the border in Canada damaged U.S. crops."[2] As the effects of industrialization accumulated in the second half of the twentieth century, concern for pollution within countries prompted a number of the industrialized states to pass national environmental protection laws. These countries soon realized, however, that the

air around them could not be protected through national efforts alone. "Particularly in Europe where many environmental issues such as air and water pollution inherently present transboundary issues, the emerging environmentalism moved to the international level."[3]

In 1968, Sweden, facing transboundary pollution problems in the form of acid rain, organized an international conference on global environmental problems.[4] Sweden hosted the first UN conference on the environment, known as the **Stockholm Conference,** in 1972. "The United Nations Conference on the Human Environment marked the culmination of efforts to place the protection of the biosphere on the official agenda of internal policy and law. Specific aspects of the environment had been the objects of international negotiations and arrangements, but the concept of the collective responsibility of nations for the quality and protection of the earth as a whole did not gain political recognition until the years immediately preceding the Stockholm Conference."[5]

Stockholm Conference First UN Conference on the environment, in 1972.

Today, air pollution remains an important part of the international environmental challenge. Perhaps the most notorious pollution results from the world's reliance on fossil fuels (coal, oil, and natural gas) to generate most of its industrial energy. Carbon dioxide is released into the atmosphere when these fuels are burned. In 2004, 7.5 billion tons of carbon were added to the atmosphere through fossil fuel combustion. If current trends continue, that number could be 9 billion by the year 2010, which would be almost 50 percent higher than 1990 levels. Global carbon emissions nearly quadrupled from 1950 to today.[6] These emissions have a rather dramatic effect on the concentration of carbon dioxide in the atmosphere. "Scientists estimate that levels [of carbon dioxide] have risen 31 percent since the onset of the Industrial Revolution around 1750."[7] Between 1990 and 2000 alone, global carbon emissions from fossil fuel combustion increased by 9.1 percent.[8]

Part of the rise in concentration of carbon dioxide is due to deforestation in the world. When trees die, carbon dioxide is added to the atmosphere in two ways. As the dead trees rot, they release carbon dioxide into the air. Also, trees consume carbon dioxide in the process of photosynthesis. When they die, less photosynthesis occurs, and so less carbon dioxide is absorbed. "Already, more than half of the forested belt around the tropics—once about 5.5 million square miles—has been lost. Pristine tropical forests in West Africa, Madagascar, the Philippines, and Brazil have been reduced to less than 10 percent of their natural areas. India has virtually no original forests remaining. Moreover, scientists estimate that at least 34 million acres of tropical forests are still being cleared yearly due to the insatiable global demand for land, timber, crops and such valuable commodities as gold and oil; millions more acres are partially logged."[9] According to satellite data, deforestation in Brazil was so extreme by 1987 that the Amazon rain forest was reduced in size by 8 million hectares, an area about the size of Austria;[10] by 1989 the deforested area was larger than the size of Japan,[11] and the pace of deforestation in the Amazon

Map: Destruction of the Rain Forest, Atlas page 42

increased by 34 percent in the early 1990s.[12] In addition to the link to rising levels of carbon dioxide in the air, deforestation also creates problems with flooding, food supplies, and biodiversity (discussed later in the chapter).

Constant emissions of large amounts of carbon dioxide into the atmosphere through fossil fuel combustion and deforestation combine with the pollution of the atmosphere by volatile chemicals known as chlorofluorocarbons (CFCs) to produce the greenhouse effect and a global warming trend. CFCs prevent infrared radiation from escaping the earth's atmosphere, thus making their own contribution to the global warming effect. CFCs are estimated to have caused 15 to 20 percent of global warming thus far.[13] Once released into the atmosphere, they can be expected to stay there for a hundred years, so they may have already had a disruptive effect on the global climate. In addition to their possible role in the process leading to global warming, CFCs may have helped to destroy the ozone layer in the upper atmosphere over the polar regions and, recently, over the entire world. The ozone layer screens out a portion of the ultraviolet radiation from the sun. Because that layer decreased by about 2 percent worldwide between 1969 and 1986, allowing 4 percent more radiation to reach the earth, an increase in skin cancer is expected.[14]

The rise in carbon emissions, CFCs, and the concentration of carbon dioxide in the atmosphere is worrisome because it could dramatically change climate throughout the world. "Unprecedented increases in global temperatures have occurred in tandem with record levels of greenhouse gas concentrations and emissions. . . . Global average temperature is due to increase by 1.4–5.8 degrees Celsius between 1990 and 2100."[15] The potential effects of this global temperature rise include "violent and unpredictable weather, more or less drastic shifts in the areas most suitable for agriculture, coastal erosion, deleterious health effects, and so on."[16] Global warming over the twentieth century was reportedly about 0.6 degrees Celsius, and the five hottest years since 1880, when recordkeeping began, have occurred since 1998. 2005 was the hottest year in recorded history (see Figure 13.1).[17] "More important than the average warming is the effect it may have on climates. Things will not just get warmer, climatologists predict, some places will, but others will get cooler, wetter, drier, or cloudier. The average warming is merely the engine that will drive the changes. The term **'global warming'** is mischievous in suggesting that hot summers are what it is all about."[18]

global warming
Long-term rise in world's surface temperatures and lower atmospheric temperatures caused by certain "greenhouse" gases such as carbon dioxide.

If the trends continue, global warming could have catastrophic effects all over the world, mostly because of rising global sea levels due to melting polar ice caps, as well as permanently lower levels of rainfall in once-fertile croplands. According to the Intergovernmental Panel on Climate Change, "It is very likely that the 20th century warming has contributed significantly to the observed sea-level rise, through thermal expansion of seawater and widespread loss of land ice."[19] Around the

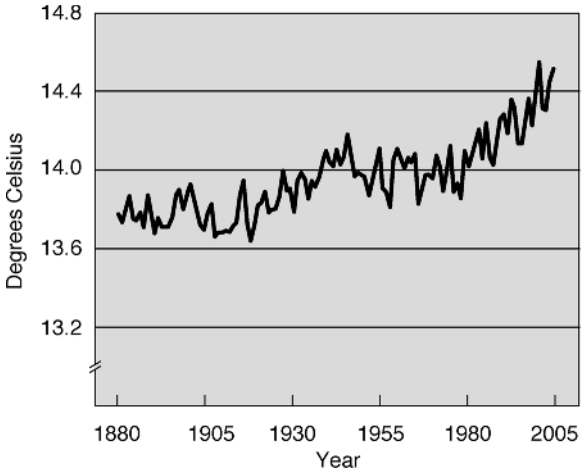

Figure 13.1 Global Average Land-Ocean Temperature at Earth's Surface, 1880–2005

Source: Worldwatch Institute, *Vital Signs 2006/2007: The Trends That Are Shaping Our Future* (New York: W.W. Norton, 2006), p. 43. Used by permission. http://www.glss.nasa.gov/

world, many coastal cities could be completely lost to a rising global sea level, which is expected to rise two to four times faster in the twenty-first century than the rise of 10 to 20 centimeters in the twentieth century. In Bangladesh, a rising sea level might put 18 percent of the country's habitable land under water, making 17 million people environmental refugees.[20] Climate models also suggest that global warming may permanently reduce rainfall in the U.S. Midwest, reducing crop yields in an area that produces 50 percent of the world's corn and 60 percent of its soybeans.[21] Of course, the United States is only one country that might be affected. "One possible result of disrupted climate is more frequent droughts. Chronic water shortages already plague 80 countries with 40 percent of the world's population."[22]

Other effects on public health are created as well:

> Warm weather speeds up insect metabolism: in warm years, insects often grow quicker, breed more frequently, and migrate sooner. . . . Many of the world's most dangerous insects for agriculture, forestry, and public health are tropical or subtropical in origin; almost by definition they are poised to follow the retreat of temperature barriers.[23]

There is still some debate about this trend (discussed in more detail below), but there does seem to be a growing consensus in the world's scientific community that a warming trend is in place on a global scale and that human activities have an enormous impact on this trend.[24]

Shrinking Natural Resources

In the 1970s, the view that the world would soon run out of several important natural resources gained widespread acceptance.[25] The energy crises of that decade were the major force making that idea so popular. By

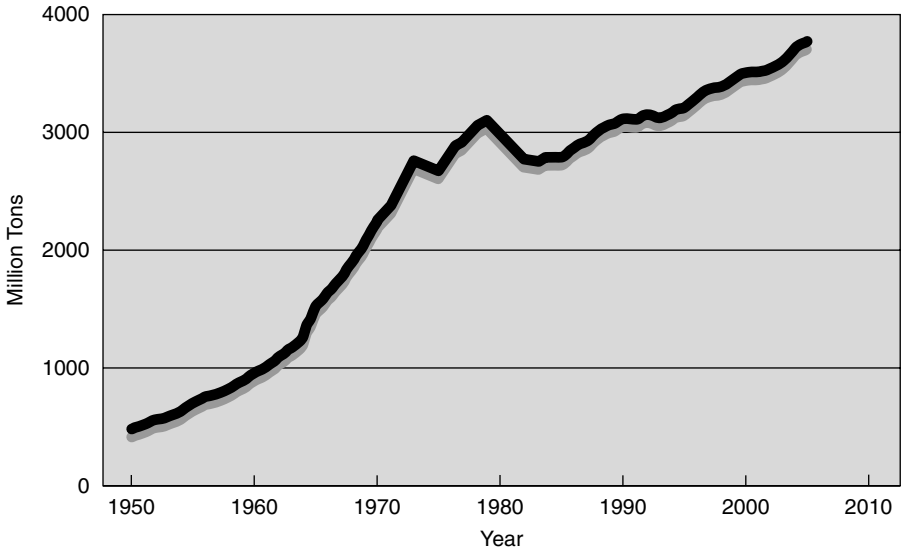

Figure 13.2 World Oil Consumption, 1950–2005

Source: "Table: World Fossil Fuel Consumption, 1950–2005" from *Vital Signs 2006/2007: The Trends That Are Shaping Our Future* by Michael Renner, et al., copyright © 2006 by Worldwatch Institute. Used by permission of W.W. Norton & Company, Inc.

the middle of the 1980s, the world had recovered from the shock of the second major increase in the price of oil in 1979, and the glut of oil on the world market had driven prices down and threatened the unity of the Organization of Petroleum Exporting Countries (OPEC). Thus, the notion that supplies of natural resources were running dangerously low for the entire world fell from favor.

Nevertheless, many analysts feel that the oil glut brought about a false sense of security. Indications are that the demand for energy will increase dramatically in the coming decades, spurred in part by economic growth in China and India. World consumption of traditional fuel supplies and electricity consumption per capita climbed between 1980 and 1998 (see Figure 13.2 on world oil consumption), and fossil fuel consumption is projected to increase by 57 percent between 1997 and 2020.[26] "Energy is the 'master resource' [because] the extraction of all other resources depends on availability and prices of energy."[27] In other words, if increasing demand does deplete supplies of energy resources, all the other natural resources will become more difficult to obtain, and widespread shortages of many of them might develop.

Map: Energy Production, Atlas page 20

Map: Energy Consumption, Atlas page 21

As previously mentioned, deforestation is another issue on the international environmental agenda. Not only do fewer trees relate to higher levels of carbon dioxide in the atmosphere, but deforestation also means fewer energy supplies and food supplies for many people living around forest areas. The shrinking of the rain forests also represents a threat to the earth's biodiversity. "Since rainforests are thought to harbor about half the world's species of plants and animals, researchers worry that destruction of the globe's genetic library will hamstring efforts to create new medicines and more productive crops."[28]

In addition, fresh water seems to be on the verge of becoming a scarce commodity. "More precious than oil, yet routinely wasted, water is arguably the world's most pressing resource issue. . . . Global water consumption rose sixfold between 1900 and 1995—more than double the rate of population growth—and continues to grow rapidly as agricultural, industrial, and domestic demand increases."[29] Some estimate that if current water consumption continues on the same trajectory, almost half of the world's population will live in areas that are subject to frequent water shortages.[30] According to an environmental vice president of the World Bank, "The wars of the [twenty-first century] will be over water instead of oil or politics."[31]Ocean water is at risk as well, harming another source of food supply. "Chemicals, solids, and nutrients from agricultural runoff, oil and gas development, logging, dredging, filling, and mining are routinely dumped directly into the ocean or otherwise end up in rivers and streams and make their way to the world's oceans. Some of the effects of ocean pollution include destruction of the world's fisheries, climate and sea level change brought on by changes in ocean temperature, and the destruction of salt marshes, mangrove swamps, coral reefs, and beaches which means the loss of habitat and biological diversity."[32]

Overfishing is also a problem. "A study of North Atlantic fisheries released in February 2002 revealed that fish catches of preferred food fish such as tuna, cod, haddock, flounder, and hake had declined by half over the past 50 years, even though fishing effort had tripled over the same period."[33] This comes at the same time that land resources, or the availability of cropland, are diminishing. The amount of land under cultivation peaked in 1981 (at 732 million hectares). Between 1981 and 1995, cropland devoted to the production of grain fell by 7.6 percent. "Given projected increases in population in coming decades, the amount of cropland per person will certainly continue to fall. . . . The current area per person of 0.12 hectares will drop to 0.09 hectares by 2020 as global population climbs."[34]

Threats to the environmental well-being of the world's waters and cropland have serious implications for human health. Certainly one of the most dismal facts about the world today is that so many people are starving for lack of food. One recent estimate suggests that 840 million people in the world are chronically malnourished and that this figure is only slightly better than the estimated 956 million hungry people in 1970.[35] Children bear the brunt of this problem. Children are seriously affected by malnourishment as it affects them daily and can impair their development. "In 50 countries with almost 40% of the world's people, more than one-fifth of children under the age of five are underweight," and in most of sub-Saharan Africa, more than 40 percent of children are underweight.[36] The United Nations estimates that if current trends continue, it would take more than 130 years to eradicate world hunger.[37]

Map: Nutrition, Atlas page 16

Map: Food Aid, Atlas page 19

Equally distressing are some signs that the problem is likely to get worse. From 1950 to 1975, world food production outpaced world population growth. But growth in food production slowed in the decade after 1975, raising doubts about how long adequate food supplies can be maintained.[38] Between 1950 and 1984, the world's production of grain grew at the rate of 3 percent a year, increasing the availability of grain on the global level by 40 percent. But during the 1990s, the growth in world grain production slowed substantially. At the same time, demand has increased steadily because of the addition of 90 million people a year and dramatically increasing affluence in much of Asia, especially China, which has a population of over 1 billion.

In addition to contributing to world hunger, the shrinking of natural resources relative to demand has the potential to contribute to international conflict. Conflict over fishing rights between Canada and Spain and over the control of oil resources between the United States and Iraq, as well as between Russia and Azerbaijan and China and several southeast Asia states, have either ended in war or violence has been threatened:

> The risk of violence over the allocation of shared water supplies is especially acute where fresh water is scarce, particularly where major river systems constitute the main source of water for two or more countries. The Nile, for example, is the main source of water for Egypt and Sudan, and a significant source for several other states; the Jordan River is vital to Israel and Jordan, while the Tigris-Euphrates system is a major source for Iraq, Syria, and Turkey. Because these states have failed to agree on the manner in which the flow of these rivers is to be divided among them, discord can arise whenever one country in a system appropriates more water than what others consider its fair share. That these countries often disagree on other matters only adds to the danger that disputes over water supplies will lead to conflict.[39]

In general, the developing world is already witnessing violent conflicts related to environmental scarcities.[40] "Within the lifetimes of our children and grandchildren, these environmental scarcities may cause widespread social disorder and violence, including war, revolution, ethnic violence, riots and coups that topple established governments."[41]

Overpopulation

The potential for food shortages and starvation (as well as many other global problems) on a massive scale seems to stem in important part from the rapid growth of the earth's population. It took from the beginning of the human species until 1804 for the world's population to reach 1 billion. The second billion was added in a little over 120 years (in 1927), and

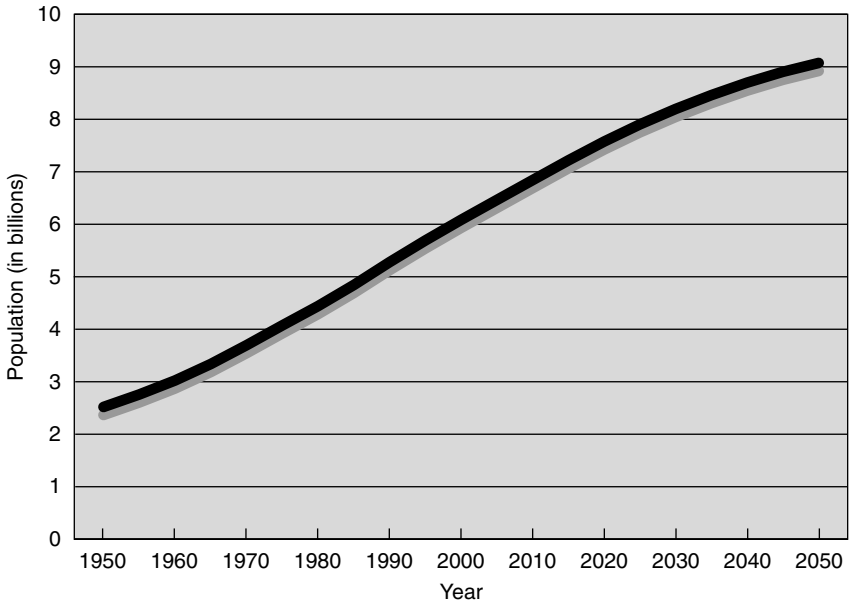

Figure 13.3 World Population, 1950–2050

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2004 Revision and World Urbanization Prospects: The 2003 Revision, http://esa.un.org/unpp, 08 November 2006; 1:32:03 PM.

the third billion took only a little over thirty years (1960). As shown in Figure 13.3, by 1974, the world's population reached 4 billion, the fifth billion was added in only thirteen more years (by 1987), and the sixth billion was added in just thirteen more (by 2000). The annual growth rate of the globe's total population was an average of 1.6 percent from 1975 to 1999. This declined to an average of 1.2 percent annual growth in 2000, a rate of growth that is expected to continue through 2015. Even with a decline in growth, the United Nations currently projects world population to reach 9.1 billion by 2050.[42] It is difficult to reverse population growth trends easily due to **population momentum.** Many years of high growth mean that more people will be entering their reproductive years in the future, giving more potential for growth.

Map: Population Density, Atlas pages 10 and 11

population momentum Tendency for population to continue to grow due to high numbers of individuals at childbearing age.

What makes the situation particularly problematic is that population grows fastest in areas of the world where poverty is stark. The six countries that accounted for half of the population growth in 2000 were India, China, Pakistan, Nigeria, Bangladesh, and Indonesia. Population increased by 69 percent in low-income countries between 1975 and 1999, compared to a 17 percent increase in high-income countries in the same period. Population experts agree that the population explosion has been brought about by two major factors, both related to economic development. One is the success of medical science. Population growth is a function of fewer people dying, rather than more people being born.[43] In 1650, the average life expectancy was only about thirty years. In 1968, it was about fifty-three years, and by 1999, it had increased to seventy.[44]

Map: Natural Population Increase, Atlas page 13

Nevertheless, great numbers of children still die at an early age, and this too adds pressure to the upward trend in population. Large families

Map: Birth Rate and Death Rate, Atlas page 12

fertility rate Average number of children born to women.

replacement level Fertility rate at which the number of children replace their mother and father.

demographic transition theory Proposition that population growth is significantly influenced by economic development effects on death rates and birthrates.

serve as a form of social security in many developing countries. Parents want to have several children to support them in their old age. And since the infant mortality rate is so high in many developing countries, they are likely to want to play it safe, adding more children to the family in anticipation of the early loss of several of them. Also, in some rural settings especially, children can be economic assets as agricultural laborers even before the parents reach old age, providing an added incentive for large families.[45] Thus, the **fertility rate** (the average number of children born to women) differs across levels of economic development. In low-income countries, the fertility rate is 3.7, while in high-income countries, the fertility rate is 1.7. Note that the fertility rate in the wealthier countries is lower than the **replacement level** (two children to replace their father and mother after they die). Below-replacement-level fertility rates mean that population levels will decline (some are already declining) in the high-income countries.

The **demographic transition theory** describes the relationship between economic development and population growth. In very poor, underdeveloped countries, death rates are high for lack of medical treatment, and birthrates are high because of high infant mortality and the need for many children to help provide for the family welfare. High death rates and birthrates make for little or no population growth. This is the situation the world as a whole was in before medical advances in the nineteenth and twentieth centuries. When states develop enough so that medicine that prolongs life expectancy is widely affordable, death rates fall, but birthrates remain high and population grows rapidly. This is the part of the transition that most of the developing countries are currently in. Once countries become more economically advanced, medicine that increases life expectancy and decreases infant mortality is available, and children are seen as economic drains rather than assets. Since modern welfare states provide old age insurance, people do not need to have many children to take care of them in their old age. In this final part of the demographic transition, which is where most developed countries are now, death rates and birthrates are low, making population growth minimal or even negative. Figure 13.4 graphically shows the demographic transition for Sweden and Sri Lanka, showing how, in both countries, death rates declined before birthrates, leading to population growth. Once birthrates decline, population growth slows, and even becomes negative when the death rate rises as the population ages. According to one economist, this transition is "one of the most fundamental of all social changes during the era of modern economic growth."[46]

The demographic transition theory does not completely capture population dynamics. Many countries have experienced a decline in birthrates prior to high economic development, and others continue to have steady birthrates despite economic development. The theory leaves out many factors beyond economics that play a role in fertility decisions, such as culture, access to and attitudes toward birth control, and government

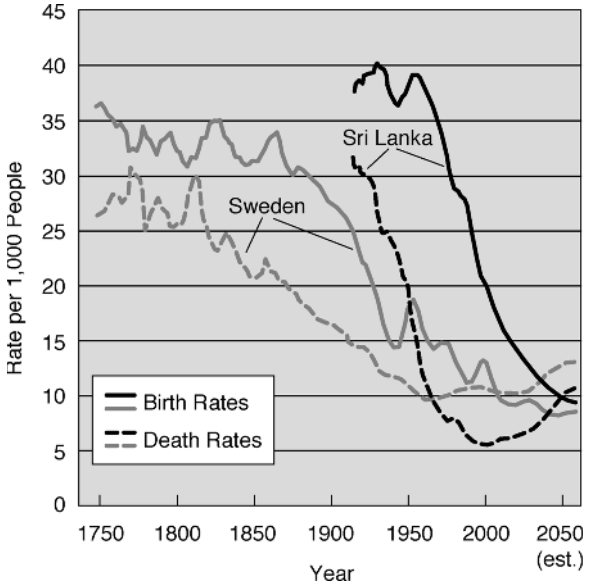

Figure 13.4 Demographic Transition: Birth and Death Rates in Sweden (1750–2050) and Sri Lanka (1910–2050)

Source: Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World,* p. 46. Copyright © 2001. Reprinted with the permission of Cambridge University Press.

population policies.[47] What seems particularly critical to lowering birthrates is the status of women. "Education, particularly of girls, has been shown to be the factor most closely related to fertility decline, by delaying marriage and first births. Increasing equality between the sexes in legal, economic, and social affairs raises the cost of children by making roles other than childbearing more feasible and attractive to women."[48] Recognizing the importance of women's status, the World Population Conference held in Cairo in 1994 emphasized raising women's status as the key to reducing birthrates.

Controlling population has become a critical issue for high-growth states. Large populations place more pressure on environmental systems and make economic development more difficult. Population growth also contributes to social and political conflict within and between states. The population density of Bangladesh, for example, is more than 1,000 people per square kilometer. The state of Assam in India, just across the border, has approximately 340 people per square kilometer, resulting in a massive migration of Bengalis to Assam. Recurring attacks in India against Bengalis are in part related to this demographic pressure.[49]

Assessments of the Challenges: Optimists and Pessimists

Part of the debate on how to respond to environmental challenges like population growth and shrinking natural resources has revolved around the question of the severity of the problems. The disparity of opinions in the various analyses of the future of the globe is disconcerting. The opinions exist on a full range of pessimism to optimism. "It appears,"

one informed analyst of such work concludes, "that highly intelligent individuals, who presumably read each other's work and who appear to respond to one another, are not convincing one another, and perhaps are not even communicating."[50] What is a concerned citizen of the world to believe?

Predicting the future of the world over the next twenty, fifty, or one hundred years is obviously tricky. But the debate between pessimists and optimists for the world's future is not for lack of studies on the problems. On the contrary, mountains of data are available to any seriously interested person. Choices must be made, and these choices should be based in part on estimates about the future impact of current trends, as well as on the probable effects of the different options that are available. It is incumbent on all those who are responsible for these choices and concerned about the fate of the planet to reduce to a minimum the extent to which these choices are based on ignorance or uninformed guesswork, even if it is also advisable for everyone involved in the debate to remember that he or she could be wrong. With that in mind, let us turn to an evaluation of the arguments made by the optimists and the pessimists.

Food Supplies

It would be easy, considering the headlines in the past decade concerning famine in Africa, to conclude that the pessimistic predictions made in the 1970s about food supplies are beginning to be realized. Some observers, for example, predicted that land for agricultural use would be intolerably scarce by the middle of the twenty-first century. These predictions, made in the late 1970s and early 1980s, were based in part on rising grain prices, but these prices fell unexpectedly and dramatically in the 1980s.[51] Such predictions have by now a rather lengthy history among those who are pessimistic about the future with respect to these problems. Paul Ehrlich made an international reputation for himself with the 1968 publication of *The Population Bomb,* in which he predicted that "the battle to feed humanity is already lost, in the sense that we will not be able to prevent large-scale famines in the next decade."[52] He claimed that general famine was certain to strike even the United States by the 1980s, and that millions or even billions would have starved to death in developing countries by that time. On the optimistic side of coin, one estimate suggests that "we [meaning we, the people of the earth] can grow nine or ten times as much food as we do now, using only conventional agriculture without damaging the environment and without spending more than a percent or two of our income. . . . It is quite reasonable to believe that we could grow . . . enough food for high quality diets for 100 billion people."[53] A study by the UN Food and Agriculture Organization is less optimistic, although it does conclude that "using modern agriculture methods the Third World could support more than 30 billion

people."[54] Similarly, the well-known optimist in these matters, Julian Simon, argues that at our current levels of agricultural efficiency, "the entire present population of the world can be supplied from a square area about 140 miles on a side about the area of Massachusetts and Vermont combined, and less than a tenth of Texas."[55] He also points out, less speculatively, that "the record of food production entirely contradicts the scary forecasts. The world trend in recent decades shows unmistakably an increase in food production per person."[56]

Perhaps the optimists on this point are and have been too optimistic. But any evaluation of contrasting opinions on this point should take into account that while pessimists have consistently been predicting disaster, "what the United Nations defines as 'chronic malnutrition' has declined 16 percent" since the 1960s.[57] In addition, the United Nations reports that "fifty-seven countries, with half of the world's people, have halved hunger or are on track to do so by 2015."[58] Even quite gross optimistic errors would not undermine the basic conclusion that the world will, in the coming decades, be able to produce enough food to prevent massive famines or catastrophically escalating food prices.

This does not mean, however, that chronic food shortages and famine are not a problem for many states and for the global community. As economist Amartya Sen points out, "Starvation is the characteristic of some people not *having* enough food to eat. It is not the characteristic of there *being* not enough food to eat. While the latter can be a cause of the former, it is but one of many *possible* causes."[59] If there is enough food in the environment, starvation and famine become problems of economic entitlement, ownership and access, distribution networks, and domestic and international politics.[60]

Population Growth

The history of demographic predictions is replete with errors and marked by continuing modifications. The predictions of Thomas Malthus in the nineteenth century, for example, proved to be very misleading. One recent analysis of Cassandras (those who predict disaster) among population experts notes that

> *The Population Bomb* appeared twenty-five years ago. . . . Written by the biologist Paul Ehrlich . . . it was a gloomy book for a gloomy time. A new Dark Age would [according to Ehrlich] cloud the world, and "men [would] have to kill and eat one another." A well-regarded book, *Famine 1975!* predicted that hunger would wipe out the Third World that year. . . . In 1972 a group of researchers at MIT . . . [issued] *The Limits to Growth,* which used advanced computer models to project that the world would run out of gold in 1981, oil in 1992, and arable land in 2000. Civilization itself would collapse by 2070.[61]

Map: World Population, Atlas pages 34 and 35

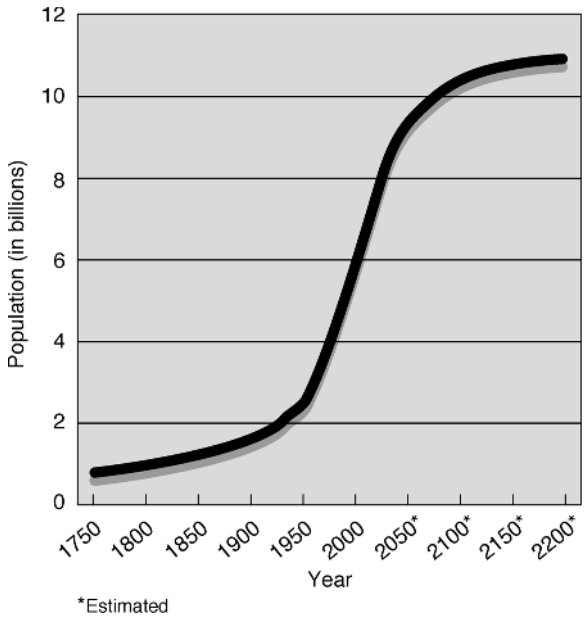

Figure 13.5 World Population, 1750–2200

Source: Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World*, p. 46. Copyright © 2001. Reprinted with the permission of Cambridge University Press.

Despite these gloomy warnings, which relied in part on rapid population growth, the UN Population Division in 1975, for the first time in its history, revised its estimate of future population growth downward, basing its conclusions on data from 1973. Previously it had predicted that by the year 2000, the world's population would be about 6.5 billion. In 1975, it pointed out that recent trends indicated that the figure would be closer to 6.3 billion.[62] "The evidence from the late 1970s and 1980s seems to clinch [the] idea . . . that world population growth rates peaked in the 1960s."[63] In fact, from 1965–1970 to 1980–1985, fertility in poor countries decreased by 30 percent. "If the decrease continues, it will surely be the most astonishing demographic shift in history."[64] Figure 13.5 demonstrates the "S-curve" shape of predicted population levels, with growth leveling off around the middle of the twenty-first century.

Population estimates have often been wrong in the past, and the latest predictions may be wrong, too. But even if the population of the world grows much faster than expected, disaster, in terms of food supplies or other aspects of the quality of life, will not necessarily result.[65] It is quite commonly pointed out that "the parts of the world that have done most poorly economically are also those where projected population growth rates are the highest."[66] But it is quite possible that poverty leads to population growth, not the opposite. Indeed, some studies "have found no association between the population growth rate and per capita income growth rate" and "the empirical evidence thus indicates no negative correlation between the rate of population growth and the standard

of living."[67] Julian Simon insists that population "density has a *positive* effect on the rate of economic growth" and that, more fundamentally,

> the standard of living has risen along with the size of the world's population since the beginning of recorded time. And with increases in . . . population have come less severe shortages, lower costs, and an increased availability of resources, including a cleaner environment, and greater access to natural recreational areas. And there is no convincing reason why these trends toward a better life . . . should not continue indefinitely.[68]

None of the preceding discussion should be taken to mean that every population control program will not contribute to economic growth. In many developing countries, such as Mexico, Egypt, and India, rapid population growth continues, and bringing it under control is almost certainly a desirable goal. At the same time, however, it is clear that the predictions made during the 1960s and 1970s about impending planet-wide disasters resulting from population growth outstripping the world's food production capabilities seem unduly alarmist.

Reserves of Natural Resources

Similarly, the dire warnings about energy resources in the 1970s confronted overwhelmingly contrary evidence in the 1980s. Consider first the most publicized warnings of the 1970s—those regarding oil. After OPEC successfully quadrupled the price of oil in the winter of 1973, those that advocated a halt to economic growth as a way of preserving natural resources used the price increase as proof that the world's supply of energy resources was running low. But in fact, the increase proved no such thing. The members of OPEC were not running out of oil; they were just charging more for it. Their cost of production was still about $.10 a barrel, even though they were charging $10 a barrel. The world production of oil actually increased by 8 percent in 1973.[69] OPEC raised the price of oil again in 1979, from about $12 a barrel to nearly $40 a barrel. Shortages again developed, and panic spread. But in the mid-1980s, Saudi Arabia and other OPEC members, as well as non-OPEC countries, were flooding the world with cheap oil in attempts to gain larger shares of the market. In addition, changes in the manufacturing processes and shifts in the large economies away from manufacturing to service industries created less of a demand. As a result, the price of a barrel of oil fell from a high of around $39 to around $10 in the early 1980s. Although the price shot up again to almost $40 a barrel during the Persian Gulf crisis in 1991, it dropped to precrisis levels fairly quickly. Since 1999, the world has seen a steady increase in the price of oil, particularly since 2003 (see Figure 13.6). In 2006, oil prices were quite high, reaching over $70 per barrel, but still lower than the 1980s peak of prices, when adjusted for inflation. The recent rise in prices is attributed to increased demand (particularly in China), decreased

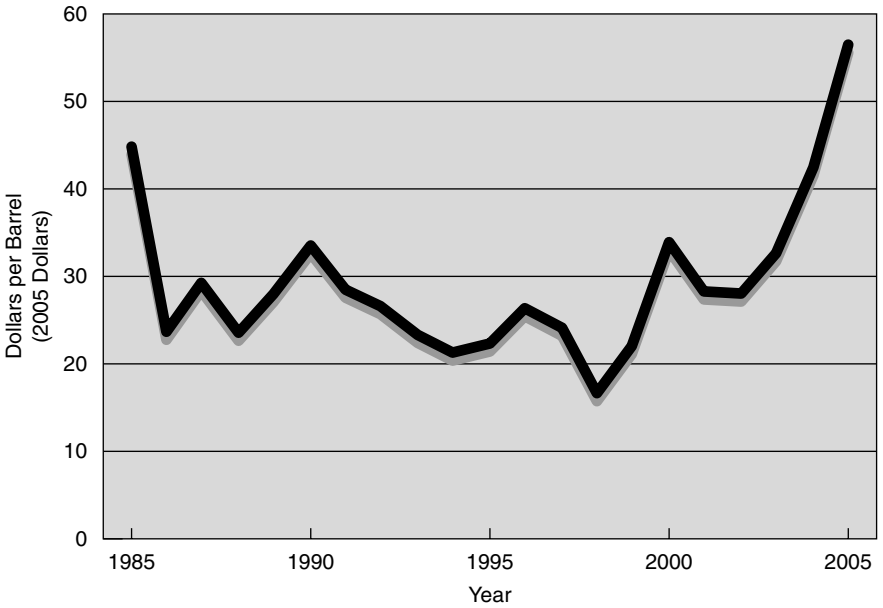

Figure 13.6 Spot Crude Oil Prices, 1985–2005
Note: Reflects West Texas Intermediate Price

Source: As seen in *Vital Signs 2006/2007: The Trends That Are Shaping Our Future* 1985–2004 from Platts, cited in BP, *Statistical Review of World Energy 2005* (London: 2005), p. 14. 2005 from U.S. Energy Information Administration, "Short Term Energy Outlook," 7 February 2006. Deflated using the U.S. Bureau of Economic Analysis's U.S. Implicit GNP Price Deflator.

Map: Mineral Fuels, Atlas pages 22 and 23

spare oil production capacity, and the political events, crises, and natural disasters that have disrupted production or threaten to disrupt future production.[70]

Oil was not the only natural resource that went from shortages in the 1970s to a global glut in the 1980s. In 1985, the *New York Times* reported that "in London, an eerie silence hangs over the tin trading ring at the Metal Exchange; trading has been halted because there are simply not enough buyers for the vast quantities of tin that producers . . . keep turning out." There were also significant declines in the prices of aluminum and copper in the first half of the 1980s.[71] "Whereas fears that the world would run out of metals and other minerals were common even fifteen years ago, the potential supply of these resources is now outstripping demand. Prices of minerals have shown a fairly consistent downward trend over the past one hundred years. They fell sharply in the 1980s, leading to gluts that threatened to impoverish countries dependent on commodity exports."[72]

One reason that pessimistic predictions of long-term shortages made in the 1970s looked rather ridiculous by the 1990s is that they were based on estimates of known reserves of the various raw materials in question. But these estimates provide a misleading basis for such predictions.[73] For example, we now know that for resource after resource, estimates of known reserves made in the 1950s proved by 1970 to be drastically low.[74] This degree of underestimation happens with regularity, in part because of the economic incentives operating on those who gather data on known reserves. Usually the original sources of such data are companies interested in the commercial exploitation of a given resource. Once a

company has located reserves that are projected to last, say, thirty years, it is unlikely even to attempt to find additional reserves for at least two important reasons. First, since the company will not be able to sell those reserves for thirty years, there is little incentive to spend time and energy locating them. Second, if known reserves become too abundant, they exert a strong downward pressure on the price of that resource.

The strength of this pattern was, arguably at least, revealed in the outcome of an interesting public wager in the 1980s between economist Julian Simon and ecologist Paul Ehrlich, well known for their optimistic and pessimistic viewpoints, respectively: "In 1980 an ecologist and an economist chose a refreshingly unacademic way to resolve their differences. They bet $1,000. Specifically the bet was over the future price of five metals, but at stake was much more a view of the planet's ultimate limits, a vision of humanity's destiny."[75] Ehrlich selected five metals—chrome, copper, nickel, tin, and tungsten—and bet $1,000 that in ten years, the prices of those metals would be higher. Simon bet $1,000 that they would be lower. By 1990, Ehrlich's five metals had declined in price, and Ehrlich mailed a check to Simon.[76]

For many resources, pessimistic predictions have emanated from various quarters about the imminent depletion of some vital commodity. Table 13.1 shows an interesting series of predictions about the depletion of oil reserves in the United States. Although the table covers only the period from 1866 to 1949, it could easily be extended. For example, "in 1979 the United States Central Intelligence Agency concluded that global oil 'output must fall within a decade ahead' and that the world 'does not have years in which to make a smooth transition to alternative energy sources.' In essence, the CIA experts were arguing that the world's primary energy supply needed to be converted to a different source within months, an utter impossibility. A generation later, oil output is more than 10 percent higher than it was in 1979."[77] The forecasts of the 1970s and early 1980s that oil prices would soon reach $50 to $100 a barrel and that oil and energy sources would soon be physically depleted look drastically premature at best. In fact, today's known reserves are at the highest level (see Figure 13.7).[78] In light of these data, even most pessimists no longer argue that the world is in imminent danger of running short of oil. Paradoxically (but, as we have, seen, actually quite predictably), both fossil fuel consumption *and* proven reserves have steadily increased through the past fifty years or so.

Map: Economics and Energy, Atlas pages 32 and 33

In general, optimists seem on fairly firm ground when they assert that "the potential supplies of all the important minerals are sufficient for many lifetimes."[79] Still, pessimists have a valid point when they emphasize that over 50 percent of the global oil reserves are estimated to be in the Middle East, a region currently vulnerable to political instability and conflict. It is possible that market forces will ultimately solve this problem, that the concentration of current known reserves will spark the discovery of huge reserves outside the Persian Gulf,[80] and that the

TABLE 13.1

A Short History of Predictions About U.S. Oil Supplies, 1866–1949

Date	Prediction	What Actually Happened
1866	Synthetics available if oil production should end (U.S. Revenue Commission)	In next 82 years, the United States produced 37 billion barrels with no need for synthetics
1885	Little or no chance of oil in California (U.S. Geological Survey)	8 billion barrels produced in California since that date, with important new findings in 1948
1891	Little or no chance of oil in Kansas or Texas (U.S. Geological Survey)	14 billion barrels produced in these two states since 1891
1908	Maximum future supply of 22.5 billion barrels (officials of U.S. Geological Survey)	35 billion barrels produced since 1908, with 26.8-billion-barrel reserve proven and available on January 1, 1949
1914	Total future production only 5.7 billion barrels (official of U.S. Bureau of Mines)	34 billion barrels produced since 1914, or six times this prediction
1920	U.S. needs foreign oil and synthetics: peak domestic production almost reached (director of U.S. Geological Survey)	1948 U.S. production in excess of U.S. consumption and more than four times 1920 output
1931	Must import as much foreign oil as possible to save domestic supply (secretary of the interior)	During the next 8 years, imports were discouraged, and 14 billion barrels were found in the United States
1939	U.S. oil supplies will last only 13 years (radio broadcasts by Department of the Interior)	New oil found since 1939 exceeds the 13-year supply known at that time
1947	Sufficient oil cannot be found in United States (chief of Petroleum Division, State Department)	4.3 billion barrels found in 1948, the largest volume in history and twice our consumption
1949	End of oil supply almost in sight (secretary of the interior)	Petroleum industry demonstrated ability to increase U.S. production by more than 1 million barrels daily in the next 5 years

Source: Presidential Energy Program, Hearings Before the Subcommittee on Energy and Power of the Committee on Interstate and Foreign Commerce, House of Representatives. First sessions on the implication of the President's proposals on the Energy Independence Act of 1975. Serial no. 94-20, p. 643. Washington, D.C.: U.S. Government Printing Office, February 17, 18, 20, 21, 1975.

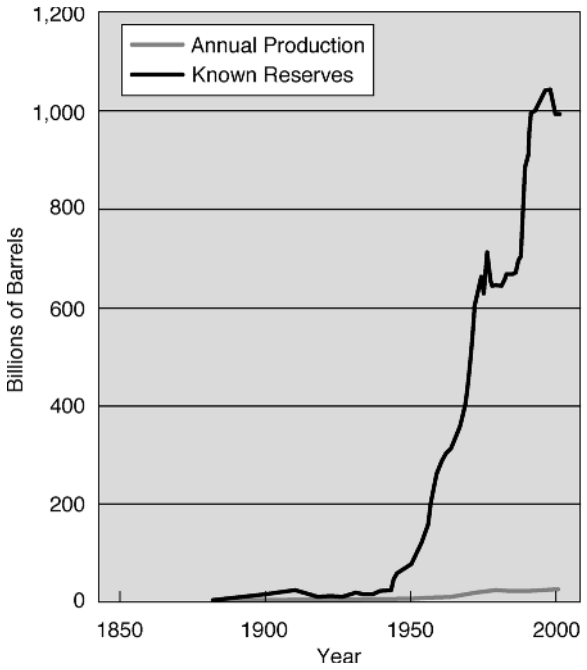

Figure 13.7 World's Known Oil Reserves and World Oil Production, 1920–2000

Source: Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World,* p. 124. Copyright © 2001. Reprinted with the permission of Cambridge University Press.

world's supply of inexpensive, readily accessible oil will continue well into the twenty-first century. But it might be prudent to develop alternative sources of energy, even if the world is not about to run out of oil, given the role of fossil fuel in other environmental challenges.

Pollution and Climate Change

Pessimistic predictions about the impact of various forms of pollution on the global atmosphere are difficult to ignore, even though they are based on scanty evidence. That evidence is often weak because pollution is a relatively recent concern, and data on relevant problems rarely go back more than twenty to thirty years. However, the most cataclysmic predictions cannot be discounted or discredited just because hard evidence is so hard to come by. The predictions could turn out to be true.

There has been considerable debate over predictions of the greenhouse effect. For one thing, it is not entirely clear that industrialization on a worldwide scale will have a warming effect on the global climate. Climatologists do not have a particularly impressive record of prognostication. Apparently they were predominantly of the opinion in the 1930s that there was a global warming trend. Spencer Weart, a specialist in the history of physics, asserts that the greenhouse effect rhetoric of the 1930s was virtually identical to that of the 1980s and 1990s—"of irreversible damage, of humankind overstepping its bounds in horrifying fashion."[81] Unfortunately for the credibility of the forecasts in the 1930s, the world

immediately got colder. The global temperature declined from the 1940s to the 1970s, with the winter of 1977 being the coldest in a century in North America. These data too had an apparent impact on forecasts about the future of the globe's climate. In 1971, one analyst expressed his opinion that "global air pollution, through its effect on the reflectivity of the earth, is currently dominant and is responsible for the temperature decline of the past decade or two."[82] And one article in 1975 suggested that "the threat of a new ice age must now stand alongside nuclear war as a likely source of wholesale death and misery for mankind."[83] In fact, "many of the same persons who [warned] about global *cooling* are the same climatologists who are now warning of global *warming*."[84]

This is not the context in which to attempt to sort out or evaluate comprehensively the opposing arguments about global warming. Let us instead examine here a couple of reasons why the issue is so difficult to resolve. First, global climate processes are so complex and affected by so many countervailing factors that making predictions about their future course is risky.[85] Tropical deforestation, for example, continues at an alarming rate and may make an important contribution to global warming. Less noted is the fact that in North America and Eurasia, forests are growing larger. "The expanding boreal forests of North America and Eurasia are much larger than the rainforests of the tropics . . . growing trees absorb substantial amounts of carbon dioxide."[86]

Then, too, human activities and impacts on the global climate may be dwarfed or minimized by natural processes. About 200 billion tons of carbon are emitted into the atmosphere by natural processes like volcanic eruptions, plant decay, and forest fires. Almost exactly that same amount is removed from the atmosphere every year, also by natural processes "breathed in" by trees or taken from the air by ocean plankton, for example. Human activities contribute about 7 billion tons of carbon annually. That is only about 3.3 percent of the amount produced by natural processes. Can such a relatively insignificant amount have the substantial impact on global climate that global warming theorists suggest? Skeptics wonder and also question the predictions that global warming will result in the dire consequences of decreased agricultural production, global sea level rise and flooding, extreme weather, and increased tropical diseases.[87]

An additional aspect of the global warming debate concerns the relationship between pollution and economic growth. Economic growth is perceived to be part of the problem by many, but it may be that growth is an important part of the solution. In the early stages of industrialization, economies are not wealthy enough to pay the costs of environmental protection.[88] As a result, although it is difficult to prove that things were worse in the previous times, because there are virtually no precise measures of pollution from the nineteenth century, pollution was a serious problem even then. Charles Dickens, for example, in his novel *Hard Times,* describes nineteenth-century Coketown (actually Preston, England) in these terms: "It was a town of machinery and tall chimneys, out of which

A protester from the environmental group Friends of the Earth wears a mask during a demonstration in Hong Kong's business district, urging drivers to shut off idling engines. Residents of cities such as Hong Kong, Beijing, Bangkok, and Mexico City often wear masks to protect their health from significant air pollution.
(© Bobby Yip/Corbis)

interminable serpents of smoke trailed themselves for ever and ever, and never got uncoiled. It had a black canal in it, and a river that ran purple with ill-smelling dye, and vast piles of buildings full of windows, where there was a rattling and a trembling all day long."[89]

Meanwhile, things were unpleasant in another budding nineteenth-century industrial power, the United States. Its largest industrial center was New York City, with some 300 foundries and machine shops and a printing industry powered by 125 steam engines, refineries, and tanneries. "The crux of New York's filthy air was Hunter's Point, on the rim of the Bronx. Grievous odors from the Point poured over Manhattan, affecting all who lived there regardless of rank or address."[90] There apparently was a lively controversy in those days about whether New York was more grievously afflicted with pollution than was Chicago. The Chicago River was reportedly polluted with grease so thick on its surface it seemed to be a liquid rainbow.

A comparison of contemporary developing societies with industrialized countries provides additional support for the assertion that economic growth and environmental deterioration do not necessarily go hand in hand. For example, developing states typically have water pollution problems, brought about by poor sanitation systems, that are more serious than those of industrialized societies. Fatal illnesses related to the consumption of impure water are extremely rare in richer countries, whereas dysentery and more serious diseases are common in most poor states. The crowding in the slums of major cities in many poor countries creates additional serious pollution problems. Economic growth may exacerbate some pollution problems for poor countries in the short run, but

ultimately such growth is likely to be a necessary condition for the alleviation of pollution.

In 1992, the World Bank published a study of the relationship between economic growth and pollution, and it revealed that "some problems decline as income increases."[91] It is also true that as per capita income increases, "some problems initially worsen but then improve as incomes rise."[92] A report in *Scientific American* points out that a study by two researchers at Princeton University found that in cities around the world, sulfur dioxide pollution fell as per capita income rose.[93] The World Bank data do show that municipal wastes per capita and carbon dioxide emissions per capita are two kinds of pollution that increase as per capita income increases.

Economic growth, then, while certainly capable of damaging the environment, also can lead to environmental improvements. And even rather stringent steps to protect the environment need not stifle economic growth. In fact, energy conservation, which can, for example, decrease the amount of carbon dioxide emitted into the atmosphere, can also increase the efficiency of an economy and even speed up growth. In 1974, in the wake of the first OPEC-induced energy crisis, a Ford Foundation study predicted that if current trends continued, energy use in the United States would double between 1970 and 1987. It also predicted that even if the United States adopted a "zero-growth policy option," energy use would still increase about 20 percent. Instead, energy consumption decreased from 1970 to 1987, while the economy grew more than 35 percent.

Still, the debate over global warming and the role of economic development may subside in future years as more and better evidence becomes available. In 1995, "in an important shift of scientific judgment, experts advising the world's governments on climate change are saying for the first time that human activity is a likely cause of the warming of the global atmosphere."[94] The story refers to a report published by the Intergovernmental Panel on Climate Change (IPCC), consisting of more than two thousand scientists assembled by the United Nations to advise the world's governments on climate policy. According to an analyst from the Worldwatch Institute, "Sophisticated computer modeling and actual measurements of the atmosphere are now converging with uncanny accuracy . . . increasingly the computer answers are corroborated by direct observation. By 1995, the fit looked too close to be pure coincidence; the . . . IPCC . . . concluded that human activity is warming the earth."[95]

Complex Relationships Connecting Environmental Challenges

One of the most pessimistic perspectives on the environmental challenges facing the globe points out the difficulty of solving one problem without causing another to worsen. In the 1970s, the results of an analysis of all

these problems based on a computer simulation of the world were published in a report titled *The Limits to Growth,* which has provoked a torrent of both praise and criticism that continues to this day; it has sold more than 30 million copies in thirty languages since it was published in 1972.[96]

Computer simulations of social systems allow social scientists a form of experimentation that would not otherwise be possible.[97] Once a simulation is operational, it can be used to obtain answers to a multitude of questions such as, What would happen if the world were this way? The answers are quite often surprising, because social systems can behave in a counterintuitive manner. Actions designed to solve problems may have no effect or may make the problems worse.[98]

The world system, according to the designers of *The Limits to Growth* simulation, operates in just such a counterintuitive fashion. Measures that seem designed to alleviate problems actually make them worse or have an impact on other parts of the system that creates even worse problems. Given the rampant poverty and starvation in the global system, for example, a seemingly logical solution would involve substantially increased food production and economic development. But *The Limits to Growth* simulation shows that the ultimate result of accelerated food production and economic development on a global basis would be disastrous. Increased economic growth would help alleviate poverty and starvation in the short run, but in the long run (over the next hundred years or so), it would exacerbate all the other problems in the system. Since more food would be available, the population would grow faster. In time, increases in per capita gross national product (GNP) would help bring the population under control, but the same rising GNP would accelerate depletion of natural resources and dramatically increase levels of pollution.

Part of the problem with the economic growth solution is that it depletes the earth's natural resources. What if, through intensified exploration, the amount of available natural resources doubled? According to *The Limits to Growth,* a rise in available resources would allow industrialization to accelerate until pollution reached dangerous levels. And even if the amount of natural resources doubled, growth would be so rapid that these reserves would be used up in a few years. Even with the more optimistic assumptions that nuclear energy will permanently satisfy the world's energy needs and that recycling programs will conserve supplies of natural resources effectively, the world's population is still doomed to a sad end. Pollution again will lead the system to collapse within a hundred years.

At the root of many of these dilemmas, it seems, is the population explosion. But in the simulated world of *The Limits to Growth,* the ultimate impact of zero population growth would be disastrous. Industrial growth would accelerate as capital accumulation was facilitated by the decreased pressure of the population explosion. Eventual depletion of nonrenewable resources would bring a sudden collapse of the industrial system.[99]

There is just one problem left unattacked. Surely it would seem that pollution control can have only good results. In the simulation, pollution controls would allow industrialization levels to reach heights unattainable in a world that would otherwise have choked to death. Because people would no longer die of emphysema, cancer, lead poisoning, birth defects, and other pollution-related diseases, population growth would continue. Ultimately, food production would not be able to keep up with the population growth, arable land would be depleted, and within the next hundred years the system would collapse.

Is there no escape? There is, according to the authors of *The Limits to Growth,* but the path entails a drastically new and comprehensive approach to the world's problems. Pollution controls must be implemented. Population control is necessary. Natural resources should be conserved. But even if all these measures are successfully implemented, ultimately industrial growth is halted, and the death rate rises as resources are depleted, pollution accumulates, and food production declines.[100] If the world is to avoid disaster, conservation and pollution control must be combined with a halt in economic growth. There are limits to growth, and the world is on the verge of reaching those limits. If economic growth is not checked, disaster is inevitable.

The Limits to Growth simulation has attracted imitators and critics since it appeared about thirty years ago. Its dire predictions were based on evidence that was questioned on a number of grounds, such as those discussed earlier in the chapter. Its value, however, was to point out the difficult balancing act that the global community must undertake if it believes that these global challenges are severe enough to warrant solutions.

The scientific debate over the severity of environmental problems and the consequences of possible solutions has affected efforts by the international community to deal with these global issues:

> Science has received particular attention as a force promoting environmental cooperation. . . . Scientists certainly do influence international negotiations, not least because scientists' methods and rules of . . . legitimacy are an alternative to strictly interest-based bargaining. That said, those methods and rules do not prevent bias and partiality in the arguments and facts scientists offer and even less prevent policy-makers from selectively using or ignoring science to support interest-based positions.[101]

The Politics of Environmental Cooperation

Despite the uncertainty of the problems, the international community has been concerned enough to put many environmental issues on the global agenda. The first major international environmental meeting, the

UN Stockholm Conference in 1972, has been followed by a number of additional efforts at environmental cooperation:

> Spurred on by the success of Stockholm, the remainder of the 1970s saw a proliferation of international environmental treaties addressing mostly conventional or "first generation" environmental issues such as air or water pollution. . . . Wildlife conservation and habitat protection also took a front seat in the 1970s. . . . As the 1980s approached, the conventional issues of air pollution gave way to . . . a "second generation" of environmental issues involving more complex and global processes inextricably connected with development issues. Many of the conventions of the 1980s and 1990s required more global consensus. Examples include the Vienna Convention on the Protection of the Ozone Layer, and the related **Montreal Protocol**. . . . Also critical during the 1980s was negotiation of the **UN Convention on the Law of the Sea,** which set out a broad constitution for the oceans including critical provisions on protecting the ocean environment. . . . The **Framework Convention on Climate Change** (1992) and the **Convention on Biological Diversity** (1992) are all further examples of the complicated and global approach now occupying much of international environmental treaty-making.[102]

Montreal Protocol 1987 treaty requiring reductions in use of CFCs and, later, almost all ozone-depleting substances.

UN Convention on the Law of the Sea Treaty adopted in 1982 with broad rules on protecting the ocean environment.

Framework Convention on Climate Change 1992 agreement among industrialized states to work toward reduction of greenhouse emissions.

Convention on Biological Diversity Treaty requiring national strategies for conservation of a variety of species and plants, genetic variations, and ecosystems.

The biodiversity and climate change agreements were concluded at the same time as the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 (often referred to as the Rio Summit or the Earth Summit). This was the most significant global meeting on the environment to date, with over a hundred heads of state in attendance, in addition to over a thousand representatives of nongovernmental organizations. The conference resulted in

> a nonbinding agreement called Agenda 21 (referring to the twenty-first century), which is a global plan of action. . . . Negotiations on Agenda 21 were the broadest and most complex international talks ever held. The 294-page comprehensive Agenda 21 encompassed every sectoral environmental issue as well as international policies affecting both environment and development, and the full range of domestic social and economic policies, all adding up to 38 chapters and 115 separate topics. The conference also produced two nonbinding sets of principles—the Rio Declaration on Environment and Development and the Statement of Forest Principles—that helped create norms and expectations.[103]

Kyoto Protocol 1997 treaty that calls for industrialized countries to reduce greenhouse gas emissions.

Following the summit in Rio, the Framework Convention on Climate Change led to intense negotiations that ultimately resulted in the 1997 **Kyoto Protocol,** which calls for industrialized countries to reduce their

greenhouse gas emissions by at least 5 percent by 2012. Some countries are targeted to reduce their emissions by as much as 8 percent. One of the controversial aspects of the protocol concerns the allowance of emission credits. Some states such as Russia and the developing world were not obliged to reduce emissions and could sell their credits to countries that were obliged to reduce emissions. The fact that developing states, which will contribute to greenhouse emissions in the near future as they industrialize, were not required to curb emissions led the United States (the largest greenhouse gas producer) to announce in 2001 that it would refuse to ratify the Kyoto Protocol. The protocol went into effect in February 2005 when the states that account for 55 percent of the carbon emissions for the top-emitting group of states ratified the treaty, although many of these states have not made much progress at meeting their Kyoto targets. "The future of the climate change regime still hangs in the balance. Nevertheless, what was once criticized by many to be void of any potential for success has shown the world that progress indeed remains possible. . . . Although major issues remain, the continued injection of science into the policymaking process, along with necessary financial and technical assistance to the developing countries, may help the various veto coalitions to make the necessary compromises for a strong climate change regime in the future."[104] The United States and Australia are the only industrialized countries not participating in the agreement. The Policy Choices box outlines some of the arguments for and against the Kyoto Protocol.

In 2002, states gathered in Johannesburg, South Africa, for the UN World Summit on Sustainable Development and produced a sixty-five-page plan of action that critics say was too ambiguous to provide concrete guidelines for future environmental protection.[105]

The Environment as Collective Goods and Common Pools

These efforts at environmental cooperation have not been easy, and many believe that most have largely failed to address some of the most challenging global environmental issues. Why this is so is best illustrated by a metaphor known as the **tragedy of the commons.** Garrett Hardin, a human ecologist, first used the phrase *tragedy of the commons* in 1968 to describe overgrazing in nineteenth-century English villages. As Hardin explains, the tragedy of the commons develops when there is a pasture in a community open to all and each herder must decide whether to add one more animal to his or her herd of cattle. All the gain from a decision to do so will go to that herder, but the cost of that decision, overgrazing on the pasture, is shared by all the herders. Because all of the gain goes to one herder but the costs are shared by all, each herder is then tempted to add to his or her herd as well. If each herder makes that decision, which

tragedy of the commons Metaphor used to describe the difficulty of achieving cooperation on natural resources that would have long-term benefits for all, given the short-term benefits of resource exploitation to individuals.

POLICY CHOICES

Supporting the Kyoto Protocol

ISSUE: Signed in December 1997, the Kyoto Protocol to the Framework Convention on Climate Change called for a worldwide reduction of emissions of carbon-based gases by an average 5.2 percent below 1990 levels by 2012, although different countries adopted different targets. Although many countries have ratified the protocol, there has been much internal debate about ratification in many countries, and some countries, including countries responsible for large emissions, have not ratified the Kyoto Protocol. The debate illustrates the difficulties in environmental cooperation.

Option #1: All countries should support and ratify the Kyoto Protocol.

Arguments: (a) Emissions of carbon-based gases are contributing to global warming, with disastrous consequences for the future. (b) It is necessary for all major industrialized states to support the protocol, especially large states like the United States, because they are responsible for the majority of emissions. (c) Not supporting the agreement means becoming isolated on the environmental issue, which might jeopardize efforts to achieve cooperation on other issues.

Counterarguments: (a) The evidence linking carbon-based emissions to global warming and climate change has been mixed. (b) The industrialized states can still continue to produce large emissions under Kyoto, because the protocol allows for large-emissions-producing states to trade credits with low-emissions-producing states. (c) States must look out for their own interests and cooperate on an issue by-issue basis.

Option #2: States should not support and ratify the Kyoto Protocol if it is not in their interests.

Arguments: (a) The developed world is not required to curb emissions, but some developing states, such as China, will likely contribute significantly to global emissions in the future. (b) Meeting the Kyoto targets and paying the penalties if they are not met are too costly to business and the economy. (c) There are alternative ways, such as voluntary programs, that states can encourage to help solve the global warming problem.

Counterarguments: (a) It would be too costly for the developing states to join Kyoto now. It is assumed that the developing world will one day join the protocol; in the meantime, the European Union has pledged a fund to help them clean their emissions. (b) Investing now in emission-reducing technologies will make for more efficient, and profitable, economies in the future. (c) Voluntary programs do not work. Although enforcement is not possible, there must be agreed-on rules, incentives, and penalties to facilitate cooperation on an issue that is in the interest of all.

is rational on the individual level, collectively they will ruin the pasture for everybody by overgrazing.[106]

Similarly, all states would be better off if, for example, pollution-creating activities were curbed. But each state individually can manufacture a product in a manner unrestricted by expensive pollution controls and thus put the product on the international market at a low price. All the profits from the sales of that product will go to the polluting state, but

the cost—the increasingly polluted atmosphere—is shared by all. Because each country can see a clear profit for itself from manufacturing a product without pollution controls, all states are tempted, rationally, to take steps that collectively will ruin the atmosphere for the entire globe. That temptation reaches nearly irresistible proportions in the light of the fact that no one state (with possible exceptions such as the huge economies of the United States and Japan) can by itself do enough harm to really matter, or enough good by restraining its polluting activities.

Although the parallels between Hardin's example of the nineteenth-century English commons and contemporary international environmental problems are clear, many caution against the conclusion that states are necessarily caught in a "tragedy":

> It is popularly believed that the actors involved in . . . [such] problems, whether individuals or governments, are trapped in an inexorable "tragedy of the commons" from which they cannot extract themselves. . . . Empirical and theoretical work on. . . . [these] situations, however, has shown that the "inexorable" nature of the problem results more from the assumptions used by theorists than from constraints that are universally present in all . . . situations.[107]

Yet the tragedy of the commons metaphor is useful in understanding some of the obstacles to environmental problems because it points out the difficulties of preserving something that is in the long-term collective interest of all, despite the short-term interest to undermine preservation.

Environmental conditions such as clean air, clean water, healthy supplies of natural resources, and a commons grazing area are similar to collective goods. Recall from Chapter 10 that all people benefit from collective goods regardless of their participation in maintaining the good. National defense, for example, is a collective good that everybody benefits from regardless of how much tax they pay to support the national defense system. Indeed, even citizens who cheat and do not pay taxes benefit from this collective good. International environmental problems are similar to collective goods, but are technically known as **common pool resources (CPRs),** since, unlike true collective goods, they can be spoiled by one actor. Common pool resources "are afflicted by an additional problem that is not encountered in situations of public goods: use of the resource by one individual may have adverse consequences for others."[108] Both collective goods and common resources, however, face the problem of who is to provide for the good or resource. "In both types of situations, a key problem is how to induce contributions to provide benefits from as many beneficiaries as possible. The classic problem of public goods, which also afflicts CPRs, is underprovision. When there are many beneficiaries, each of whose contribution is small relative to the cost of provision, the good will not be supplied in optimal quantity, unless institutional arrangements exist that induce incentives to provide it."[109]

common pool resources (CPRs) Goods that can be spoiled by one actor.

In the international system, the problems of underprovision and adverse consequences by individual actors are compounded by the lack of an overarching authority to coordinate the maintenance and provision of collective goods. To solve some of the most important environmental problems requires the coordination of several states. But the temptation to follow short-term national interests over collective interests or even long-term national interests is often too high.

Because of the nature of these problems, the world's states are having a difficult time cooperating in a way that might effectively deal with the dangers of global warming, shrinking natural resources, and population growth. It is in individual states' interests to pollute, cut down forests, and exploit cheap resources. In some circumstances, it is in the individual world citizen's self-interest to have more children. Yet the collective result of these individual decisions can mean that everyone's welfare, including that of future generations, is compromised if today's environmental problems accumulate to threaten the carrying capacity of the earth, just as overherding turned common pastures into desert in nineteenth-century villages.

Political Obstacles to Environmental Cooperation

In addition to the general problems of getting independent actors to contribute to collective goods, international environmental cooperation is affected by a number of existing political divisions. Perhaps the most important division complicating recent efforts is the North-South debate on environmental challenges. "Inequitable economic relations between North and South have proven to be a crucial element of the political context of global environmental politics, as on other issues. The developing states' perceptions of the global economic structure as fundamentally inequitable often shape their policy responses to global environmental issues and their strategies for negotiating on issues as different as elephants and climate."[110]

The poorer developing countries point out that the blame for the environmental problems we are facing today lies with the past and current actions of the richer developed states. It was, after all, during the time of the North's industrialization that pollution and resource scarcity developed. Today, developed countries consume more than nine times as much electricity per capita as developing countries and emit over six times as much carbon dioxide per capita.[111] The United States alone consumes 35 percent of the world's resources but constitutes only 6 percent of the global population. "Moreover, the poorest people in the poorest countries—which consist of several hundred million adults and children, and include subsistence farmers, landless rural workers, and destitute and homeless people in expanding mega cities—still do not consume *any* commercial fuels or electricity directly."[112] The demand for paper and wood products from the rain forests of the world is primarily located within the North as well. Demand for coffee in the North has

also resulted in coffee plantations' replacing rain forest land. "In Latin America, so many trees have been felled to create coffee plantations that migratory songbirds are losing vital winter habitat. As consumers of fully one-third of the world's coffee, Americans contribute to such environmental degradation."[113]

Thus, the South argues that much of the environmental damage is due to current and past abuses by the North so the North should bear the greatest burden, particularly the financial burden of solving environmental challenges. The North, for its part, points out that it is the developing world that accounts for the large and growing emissions of greenhouse gases.[114] Because of the role that the industrializing South will play in future environmental degradation, the North argues that the South is the key to preventing future problems. The South, however, fears that environmental cooperation comes at the expense of development. For the South, the priority is to meet the short-term economic needs of the current generation. While developing countries may share concern about the future of the global commons, many are facing severe poverty, a deadly killer on a massive scale, right now. "Poverty is already a worse killer than any foreseeable environmental distress, according to the chief economist of the World Bank. Nobody should kid themselves that they are doing Bangladesh a favor when they worry about global warming."[115] For the South, then, sacrificing economic development, which the North already enjoys, is unacceptable.

Recognizing this dilemma, there has emerged a consensus in the international community that cooperation on environmental issues must take seriously the question of the South's economic development. The term **sustainable development** captures this idea. The consensus on sustainable development can be traced back to 1983 when the United Nations created a commission to study global environmental problems and possible solutions. Chaired by the prime minister of Norway, Gro Harlem Brundtland, the commission produced a report (known as the Brundtland report) in 1987 titled *Our Common Future,* which

sustainable development
Development that meets current economic needs without compromising future economic growth and environmental health.

> took an integrated approach to environment and development issues. Indeed economic development was as central to the report as were environmental issues. The Brundtland Commission did not invent the term sustainable development, but it did popularize the term and place it squarely in the center of international policymaking. The Commission's definition of sustainable development remains the most famous definition of the term: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[116]

While most of the international environmental community agrees that environmental cooperation must be pursued with economic development in mind, there is no consensus on how to do this and whether the

emphasis should be placed on sustaining the environment or developing economies.[117]

The disagreements between the North and the South were certainly evident at the Rio Earth Summit in 1992:

> The issue of inequitable consumption patterns as a cause of global environmental degradation was elevated to a new status in international politics at the insistence of the developing countries. The issue was woven through several chapters of Agenda 21 as well as the Rio Declaration and the Statement of Forest Principles, making it a major theme of the entire conference. Industrialized countries were asked to accept responsibility to change their "unsustainable lifestyles."[118]

The developing countries failed, however, to get the wealthier countries to agree to policies aimed at changing consumption patterns or to certain debt-reduction programs that the South argued were important for economic development. The developed countries failed to get the poorer countries to agree on particular forest management policies.

Disagreements between the North and the South over responsibility issues also surfaced during the Kyoto Protocol negotiations. In this meeting

> Brazil presented an analysis that compared the relative responsibility of Annex I (industrialized) countries and of non–Annex I (developing) countries for climate change, not just in terms of carbon dioxide emissions in a given year, but in terms of carbon dioxide concentrations because of historical emissions. It showed that the responsibility of non–Annex I countries for accumulated emissions would not equal that of Annex I countries until the middle of the 22nd century.[119]

Although the Rio Summit was the meeting at which the divide between the North and the South was most pronounced, other efforts at environmental cooperation have also been affected by the differences between the developing and developed states. In fact, "the developing states made sure that the 2002 World Summit on Sustainable Development did not include the world 'environment' in its title."[120] These differences, however, were not always obstacles to cooperation. The developing states, for example, signed the 1987 Montreal Protocol after a fund was established to help them switch to the more costly substitutes for CFC that would not contribute to ozone depletion.[121]

The North-South debate is not the only political division in the world complicating cooperation on environmental challenges. States that are in similar positions economically do not always agree on environmental issues. The European Union states, for example, were prepared to adopt specific targets and deadlines for conversion to renewable sources of energy at the 2002 World Summit, but the United States disagreed and successfully blocked their efforts to include targets and dates

in the final program. And at the Rio Earth Summit in 1992, on many issues

> countries were not united along development lines. Developing countries themselves were split over such issues as climate change (oil producing nations vs. small island states), fisheries (distant water fishing countries vs. coastal countries), and population growth (Catholic and Muslim countries vs. more secular countries). Industrialized countries disagreed on a number of issues, including ODA [overseas development assistance] levels (Nordic countries vs. the United States), fisheries (distant water fishing countries vs. coastal countries), hazardous and radioactive waste disposal, and the need to reduce excessive production.[122]

In general, most efforts at environmental cooperation produce divisions between those that are more affected by the problem and those that are not. On the issue of transboundary air pollution, for example, "those states that had been the victims of . . . acid rain—notably Sweden, Finland, and Norway—took the initiative to negotiate for stringent and binding regulations on emissions of sulfur dioxide and nitrogen oxide. But the industrialized states that were net exporters of acid rain formed a veto coalition, in large part because of their reliance on coal-fired power stations, which accounted for two-thirds of all sulfur dioxide emissions. Its members were the United States, the United Kingdom, the Federal Republic of Germany, Belgium, and Denmark."[123]

Just like other issues in international relations, the fact that states are not unitary actors and face domestic pressures at home can complicate efforts at environmental cooperation.[124] Business and environmental groups have been key domestic players in global environmental debates. Some states are quite susceptible to business interests opposed to environmental agreements. After ten years of negotiations on the Law of the Sea Treaty, for example, the United States rejected the treaty in 1982, citing its concern that the treaty rules for governing mineral resources in the deep seas were contrary to private enterprise principles. Business interests may represent themselves at international environmental meetings. At the Kyoto Summit on global warming, "the most powerful MNCs [multinational corporations] representing oil and car manufacturers worked to defeat stringent new environmental standards that might decrease carbon emissions (and thereby cut into the sales of existing fuels or cars). [These] . . . stricter standards were defeated at the Kyoto meetings."[125]

The environment and business interests can also clash in free trade negotiations.[126]

> When the GATT [General Agreement on Tariffs and Trade], . . . was negotiated just after World War II, there was not mention of the word *environment*. At that time no one saw much connection between trade liberalization and environmental

> protection. In fact, for the next 40 years, trade and environmental policymakers pursued their respective agendas on parallel tracks that rarely, if ever, intersected. The wake-up call for environmentalists was the U.S. ban on tuna from Mexico and Venezuela on the ground that their fleets did not meet U.S. standards for minimizing dolphin kills in tuna fishing [as required by the 1972 **Marine Mammal Protection Act**]. In 1991 the GATT declared that the U.S. ban was illegal under the rules of international trade. U.S. environmentalists were alarmed that a national environmental law could be overturned by the GATT and began to take seriously the environmental implications of trade.[127]

Marine Mammal Protection Act
U.S. law that prohibits the sale of tuna if it is not caught with "dolphin-safe" fishing methods.

Environmental values clashed with free trade principles again in the negotiation of the North American Free Trade Agreement (NAFTA) in 1992. Environmentalists worried that less strict environmental laws in Mexico combined with free trade would mean that U.S. companies would relocate to Mexico, where they could pollute without penalty, creating more environmental damage. A coalition of consumers, labor groups, and environmentalists worked to make NAFTA the first trade agreement to have supplemental agreements on environmental issues.[128] While some areas of the North American environment have seemed to improve due to NAFTA-related agreements, other areas seem to be deteriorating due to trade competition, and the debate between environmentalists and free traders continues as NAFTA may expand into a larger Free Trade Area of the Americas (see Chapter 12).[129]

Since its creation in 1995, the World Trade Organization (WTO) has heard a number of cases of environmentalists versus free traders. These cases included issues such as U.S. laws requiring fuel imports to meet "clean" gasoline standards and imported shrimp to be caught by vessels that do not endanger sea turtles. The United States and the European Union (EU) have also been involved in a WTO dispute over U.S. use of genetically modified organisms (GMOs) in agriculture. The EU, which views GMOs in food as unsafe, placed a moratorium on GMO imports from 1999 to 2004, but the WTO recently ruled that this ban violated WTO free trade laws. Although those who advocate more liberal trade now have to contend with environmental challenges, it is unclear which value has the advantage. It is true that the WTO treaty recognized the importance of securing "the optimal use of the world's resources in accordance with the objective of sustainable development."[130] On the other hand, the Framework Convention on Climate Change specifies that cooperative efforts on global warming should abide by GATT/WTO trade principles.[131]

Value differences have also affected global cooperation on environmental issues. Population growth is one example. Although the United States took the lead in the 1960s in funding family planning programs in the developing world, funding for international population programs has been controversial. As discussed in Chapter 9, some domestic groups

succeeded in getting Congress to cut off funding for any organization involved in abortion activities. The Clinton administration reinstated the funding, amid considerable controversy, and the subsequent Bush administration returned to the policy of withholding money from the United Nations Population Fund.[132] There has also been a value clash over particular countries' population control programs. "China's one-child policy—the toughest population-control policy in the world—has been especially criticized for allegedly forcing pregnant women who already have a child to have abortions, even late in pregnancy."[133]

The relationship between population growth and the status of women has also generated value conflicts in global efforts to curb population growth. At the 1994 World Population Conference in Egypt, women's rights groups pushed for the funding of programs to educate girls and women generally and to promote women's equality, arguing that more economic and political freedom is the key to decreasing birthrates in the developing countries. Other groups, including the Catholic Church and some Islamic countries, allied to block some of these population proposals. The Policy Choices box outlines some of the issues in the debate on population policy.

Theoretical Perspectives on Environmental Cooperation

Despite the numerous obstacles, cooperation on environmental challenges is possible. Because of the Montreal Protocol, for example, the total consumption of CFCs has dropped dramatically. "The Montreal Protocol is the best example so far of a regime that has been continually strengthened in response to new scientific evidence and technological innovations."[134]

The major theoretical perspectives (see Chapter 1) for understanding global politics can shed light on international environmental cooperation, even though it is a fairly new area in world politics. In looking at the prospects for environmental cooperation, realism, for example, would expect cooperation to be very difficult, given states' self-interested motivations to guard their power and autonomy. Furthermore, environmental issues are the stuff of "low politics" and do not demand the attention of states compared to "high politics," such as national defense.[135] When cooperation does occur, realism would expect international agreements to reflect the interests of the most powerful states strongly. On the issue of climate change, for example, realists would point out the influence of the United States. In the negotiations on the Framework Convention on Climate Change, "the United States opposed the others (particularly a number of European countries) that wanted a timetable for greenhouse gas emission reductions. Largely because of the U.S. position, the members of the international community could only agree to the provision that industrialized countries would try to ensure that their greenhouse gas emissions in the year 2000 were no higher than they were in 1990."[136]

POLICY CHOICES

Addressing Population Growth

ISSUE: Given the seemingly obvious connection between more and more people on the planet and a wide variety of environmental problems—such as rain forest depletion, global warming, and hunger—it may be surprising to note that not everyone agrees that curbing population growth is a good policy. Still, despite compelling objections, most of the world's most populous countries are engaged in one or another form of population control.

Option #1: Global efforts to reduce population growth should be redoubled, and effective family planning programs should be supported.

Arguments: (a) Overpopulation is at the root of many serious environmental problems, as more and more people create greater and greater demands on the planet. (b) Economic success depends on creating sustainable growth within countries. Poor countries will remain poor as long as their populations continue to grow excessively. (c) Without education about family planning, people will naturally continue to procreate, thereby adding to the population problem.

Counterarguments: (a) Environmental destruction is related to excessive consumption associated with global capitalism, not excessive population. If wealthy countries would scale back their luxurious lifestyles, global population could safely exceed current projections. (b) Historically, population growth has frequently occurred alongside or in advance of economic progress. People should be viewed as a resource, not a burden. (c) Individuals' right to procreate should not be threatened for political convenience. People are not cattle, and implementing population control policies fundamentally degrades people who naturally pursue a most basic human desire.

Option #2: The international community should turn its attention to other serious global problems, rather than continuing to support policies aimed at reducing population growth.

Arguments: (a) Raising overpopulation fears opens the door for prejudicial reactions toward the poor and likely lessens political will to address catastrophic illnesses such as AIDS. (b) People respond to economic factors in their decisions to have children. Countries should focus on raising standards of living, and population growth will then take care of itself. (c) Population pressures are correctly considered local problems, and should be dealt with only by individual states rather than the international community.

Counterarguments: (a) Programs aimed at limiting population growth often have other benefits, such as promoting the use of condoms and educating and empowering women. (b) Without government intervention, people will continue to make the decision to have more children based on cultural factors and religious beliefs. (c) Excessive populations within states all too often spill over to other states in the form of immigrants, refugees, and regional instability, thus turning a local problem into a global one.

While not denying that state interests are important, liberalism, as a theoretical perspective, would also highlight the importance of nonstate and substate actors in global environmental politics. These actors include the World Wildlife Fund, which was established in 1961 with the aim of

A Greenpeace ship blocks the entrance to a British military supply port in January 2003, to protest against the approaching war with Iraq. Greenpeace actively works against the negative effects to the environment that can result from, for example, dumping on the high seas, nuclear testing, and military interventions.
(AFP/Getty Images)

protecting endangered species and habitats. "It is the largest private NGO devoted to conservation with a $40 million annual budget and over 5 million members in 28 different countries. The WWF has over 800 projects underway and works with 7,000 NGO's in developing countries to help preserve wildlife and educate people."[137] Perhaps the most famous non-state environmental group is **Greenpeace.** "Greenpeace's goal is to influence national and international environmental legislation the world over even if it means practicing civil disobedience on the high seas."[138] In May 2002, for example, a Greenpeace boat rammed into France's America's Cup yacht to protest the team's sponsor, a nuclear power company owned by the French government. This was just one incident in Greenpeace's history with France.[139] In 1985, the Greenpeace ship *Rainbow Warrior* was sunk in an assault by French special forces, apparently in order to prevent it from protesting French nuclear testing.

Greenpeace
NGO that seeks to influence national and international environmental policy.

The large number of NGOs at the 1992 Rio Summit is further evidence that the actors emphasized in the liberal theoretical perspective are shaping environmental cooperation. On the global warming issue specifically,

> Like most recent international environmental treaties, the terms of the FCCC [Framework Convention on Climate Change] explicitly allow for and encourage participation by non-state

> actors through various formal and informal procedural mechanisms. . . . Thus while the FCCC is a creature of states, and the international climate regime is dominated by governments, as a formal matter, nonstate actors are encouraged and enabled to participate in its operation and evolution. In practice, NGOs are now a pervasive presence.[140]

Liberalism would also focus on the importance of international organizations as actors that facilitate and provide incentives for cooperation. On the topic of climate change, for example, international organizations have certainly been instrumental as regular multilateral meetings, requirements to publish reports, and ongoing monitoring and assessment have facilitated implementation of the FCCC.[141] Generally, international institutions can affect environmental cooperation in three key ways:

> (1) They can contribute to more appropriate agendas, reflecting the convergence of political and technical consensus about the nature of environmental threats; (2) they can contribute to more comprehensive and specific international policies, agreed upon through a political process whose core is intergovernmental bargaining; and (3) they can contribute to national policy responses which directly control sources of environmental degradation.[142]

Beyond specific organizations, liberals point to the emergence of international regimes as focal points for environmental cooperation. As discussed in Chapter 9, international regimes are implicit or explicit rules and norms that govern actors' behaviors. Not all international regimes all equally effective. The regime to govern Antarctica, for example, has been effective at keeping the region open for scientific research and other agreed-on activities. This can be contrasted with many of the attempted international fisheries regimes, which have generally not achieved their goal of preventing overfishing.[143] It appears that regimes that, among other things, address domestic opposition forces within states and "contribute to an improved understanding of the problem" are more likely to be effective at securing environmental cooperation.[144]

The world economic system perspective on global environmental politics would stress the structure of economic capital, particularly energy capital, in the world and its effects on cooperation attempts. On the greenhouse issue, for example, world economic system analysts would point to the structure of oil capital and the oil companies' power to thwart cooperation that would harm their interests. "The reaction of many of the companies involved in fossil fuel production use (particularly coal and oil) has been as would be expected by a historical materialism [or world economic system] analysis. Consider, for example, the Global Climate Coalition—a grouping of (primarily) U.S. industry interests that has been working hard to discredit the international scientific consensus on climate change and to highlight the economic costs of reductions."[145]

The world economic system perspective, particularly dependency theory, would also highlight the many disagreements between the North and the South over environmental issues:

> Although many officials of developing countries . . . recognize the seriousness of local and global environmental degradation for their own economic future, many of them regard environmental regimes for ozone and climate, for example, as a means by which industrialized countries will maintain their control over resources and technology or even gain control over resources now located in the South. One developing-country delegate to the second meeting of the parties to the Montreal Protocol in 1990 declared that for "some countries," the protocol was a "pretext" to place new obstacles in the way of efforts by developing countries to develop their economies.[146]

ecoimperialism
Perspective that sees the North's position on environmental issues as indirect control the South.

From the dependency perspective, the North's positions on environmental issues are simply instances of "**ecoimperialism**."[147]

Constructivist perspectives on international politics would emphasize the importance of norms and discourse that have been constructed on environmental cooperation.[148] They would also point out the differences in the understandings of environment:

> This insight helps explain much about global environmental politics. One of the consistent mishaps in international environmental affairs is the assumption that all parties concerned with climate change, biological diversity, and so forth share the same understanding of the problem. To take the most obvious example: many northern states and nongovernmental organizations (NGOs) work on behalf of wilderness preservation and biological diversity in the developing world. Yet, many in the developing world argue that one person's wilderness is another person's home, and that what is a valued endangered species to some is dinner, a threat, or potential income to another. . . . "Nature," as such, is not a single realm with a universalized meaning, but an ideational canvas on which one project's one's sensibilities, cultural attributes, economic conditions, and social necessities.[149]

Feminist perspectives would also point out the gendered meanings of nature and the environment. Some feminist perspectives argue that women and women's views have a special connection to environmental issues. Both women and the natural environment, for example, fall prey to domination on a global level through the production and consumption patterns created and maintained by the international market. The ramifications of the international economic system for the natural environment are most readily apparent in underdeveloped regions and, by extension, in the lives of the rural people who depend on the natural world for their survival.

Since the daily tasks of providing for basic needs usually fall to women in these communities, women are the most acutely aware of the results of environmental destruction. The actions these women have taken to reclaim the natural environment as their home have created the groundswell that has grown into an international **ecofeminist movement**.[150] Feminist activists have been an important part of environmental politics, particularly on issues of population and the importance of women's status in changing population dynamics.

ecofeminist movement Group with perspective that links oppression of women with environmental abuse.

SUMMARY

- The global community can be analyzed as an integrated entity rather than simply a group of interrelated but separate states. Global environmental problems lend themselves to such analyses because the hole in the ozone layer, for example, does not respect international boundaries. Since the 1970s, states have increasingly recognized the importance of environmental issues and have placed global environmental cooperation on the international political agenda.
- Important environmental challenges include pollution, damage to the ozone layer, deforestation, global warming, availability of natural resources and food supplies, and overpopulation. An integrated analysis of such global problems as the population explosion, famine, depletion of natural resources, global warming, and threats to the ozone layer in the upper atmosphere reveals that ostensible solutions to any one of those problems might unexpectedly make related problems even more serious. The role of economic development and industrialization in contributing to environmental problems has been part of the debate on the global environment.
- Analysts of environmental issues tend either to be very pessimistic about the future of the global community or optimistic that admittedly serious problems can be dealt with. Pessimistic predictions from the 1960s and the 1970s about the population explosion, food shortages, and depletion of energy resources, for example, have proved premature at best. And economic growth, which tends to be distrusted by many pessimistic analysts, can create resources to devote to the solution of global environmental problems. Pessimistic predictions about future global environmental disasters cannot be discounted entirely, if only because they focus on unprecedented threats, about which human understanding is necessarily limited. Still, skepticism about such predictions has probably been warranted more often than not. Comparing the predictive capabilities of competing sources of information is one important basis for evaluating their relative credibility. Yet pessimists, alarmists, and environmental activists have made important contributions to the growing interest by international actors in the environment.
- Although states, nongovernmental groups, and international organizations have become concerned about many environmental issues,

cooperation on solutions to these issues has proved difficult, partly because collective action requires states to take action that is not necessarily in their short-term individual interests. Cooperation is also complicated by divisions between states in the North and states in the South over what economic development is sustainable, as well as by conflicts between environmental issues and free trade, business interests, and values related to reproduction.

- Despite these hurdles, there have been numerous efforts in recent years to deal with environmental problems. These include the Montreal Protocol on chlorofluorocarbons, the Framework Convention on Climate Change and the Kyoto Protocol, and the Convention on Biological Diversity.
- Theoretical perspectives stress different factors for understanding global environmental cooperation. Realism focuses on the importance of large states that, seeking to protect their sovereignty and other interests, can effectively block global initiatives on the environment, while liberalism stresses the significance of international and nongovernmental organizations in environmental negotiations. The world economic system perspective points to the structure of energy capital in the world and how it affects attempts at cooperation. Constructivist and feminist perspectives look at the hidden meaning in discourse and understandings about the environment.

KEY TERMS

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fertility rate 457
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