

ISSUE 21



Is Humankind Dangerously Harming the Environment?

YES: Lester R. Brown, from "On the Edge," *World on the Edge: How to Prevent Environmental and Economic Collapse* (Earth Policy Institute, 2011)

NO: Bjorn Lomborg, from "The Truth about the Environment," *The Economist* (August 4, 2001)

Learning Outcomes

After reading this issue, you should be able to:

- Discern the trends or issues that greatly concern many environmentalists.
- Identify what has been done to address the environmental issues and estimate what still needs to be done.
- Assess the accuracy of the information on which you depend to understand environmental issues.
- Begin to explore the potential consequences of environmental problems on societies and lifestyles.
- Identify the information that you need to acquire to have a pretty good understanding of the environmental issues that are facing us today.

ISSUE SUMMARY

YES: Lester R. Brown, founder of the Worldwatch Institute and now president of the Earth Policy Institute, argues that population growth and economic development are placing increasingly harmful demands on the environment for resources and to grow food for improving diets.

NO: Bjorn Lomborg, a statistician at the University of Aarhus, Denmark, presents evidence that population growth is slowing down; natural resources are not running out; species are disappearing very slowly; the environment is improving in some ways; and assertions about environmental decline are exaggerated.

Much of the literature on socioeconomic development in the 1960s was premised on the assumption of inevitable material progress for all. It largely ignored the impacts of development on the environment and presumed that the availability of raw materials would not be a problem. The belief was that all societies would get richer because all societies were investing in new equipment and technologies that would increase productivity and wealth. Theorists recognized that some poor countries were having trouble developing, but they blamed those problems on the deficiencies of the values and attitudes of those countries and on inefficient organizations.

In the late 1960s and early 1970s, an intellectual revolution occurred. Environmentalists had criticized the growth paradigm throughout the 1960s, but they were not taken very seriously at first. By the end of the 1960s, however, marine scientist Rachel Carson's book *Silent Spring* (Alfred A. Knopf, 1962) had worked its way into the public's consciousness. Carson's book traces the noticeable loss of birds to the use of pesticides. Her book made the middle and upper classes in the United States realize that pollution affects complex ecological systems in ways that put even the wealthy at risk.

In 1968, Paul Ehrlich, a professor of population studies, published *The Population Bomb* (Ballantine Books), which states that overpopulation is the major problem facing mankind. This means that population has to be controlled or the human race might cause the collapse of the global ecosystems and the deaths of many humans. Ehrlich explained why he thought the devastation of the world was imminent:

Because the human population of the planet is about five times too large, and we're managing to support all these people—at today's level of misery—only by spending our capital, burning our fossil fuels, dispersing our mineral resources and turning our fresh water into salt water. We have not only overpopulated but overstretched our environment. We are poisoning the ecological systems of the earth—systems upon which we are ultimately dependent for all of our food, for all of our oxygen and for all of our waste disposal.

In 1973, *The Limits to Growth* (Universe), by Donella H. Meadows et al., was published. It presents a dynamic systems computer model for world economic, demographic, and environmental trends. When the computer model projected trends into the future, it predicted that the world would experience ecological collapse and population die-off unless population growth and economic activity were greatly reduced. This study was both attacked and defended, and the debate about the health of the world has been heated ever since.

Let us examine the population growth rates for the past, present, and future. At about A.D. 1, the world had about one-quarter billion people. It took about 1,650 years to double this number to one-half billion and 200 years to double the world population again to 1 billion by 1850. The next doubling took only about 80 years, and the last doubling took about 45 years (from

2 billion in 1930 to about 4 billion in 1975). The world population may double again to 8 billion sometime between 2015 and 2025. At the same time that population is growing, people are trying to get richer, which means consuming more, polluting more, and using more resources. Are all these trends threatening the carrying capacity of the planet and jeopardizing the prospects for future generations?

In the following selections, Lester R. Brown warns that the population growth and the sevenfold expansion of the economy in the past half century is placing demands on the environment that exceed the Earth's natural capacity. As a result we face many environmental problems. The one that Brown focuses on is the difficulty of increasing food production enough to feed growing populations with better diets and with declining natural resources. Bjorn Lomborg counters that the evidence supports optimism—not environmental pessimism. He maintains that resources are becoming more abundant, food per capita is increasing, the extinction of species is at a very slow rate, and environmental problems are transient and will get better.



On the Edge

In the summer of 2010, record-high temperatures hit Moscow. At first it was just another heat wave, but the scorching heat that started in late June continued through mid-August. Western Russia was so hot and dry in early August that 300 or 400 new fires were starting every day. Millions of acres of forest burned. So did thousands of homes. Crops withered. Day after day, Moscow was bathed in seemingly endless smoke. The elderly and those with impaired respiratory systems struggled to breathe. The death rate climbed as heat stress and smoke took their toll. The average July temperature in Moscow was a scarcely believable 14 degrees Fahrenheit above the norm. Twice during the heat wave, the Moscow temperature exceeded 100 degrees Fahrenheit, a level Muscovites had never before experienced. Watching the heat wave play out over a seven-week period on the TV evening news, with the thousands of fires and the smoke everywhere, was like watching a horror film that had no end. Russia's 140 million people were in shock, traumatized by what was happening to them and their country.

The most intense heat in Russia's 130 years of record keeping was taking a heavy economic toll. The loss of standing forests and the projected cost of their restoration totaled some \$300 billion. Thousands of farmers faced bankruptcy. Russia's grain harvest shrank from nearly 100 million tons to scarcely 60 million tons as crops withered. Recently the world's number three wheat exporter, Russia banned grain exports in a desperate move to rein in soaring domestic food prices. Between mid-June and mid-August, the world price of wheat climbed 60 percent. Prolonged drought and the worst heat wave in Russian history were boosting food prices worldwide.

But there was some good news coming out of Moscow. On July 30th, Russian President Dmitry Medvedev announced that in large parts of western Russia "practically everything is burning." While sweating, he went on to say, "What's happening with the planet's climate right now needs to be a wake up call to all of us." In something akin to a deathbed conversion, Russia's president was abandoning his country's position as a climate change denier and an opponent of carbon reduction initiatives.

Even before the Russian heat wave ended, there were reports in late July of torrential rains in the mountains of northern Pakistan. The Indus River, the lifeline of Pakistan, and its tributaries were overflowing. Levees that had confined the river to a narrow channel so the fertile floodplains could

be farmed had failed. Eventually the raging waters covered one fifth of the country. The destruction was everywhere. Some 2 million homes were damaged or destroyed. More than 20 million people were affected by the flooding. Nearly 2,000 Pakistanis died. Some 6 million acres of crops were damaged or destroyed. Over a million livestock drowned. Roads and bridges were washed away. Although the flooding was blamed on the heavy rainfall, there were actually several trends converging to produce what was described as the largest natural disaster in Pakistan's history.

On May 26, 2010, the official temperature in Mohenjo-daro in south-central Pakistan reached 128 degrees Fahrenheit, a record for Asia. Snow and glaciers in the western Himalayas, where the tributaries of the Indus River originate, were melting fast. As Pakistani glaciologist M. Iqbal Khan noted, the glacial melt was already swelling the flow of the Indus even before the rains came.

The pressure of population on natural resources is intense. Pakistan's 185 million people are squeezed into an area 8 percent that of the United States. Ninety percent of the original forests in the Indus Basin are gone, leaving little to absorb the rainfall and reduce runoff. Beyond this, Pakistan has a livestock population of cattle, water buffalo, sheep, and goats of 149 million, well above the 103 million grazing livestock in the United States. The result is a country stripped of vegetation. When it rains, rapid runoff erodes the soil, silting up reservoirs and reducing their capacity to store flood water.

Twenty or more years ago, Pakistan chose to define security largely in military terms. When it should have been investing in reforestation, soil conservation, education, and family planning, it was shortchanging these activities to bolster its military capacity. In 1990, the military budget was 15 times that of education and a staggering 44 times that of health and family planning. As a result, Pakistan is now a poor, overpopulated, environmentally devastated nuclear power where 60 percent of women cannot read and write.

What happened to Russia and to Pakistan in the summer of 2010 are examples of what lies ahead for all of us if we continue with business as usual. The media described the heat wave in Russia and the flooding in Pakistan as natural disasters. But were they? Climate scientists have been saying for some time that rising temperatures would bring more extreme climate events. Ecologists have warned that as human pressures on ecosystems mount and as forests and grasslands are destroyed, flooding will be more severe.

The signs that our civilization is in trouble are multiplying. During most of the 6,000 years since civilization began we lived on the sustainable yield of the earth's natural systems. But in recent decades, humanity has overshot the level that those systems can sustain. We are liquidating the earth's natural assets to fuel our consumption. Half of us live in countries where water tables are falling and wells are going dry. Soil erosion exceeds soil formation on one third of the world's cropland, draining the land of its fertility. The world's ever-growing herds of cattle, sheep, and goats are converting vast stretches of grassland to desert. Forests are shrinking by 13 million acres per year as we clear land for agriculture and cut trees for lumber and paper. Four fifths of oceanic fisheries are being fished at capacity or overfished and headed for collapse. In system after system, demand is overshooting supply.

Meanwhile, with our massive burning of fossil fuels, we are overloading the atmosphere with carbon dioxide (CO₂), pushing the earth's temperature ever higher. This in turn generates more frequent and more extreme climatic events, including crop-withering heat waves, more intense droughts, more severe floods, and more destructive storms. The earth's rising temperature is also melting polar ice sheets and mountain glaciers. If the Greenland ice sheet, which is melting at an accelerating rate, were to melt entirely, it would inundate the rice-growing river deltas of Asia and many of the world's coastal cities. It is the ice melt from the mountain glaciers in the Himalayas and on the Tibetan Plateau that helps sustain the dry-season flow of the major rivers in India and China—the Ganges, Yangtze, and Yellow Rivers—and the irrigation systems that depend on them.

At some point, what had been excessive local demands on environmental systems when the economy was small became global in scope. A 2002 study by a team of scientists led by Mathis Wackernagel aggregates the use of the earth's natural assets, including CO₂ overload in the atmosphere, into a single indicator—the ecological footprint. The authors concluded that humanity's collective demands first surpassed the earth's regenerative capacity around 1980. By 1999, global demands on the earth's natural systems exceeded sustainable yields by 20 percent. Ongoing calculations show it at 50 percent in 2007. Stated otherwise, it would take 1.5 Earths to sustain our current consumption. Environmentally, the world is in overshoot mode. If we use environmental indicators to evaluate our situation, then the global decline of the economy's natural support systems—the environmental decline that will lead to economic decline and social collapse—is well under way.

No previous civilization has survived the ongoing destruction of its natural supports. Nor will ours. Yet economists look at the future through a different lens. Relying heavily on economic data to measure progress, they see the near 10-fold growth in the world economy since 1950 and the associated gains in living standards as the crowning achievement of our modern civilization. During this period, income per person worldwide climbed nearly fourfold, boosting living standards to previously unimaginable levels. A century ago, annual growth in the world economy was measured in the billions of dollars. Today, it is measured in the trillions. In the eyes of mainstream economists, the world has not only an illustrious economic past but also a promising future.

Mainstream economists see the 2008–09 global economic recession and near-collapse of the international financial system as a bump in the road, albeit an unusually big one, before a return to growth as usual. Projections of economic growth, whether by the World Bank, Goldman Sachs, or Deutsche Bank, typically show the global economy expanding by roughly 3 percent a year. At this rate the 2010 economy would easily double in size by 2035. With these projections, economic growth in the decades ahead is more or less an extrapolation of the growth of recent decades.

How did we get into this mess? Our market-based global economy as currently managed is in trouble. The market does many things well. It allocates resources with an efficiency that no central planner could even imagine, much

less achieve. But as the world economy expanded some 20-fold over the last century it has revealed a flaw—a flaw so serious that if it is not corrected it will spell the end of civilization as we know it.

The market, which sets prices, is not telling us the truth. It is omitting indirect costs that in some cases now dwarf direct costs. Consider gasoline. Pumping oil, refining it into gasoline, and delivering the gas to U.S. service stations may cost, say, \$3 per gallon. The indirect costs, including climate change, treatment of respiratory illnesses, oil spills, and the U.S. military presence in the Middle East to ensure access to the oil, total \$12 per gallon. Similar calculations can be done for coal. We delude ourselves with our accounting system. Leaving such huge costs off the books is a formula for bankruptcy. Environmental trends are the lead indicators telling us what lies ahead for the economy and ultimately for society itself. Falling water tables today signal rising food prices tomorrow. Shrinking polar ice sheets are a prelude to falling coastal real estate values.

Beyond this, mainstream economics pays little attention to the sustainable yield thresholds of the earth's natural systems. Modern economic thinking and policymaking have created an economy that is so out of sync with the ecosystem on which it depends that it is approaching collapse. How can we assume that the growth of an economic system that is shrinking the earth's forests, eroding its soils, depleting its aquifers, collapsing its fisheries, elevating its temperature, and melting its ice sheets can simply be projected into the long-term future? What is the intellectual process underpinning these extrapolations?

We are facing a situation in economics today similar to that in astronomy when Copernicus arrived on the scene, a time when it was believed that the sun revolved around the earth. Just as Copernicus had to formulate a new astronomical worldview after several decades of celestial observations and mathematical calculations, we too must formulate a new economic worldview based on several decades of environmental observations and analyses.

The archeological record indicates that civilizational collapse does not come suddenly out of the blue. Archeologists analyzing earlier civilizations talk about a decline-and-collapse scenario. Economic and social collapse was almost always preceded by a period of environmental decline. For past civilizations it was sometimes a single environmental trend that was primarily responsible for their decline. Sometimes it was multiple trends. For Sumer, it was rising salt concentrations in the soil as a result of an environmental flaw in the design of their otherwise extraordinary irrigation system. After a point, the salts accumulating in the soil led to a decline in wheat yields. The Sumerians then shifted to barley, a more salt-tolerant crop. But eventually barley yields also began to decline. The collapse of the civilization followed. Archeologist Robert McC. Adams describes the site of the ancient Sumerian civilization on the central floodplain of the Euphrates River in what is now Iraq as an empty, desolate area now outside the frontiers of cultivation. He says, "Vegetation is sparse, and in many areas it is almost wholly absent. . . . Yet at one time, here lay the core, the heartland, the oldest urban, literate civilization in the world."

For the Mayans, it was deforestation and soil erosion. As more and more land was cleared for farming to support the expanding empire, soil erosion

undermined the productivity of their tropical soils. A team of scientists from the National Aeronautics and Space Administration has noted that the extensive land clearing by the Mayans likely also altered the regional climate, reducing rainfall. In effect, the scientists suggest, it was the convergence of several environmental trends, some reinforcing others, that led to the food shortages that brought down the Mayan civilization.

Although we live in a highly urbanized, technologically advanced society, we are as dependent on the earth's natural support systems as the Sumerians and Mayans were. If we continue with business as usual, civilizational collapse is no longer a matter of whether but when. We now have an economy that is destroying its natural support systems, one that has put us on a decline and collapse path. We are dangerously close to the edge. Peter Goldmark, former Rockefeller Foundation president, puts it well: "The death of our civilization is no longer a theory or an academic possibility; it is the road we're on."

Judging by the archeological records of earlier civilizations, more often than not food shortages appear to have precipitated their decline and collapse. Given the advances of modern agriculture, I had long rejected the idea that food could be the weak link in our twenty-first century civilization. Today I think not only that it could be the weak link but that it is the weak link.

The reality of our situation may soon become clearer for mainstream economists as we begin to see some of the early economic effects of overconsuming the earth's resources, such as rising world food prices. We got a preview when, as world grain demand raced ahead and as supplies tightened in early 2007, the prices of wheat, rice, corn, and soybeans began to climb, tripling historical levels by the spring of 2008. Only the worst global economic downturn since the Great Depression, combined with a record world grain harvest in 2008, managed to check the rise in grain prices, at least for the time being. Since 2008, world market prices have receded somewhat, but as of October 2010, following the disastrous Russian grain harvest, they were still nearly double historical levels and rising.

On the social front, the most disturbing trend is spreading hunger. For the last century's closing decades, the number of chronically hungry and malnourished people worldwide was shrinking, dropping to a low of 788 million by 1996. Then it began to rise—slowly at first, and then more rapidly—as the massive diversion of grain to produce fuel for cars doubled the annual growth in grain consumption. In 2008, it passed 900 million. By 2009, there were more than a billion hungry and malnourished people. The U.N. Food and Agriculture Organization anticipated a decline in the number of hungry people in 2010, but the Russian heat wave and the subsequent climb in grain prices may have ended that hope.

This expansion in the ranks of the hungry is disturbing not only in humanitarian terms but also because spreading hunger preceded collapse for so many of the earlier civilizations whose archeological sites we now study. If we use spreading hunger as an indicator of the decline that precedes social collapse for our global civilization, then it began more than a decade ago. As environmental degradation and economic and social stresses mount, the more fragile governments are having difficulty managing them. And as rapid

population growth continues, cropland becomes scarce, wells go dry, forests disappear, soils erode, unemployment rises, and hunger spreads. In this situation, weaker governments are losing their credibility and their capacity to govern. They become failing states—countries whose governments can no longer provide personal security, food security, or basic social services, such as education and health care. For example, Somalia is now only a place on the map, not a nation-state in any meaningful sense of the term.

The term “failing state” has only recently become part of our working vocabulary. Among the many weaker governments breaking down under the mounting stresses are those in Afghanistan, Haiti, Nigeria, Pakistan, and Yemen. As the list of failing states grows longer each year, it raises a disturbing question: How many states must fail before our global civilization begins to unravel? How much longer can we remain in the decline phase, whether measured in natural asset liquidation, spreading hunger, or failing states, before our global civilization begins to break down? Even as we wrestle with the issues of resource scarcity, world population is continuing to grow. Tonight there will be 219,000 people at the dinner table who were not there last night, many of them with empty plates.

If we continue with business as usual, how much time do we have before we see serious breakdowns in the global economy? The answer is, we do not know, because we have not been here before. But if we stay with business as usual, the time is more likely measured in years than in decades. We are now so close to the edge that it could come at any time. For example, what if the 2010 heat wave centered in Moscow had instead been centered in Chicago? In round numbers, the 40 percent drop from Russia’s recent harvests of nearly 100 million tons cost the world 40 million tons of grain, but a 40-percent drop in the far larger U.S. grain harvest of over 400 million tons would have cost 160 million tons.

Food price stability now depends on a record or near-record world grain harvest every year. And climate change is not the only threat to food security. Spreading water shortages are also a huge, and perhaps even more imminent, threat to food security and political stability. Water-based “food bubbles” that artificially inflate grain production by depleting aquifers are starting to burst, and as they do, irrigation-based harvests are shrinking. The first food bubble to burst is in Saudi Arabia, where the depletion of its fossil aquifer is virtually eliminating its 3-million-ton wheat harvest. And there are another 17 countries with food bubbles based on overpumping. The Saudi loss of some 3 million tons of wheat is less than 1 percent of the world wheat harvest, but the potential losses in some countries are much larger. The grain produced by overpumping in India feeds 175 million Indians, according to the World Bank. For China, the comparable number is 130 million people. We don’t know exactly when these water-based food bubbles will burst, but it could be any time now.

If world irrigation water use has peaked, or is about to, we are entering an era of intense competition for water resources. Expanding world food production fast enough to avoid future price rises will be much more difficult. A global civilization that adds 80 million people each year, even as its irrigation water supply is shrinking, could be in trouble.

Further complicating our future, the world may be reaching peak water at more or less the same time that it hits peak oil. Fatih Birol, chief economist with the International Energy Agency, has said, "We should leave oil before it leaves us." I agree. If we can phase out the use of oil quickly enough to stabilize climate, it will also facilitate an orderly, managed transition to a carbon-free renewable energy economy. Otherwise we face intensifying competition among countries for dwindling oil supplies and continued vulnerability to soaring oil prices. And with our recently developed capacity to convert grain into oil (that is, ethanol), the price of grain is now tied to that of oil. Rising oil prices means rising food prices. Once the world reaches peak oil and peak water, continuing population growth would mean a rapid drop in the per capita supply of both. And since both are central to food production, the effects on the food supply could leave many countries with potentially unmanageable stresses. And these are in addition to the threats posed by increasing climate volatility.

We are facing issues of near-overwhelming complexity and unprecedented urgency. Can we think systemically and fashion policies accordingly? Can we move fast enough to avoid economic decline and collapse? Can we change direction before we go over the edge? We are in a race between natural and political tipping points, but we do not know exactly where nature's tipping points are. Nature determines these. Nature is the timekeeper, but we cannot see the clock.

Since it is the destruction of the economy's natural supports and disruption of the climate system that are driving the world toward the edge, these are the trends that must be reversed. To do so requires extraordinarily demanding measures, a fast shift away from business as usual to what we at the Earth Policy Institute call Plan B. With a scale and urgency similar to the U.S. mobilization for World War II, Plan B has four components: a massive cut in global carbon emissions of 80 percent by 2020; the stabilization of world population at no more than 8 billion by 2040; the eradication of poverty; and the restoration of forests, soils, aquifers, and fisheries.

The Earth Policy Institute estimates that stabilizing population, eradicating poverty, and restoring the economy's natural support systems would cost less than \$200 billion of additional expenditures a year—a mere one eighth of current world military spending. In effect, the Plan B budget encompassing the measures needed to prevent civilization collapse is the new security budget.

One thing is certain—we are facing greater change than any generation in history. What is not clear is the source of this change. Will we stay with business as usual and enter a period of economic decline and spreading chaos? Or will we quickly reorder priorities, acting at wartime speed to move the world onto an economic path that can sustain civilization?

The Truth about the Environment

Ecology and economics should push in the same direction. After all, the “eco” part of each word derives from the greek word for “home”, and the protagonists of both claim to have humanity’s welfare as their goal. Yet environmentalists and economists are often at loggerheads. For economists, the world seems to be getting better. For many environmentalists, it seems to be getting worse.

These environmentalists, led by such veterans as Paul Ehrlich of Stanford University, and Lester Brown of the Worldwatch Institute, have developed a sort of “litany” of four big environmental fears:

- Natural resources are running out.
- The population is ever growing, leaving less and less to eat.
- Species are becoming extinct in vast numbers: forests are disappearing and fish stocks are collapsing.
- The planet’s air and water are becoming ever more polluted.

Human activity is thus defiling the earth, and humanity may end up killing itself in the process.

The trouble is, the evidence does not back up this litany. First, energy and other natural resources have become more abundant, not less so since the Club of Rome published *The Limits to Growth* in 1972. Second, more food is now produced per head of the world’s population than at any time in history. Fewer people are starving. Third, although species are indeed becoming extinct, only about 0.7% of them are expected to disappear in the next 50 years, not 25–50%, as has so often been predicted. And finally, most forms of environmental pollution either appear to have been exaggerated, or are transient—associated with the early phases of industrialisation and therefore best cured not by restricting economic growth, but by accelerating it. One form of pollution—the release of greenhouse gases that causes global warming—does appear to be a long-term phenomenon, but its total impact is unlikely to pose a devastating problem for the future of humanity. A bigger problem may well turn out to be an inappropriate response to it.

Can Things Only Get Better?

Take these four points one by one. First, the exhaustion of natural resources. The early environmental movement worried that the mineral resources on which modern industry depends would run out. Clearly, there must be some

limit to the amount of fossil fuels and metal ores that can be extracted from the earth: the planet, after all, has a finite mass. But that limit is far greater than many environmentalists would have people believe.

Reserves of natural resources have to be located, a process that costs money. That, not natural scarcity, is the main limit on their availability. However, known reserves of all fossil fuels, and of most commercially important metals, are now larger than they were when *The Limits to Growth* was published. In the case of oil, for example, reserves that could be extracted at reasonably competitive prices would keep the world economy running for about 150 years at present consumption rates. Add to that the fact that the price of solar energy has fallen by half in every decade for the past 30 years, and appears likely to continue to do so into the future, and energy shortages do not look like a serious threat either to the economy or to the environment.

The development for non-fuel resources has been similar. Cement, aluminum, iron, copper, gold, nitrogen and zinc account for more than 75% of global expenditure on raw materials. Despite an increase in consumption of these materials of between two- and ten-fold over the past 50 years, the number of years of available reserves has actually grown. Moreover, the increasing abundance is reflected in an ever-decreasing price: *The Economist's* index of prices of industrial raw materials has dropped some 80% in inflation-adjusted terms since 1845.

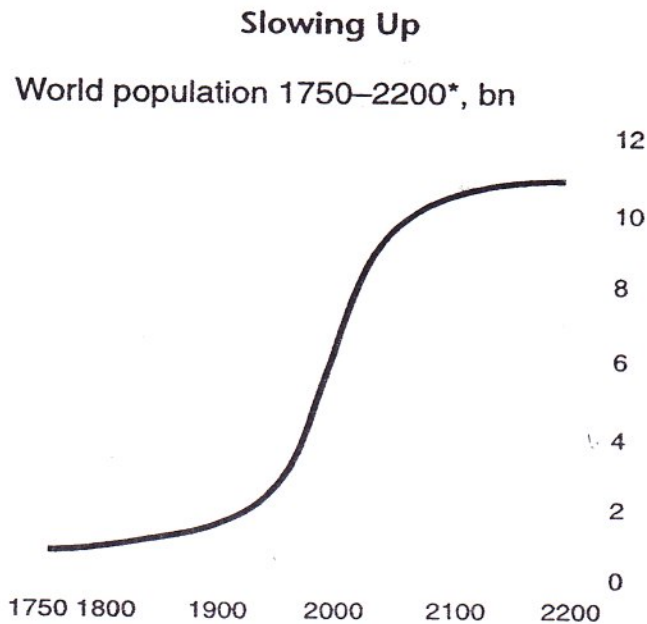
Next, the population explosion is also turning out to be a bugaboo. In 1968, Dr. Ehrlich predicted in his best selling book, *The Population Bomb*, that "the battle to feed humanity is over. In the course of the 1970s the world will experience starvation of tragic proportions—hundreds of millions of people will starve to death."

That did not happen. Instead, according to the United Nations, agricultural production in the developing world has increased by 52% per person since 1961. The daily food intake in poor countries has increased from 1,932 calories, barely enough for survival, in 1961 to 2,650 calories in 1998, and is expected to rise to 3,020 by 2030. Likewise, the proportion of people in developing countries who are starving has dropped from 45% in 1949 to 18% today, and is expected to decline even further to 12% in 2010 and just 6% in 2030. Food, in other words, is becoming not scarcer but ever more abundant. This is reflected in its price. Since 1800, food prices have decreased by more than 90%, and in 2000, according to the World Bank, prices were lower than ever before.

Modern Malthus

Dr. Ehrlich's prediction echoes that made 170 years earlier by Thomas Malthus. Malthus claimed that, if unchecked, human population would expand exponentially, while food production could increase only linearly, by bringing new land into cultivation. He was wrong. Population growth has turned out to have an internal check: as people grow richer and healthier, they have smaller families. Indeed, the growth rate of the human population reached its peak, of more than 2% a year, in the early 1960s. The rate of increase has been

Figure 1



*UN medium-variant forecast from 2000
 Source: UNPD

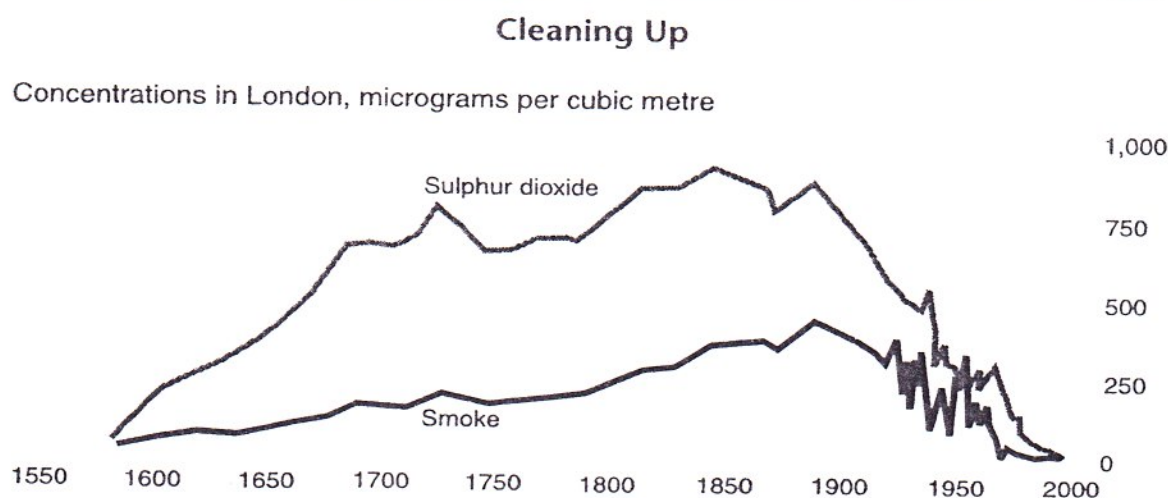
declining ever since. It is now 1.26%, and is expected to fall to 0.46% in 2050. The United Nations estimates that most of the world's population growth will be over by 2100, with the population stabilising at just below 11 billion (see Figure 1).

Malthus also failed to take account of developments in agricultural technology. These have squeezed more and more food out of each hectare of land. It is this application of human ingenuity that has boosted food production, not merely in line with, but ahead of, population growth. It has also, incidentally, reduced the need to take new land into cultivation, thus reducing the pressure on biodiversity.

Third, that threat of biodiversity loss is real, but exaggerated. Most early estimates used simple island models that linked a loss in habitat with a loss of biodiversity. A rule-of-thumb indicated that loss of 90% of forest meant a 50% loss of species. As rainforests seemed to be cut at alarming rates, estimates of annual species loss of 20,000–100,000 abounded. Many people expected the number of species to fall by half globally within a generation or two.

However, the data simply do not bear out these predictions. In the eastern United States, forests were reduced over two centuries to fragments totalling just 1–2% of their original area, yet this resulted in the extinction of only one forest bird. In Puerto Rico, the primary forest area has been reduced over the past 400 years by 99%, yet “only” seven of 60 species of bird have become extinct. All but 12% of the Brazilian Atlantic rainforest was cleared in the 19th century, leaving only scattered fragments. According to the rule-of-thumb,

Figure 2



Source: B. Lomborg

half of all its species should have become extinct. Yet, when the World Conservation Union and the Brazilian Society of Zoology analysed all 291 known Atlantic forest animals, none could be declared extinct. Species, therefore, seem more resilient than expected. And tropical forests are not lost at annual rates of 2.4%, as many environmentalists have claimed: the latest UN figures indicate a loss of less than 0.5%.

Fourth, pollution is also exaggerated. Many analyses show that air pollution diminishes when a society becomes rich enough to be able to afford to be concerned about the environment. For London, the city for which the best data are available, air pollution peaked around 1890 (see Figure 2). Today, the air is cleaner than it has been since 1585. There is good reason to believe that this general picture holds true for all developed countries. And, although air pollution is increasing in many developing countries, they are merely replicating the development of the industrialised countries. When they grow sufficiently rich they, too, will start to reduce their air pollution.

All this contradicts the litany. Yet opinion polls suggest that many people, in the rich world, at least, nurture the belief that environmental standards are declining. Four factors cause this disjunction between perception and reality.

Always Look on the Dark Side of Life

One is the lopsidedness built into scientific research. Scientific funding goes mainly to areas with many problems. That may be wise policy, but it will also create an impression that many more potential problems exist than is the case.

Secondly, environmental groups need to be noticed by the mass media. They also need to keep the money rolling in. Understandably, perhaps, they sometimes exaggerate. In 1997, for example, the Worldwide Fund for Nature issued a press release entitled, "Two-thirds of the world's forests lost forever." The truth turns out to be nearer 20%.

Table 1

The Price of a Life	
Cost of Saving One Year of One Person's Life – 1993\$	
Passing laws to make seat-belt use mandatory	69
Sickle-cell anaemia screening for black new-borns	240
Mammography for women aged 50	810
Pneumonia vaccination for people aged over 65	2,000
Giving advice on stopping smoking to people who smoke more than one packet a day	9,800
Putting men aged 30 on a low-cholesterol diet	19,000
Regular leisure-time physical activity, such as jogging for men aged 35	38,000
Making pedestrians and cyclists more visible	73,000
Installing air-bags (rather than manual lap belts) in cars	120,000
Installing arsenic emission-control at glass-manufacturing plants	51,000,000
Setting radiation emission standards for nuclear-power plants	180,000,000
Installing benzene emission control at rubber-tyre manufacturing plants	20,000,000,000

Source: T. Tengs et al, *Risk Analysis*, June 1995

Though these groups are run overwhelmingly by selfless folk, they nevertheless share many of the characteristics of other lobby groups. That would matter less if people applied the same degree of scepticism to environmental lobbying as they do to lobby groups in other fields. A trade organisation arguing for, say, weaker pollution controls is instantly seen as self-interested. Yet a green organisation opposing such a weakening is seen as altruistic, even if a dispassionate view of the controls in question might suggest they are doing more harm than good.

A third source of confusion is the attitude of the media. People are clearly more curious about bad news than good. Newspapers and broadcasters are there to provide what the public wants. That, however, can lead to significant distortions of perception. An example was America's encounter with El Niño in 1997 and 1998. This climatic phenomenon was accused of wrecking tourism, causing allergies, melting the ski-slopes and causing 22 deaths by dumping snow in Ohio.

A more balanced view comes from a recent article in the *Bulletin of the American Meteorological Society*. This tries to count up both the problems and the benefits of the 1997–98 Niño. The damage it did was estimated at \$4 billion. However, the benefits amounted to some \$19 billion. These came from higher winter temperatures (which saved an estimated 850 lives, reduced heating costs and diminished spring floods caused by meltwaters) and from the well-documented connection between past Niños and fewer Atlantic hurricanes. In 1998, America experienced no big Atlantic hurricanes and thus avoided huge losses. These benefits were not reported as widely as the losses.

The fourth factor is poor individual perception. People worry that the endless rise in the amount of stuff everyone throws away will cause the world to run out of places to dispose of waste. Yet, even if America's trash output

continues to rise as it has done in the past, and even if the American population doubles by 2100, all the rubbish America produces through the entire 21st century will still take up only the area of a square, each of whose sides measures 28 km (18 miles). That is just one-12,000th of the area of the entire United States.

Ignorance matters only when it leads to faulty judgments. But fear of largely imaginary environmental problems can divert political energy from dealing with real ones. The table, showing the cost in the United States of various measures to save a year of a person's life, illustrates the danger. Some environmental policies, such as reducing lead in petrol and sulphur-dioxide emissions from fuel oil, are very cost-effective. But many of these are already in place. Most environmental measures are less cost-effective than interventions aimed at improving safety (such as installing air-bags in cars) and those involving medical screening and vaccination. Some are absurdly expensive.

Yet a false perception of risk may be about to lead to errors more expensive even than controlling the emission of benzene at tyre plants. Carbon-dioxide emissions are causing the planet to warm. The best estimates are that the temperature will rise by some 2°–3°C in this century, causing considerable problems, almost exclusively in the developing world, at a total cost of \$5,000 billion. Getting rid of global warming would thus seem to be a good idea. The question is whether the cure will actually be more costly than ailment.

Despite the intuition that something drastic needs to be done about such a costly problem, economic analyses clearly show that it will be far more expensive to cut carbon-dioxide emissions radically than to pay the costs of adaptation to the increased temperatures. The effect of the Kyoto Protocol on the climate would be minuscule, even if it were implemented in full. A model by Tom Wigley, one of the main authors of the reports of the UN Climate Change Panel, shows how an expected temperature increase of 2.1°C in 2100 would be diminished by the treaty to an increase of 1.9°C instead. Or, to put it another way, the temperature increase that the planet would have experienced in 2094 would be postponed to 2100.

So the Kyoto agreement does not prevent global warming, but merely buys the world six years. Yet, the cost of Kyoto, for the United States alone, will be higher than the cost of solving the world's single most pressing health problems: providing universal access to clean drinking water and sanitation. Such measures would avoid 2m deaths every year, and prevent half a billion people from becoming seriously ill.

And that is the best case. If the treaty were implemented inefficiently, the cost of Kyoto could approach \$1 trillion, or more than five times the cost of worldwide water and sanitation coverage. For comparison, the total global-aid budget today is about \$50 billion a year.

To replace the litany with facts is crucial if people want to make the best possible decisions for the future. Of course, rational environmental management and environmental investment are good ideas—but the costs and benefits of such investments should be compared to those of similar investments in all the other important areas of human endeavour. It may be costly to be overly optimistic—but more costly still to be too pessimistic.

EXPLORING THE ISSUE



Is Humankind Dangerously Harming the Environment?

Critical Thinking and Reflection

1. What is the evidence that food production is inadequate for the current world population and probably will become even less adequate in the next two decades?
2. What current trends are worsening world agriculture's ability to keep total food production in pace with world population and increasingly rich (more meat) diets?
3. How are the world's major bio-systems declining over the past four decades: croplands, grasslands, forests, and oceans?
4. Brown writes about economic and social collapse if appropriate steps are not taken soon. On what grounds does he make such scary statements?
5. What are the likely impacts of global warming over the next half century? What are the possible but debatable impacts of global warming?
6. What factors are holding back the changes that would make us a sustainable society according to Brown?

Is There Common Ground?

There is common ground in the belief that the environment is worsening in many ways. The disagreement is about how serious these problems are and whether market responses to higher prices along with technological innovations will largely take care of them. Most environmentalists, however, cannot believe these problems can be taken care of so easily. In general, conservation actions cost three times the value of the benefits they bring. This inhibits their application if market forces determine actions. Government regulations can force actions that polluters and other environmental abusers do not want to do. But powerful people and the corporations do a good job of preventing tough regulations and policies. So far this train of thought suggests that even if solutions are available, they may be difficult to institute, so the problems are likely to worsen. If so then both the optimists and the pessimists may have good arguments. The optimists know that solutions are available and the pessimists know that too little gets done. Brown warns that the world has had 30–40 years to make the needed changes and has done little. Now it must act at wartime speed or societal collapse is possible. Lomborg calls Brown's type of thinking "crazy." After all, life is getting longer and better in many ways, so the prophets of doom must be wrong.

Additional Resources

Although a number of works (see below) support Lomborg's argument, his evidence has come under heavy attack (see Richard C. Bell, "How Did the Skeptical Environmentalist Pull the Wool Over the Eyes of So Many Editors?" *WorldWatch* (March–April 2002) and *Scientific American* (January 2002)). The issue of the state of the environment and prospects for the future has been hotly debated for over 40 years, with little chance of ending soon. Two key issues are the potential impacts of global warming and the net effects of future agricultural technologies, which will be used to feed growing populations with richer diets. On the former, for works that argue that global warming is a major world problem, see Al Gore, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It* (Rodale Press, 2006); William Antholis and Strobe Talbott, *Fast Forward: Ethics and Politics in the Age of Global Warming* (Brookings Institution Press, 2010); Mark Hertsgaard, *Hot: Living Through the Next Fifty Years on Earth* (Houghton Mifflin Harcourt, 2011); Brian M. Fagan, *The Great Warming: Climate Change and the Rise and Fall of Civilizations* (Bloomsbury Press, 2008); David Archer, *The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate* (Princeton University Press, 2009); Mark Lynas, *Six Degrees: Our Future on a Hotter Planet* (National Geographic, 2008); Tim F. Flannery, *Now or Never: Why We Must Act Now to End Climate Change and Create a Sustainable Future* (Atlantic Monthly Press, 2009); Charles Derber, *Greed to Green: Solving Climate Change and Remaking the Economy* (Paradigm Publishers, 2010); and Gabrielle Walker and Sir David King, *The Hot Topic: What We Can Do about Global Warming* (Harcourt, 2008).

Antagonists to the global warming thesis that human activities are a major cause of global warming include S. Fred Singer and Dennis T. Avery, *Unstoppable Global Warming: Every 1,500 Years* (Rowman & Littlefield, 2007); Roy W. Spencer, *The Great Global Warming Blunder: How Mother Nature Fooled the World's Top Climate Scientists* (Encounter Books, 2010); Ian R. Plimer, *Heaven and Earth: Global Warming, the Missing Science* (Taylor Trade, 2009); Patrick J. Michaels and Robert C. Balling Jr., *Climate of Extremes: Global Warming Science They Don't Want You to Know* (Cato Institute, 2009); Christopher Booker, *The Real Global Warming Disaster: Is the Obsession with Climate Change Turning Out to Be the Most Costly Scientific Blunder in History?* (Continuum, 2009); Garth W. Paltridge, *The Climate Caper: Facts and Fallacies of Global Warming* (Quartet Books, 2009); and Ronald Bailey, ed., *Global Warming and Other Eco-Myths: How the Environmental Movement Uses False Science to Scare Us to Death* (Prima, 2002). Lomborg's contribution to the global warming literature is *Cool It: The Skeptical Environmentalist's Guide to Global Warming* (Alfred A. Knopf, 2007). For the political side of the global warming issue, see Raymond S. Bradley, *Global Warming and Political Intimidation: How Politicians Cracked Down on Scientists as the Earth Heated Up* (University of Massachusetts Press, 2011). Two works that focus on what to do about global warming are Robert K. Musil, *Hope for a Heated Planet: How Americans Are Fighting Global Warming and Building a Better Future* (Rutgers University Press, 2009) and William D. Nordhaus, *A Question of Balance: Weighing the Options on Global Warming Policies* (Yale University Press, 2008).

On food production issues and agriculture technologies, see Lester R. Brown, *On the Edge: How to Prevent Environmental and Economic Collapse* (Earth Policy Institute, 2011) and *Plan B 4.0: Mobilizing to Save Civilization* (W. W. Norton, 2009); and Bread for the World Institute, *Are We on Track to End Hunger? 14th Annual Report on the State of World Hunger* (Bread for the World Institute, 2004). On agricultural technologies, see Vaclav Smil, *Feeding the World: A Challenge for the Twenty-First Century* (MIT Press, 2000).

Publications that are optimistic about the health of the environment and the availability of resources include Bjorn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World* (Cambridge University Press, 2001); Ronald Bailey, ed., *The True State of the Planet* (Free Press, 1995); and Gregg Easterbrook, *A Moment on the Earth: The Coming Age of Environmental Optimism* (Viking, 1995). Publications by some who believe that population growth and human interventions in the environment have dangerous consequences for the future of mankind include Richard Krooth, *Gaia and the Fate of Midas: Wrenching Planet Earth* (University Press of America, 2009); Richard A. Matthew, ed., *Global Environmental Change and Human Society* (MIT Press, 2010); Hans Gunter Brauch et al., *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Springer, 2009); Tim Jackson, *Prosperity Without Growth: Economics for a Finite Planet* (Earthscan, 2009); Joseph Wayne Smith, Graham Lyons, and Gary Sauer-Thompson, *Healing a Wounded World* (Praeger, 1997); Douglas E. Booth, *The Environmental Consequences of Growth* (Routledge, 1998); Kirill Kondratyev et al., *Stability of Life on Earth: Principal Subject of Scientific Research in the 21st Century* (Springer 2004); and James Gustive Speth, *Red Sky at Morning: America and the Crisis of the Global Environment* (Yale University Press, 2004).

Several works relate environmental problems to very severe political, social, and economic problems, including Joseph Wayne Smith and Sandro Positano, *The Self-Destructive Affluence of the First World: The Coming Crisis of Global Poverty and Ecological Collapse* (Edwin Mellen Press, 2010); Joel Kovel, *The Enemy of Nature: The End of Capitalism or the End of the World?* (Zed Books, 2007); Michael Renner, *Fighting for Survival* (W. W. Norton, 1996); Michael N. Dobkowski and Isidor Wallimann, eds., *The Coming Age of Scarcity: Preventing Mass Death and Genocide in the Twenty-First Century* (Syracuse University Press, 1998) and *On the Edge of Scarcity: Environment, Resources, Population, Sustainability, and Conflict* (Syracuse University Press, 2002); and one with a long time frame, Sing C. Chew, *World Ecological Degradation: Accumulation, Urbanization, and Deforestation, 3000 B.C.—A.D. 2000* (Roman & Littlefield, 2001). Since environmental changes could have such devastating effects, many have proposed solutions to these problems. The broadest term for these changes is sustainability. The following works suggests paths to sustainability, most of which require dramatic changes: Eric F. Lambin, *The Middle Path: Avoiding Environmental Catastrophe* (University of Chicago Press, 2007); James Gustave Speth, *The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability* (Yale University Press, 2008); Charles J. Kibert et al., *Working Toward Sustainability: Ethical Decision Making in a Technological World* (Wiley, 2012); Russ Beaton and Chris Maser, *Economics and Ecology:*

United for a Sustainable World (CRC Press, 2012); Robin Hahnel, *Green Economics: Confronting the Ecological Crisis* (M. E. Sharpe, 2011); Ian Chambers and John Humble, *Developing a Plan for the Planet: A Business Plan for Sustainable Living* (Gower Publishing, 2011); Jennifer Clapp and Peter Dauvergne, *Paths to a Green World: The Political Economy of the Global Environment* (MIT Press, 2011); Costas Panayotakis, *Remaking Scarcity: From Capitalist Inefficiency to Economic Democracy* (Fernwood, 2011); and Milissa Leach et al., *Dynamic Sustainabilities: Technology, Environment, Social Justice* (Earthscan, 2010).

Worldwatch Institute publishes an important series on environmental problems, which includes two annuals: *State of the World* and *Vital Signs*.

