

3 You Have to Admit It's Getting Better

The race to be greener than thou is partly motivated by a concern that economic growth comes at a cost to environmental quality. As far back as the writings of the Reverend Thomas Malthus in the eighteenth century, people have worried that exponential growth in consumption would outstrip finite quantities of natural resources, ultimately causing famine, pestilence, and population decline. As noted in chapter 2, predicting that we would face a timber famine, Theodore Roosevelt put millions of acres of public domain under the control of the U.S. Forest Service in the name of sustaining our supply of wood through scientific management.

Modern environmentalists are still concerned about population growth, but now the concern is that we will foul our own nest and destroy nature in the process. The perceived conflict between economic growth and environmental quality today is embodied in the environmental buzzword *sustainability*—a word that means everything and nothing and thus offers endless opportunities to be abused. As environmental policy analyst Timothy O’Riordan (1988, 30) put it, sustainable development’s “beguiling simplicity and apparently self-evident meaning have obscured its inherent ambiguity.”

For many people sustainability equates to a vague notion that we should balance economic activities against natural resource use and that this balance is determined by “trained” experts. As discussed in chapter 2, this idea has been lifted verbatim from the nineteenth-century conservation philosophy of Theodore Roosevelt and his colleague Gifford Pinchot. But it seems we have already forgotten the

problems of implementing Pinchot's sustained yield and multiple-use theory. As biologist David Ehrenfeld put it, "we cannot make everything best simultaneously" (quoted in Freyfogle 2006, 127). Sustainability should be viewed as a Trojan Horse that we have unwisely allowed into our homes (Freyfogle 2006, 115).

If we equate sustainability with efficient resource use and improved environmental quality, however, market economies with secure private property rights have an excellent track record. As discussed in chapter 1, Julian Simon was noted for his optimism over what human ingenuity combined with market incentives could do to ensure endless benefits from resources. In addition to the price data on the five metals included in Simon's bet with Ehrlich (see figure 5), similar trends exist with minerals throughout the twentieth century (see figures 6 and 7).

Rapid growth in demand from countries such as China and India and political instability in areas such as the Middle East can cause short-term price increases, but new supplies and substitutes mitigate against long-term increases. For example, copper wire, once used for transmitting information, has been replaced by fiber optics, satellites, and microchips. In the late nineteenth century Chile had a virtual monopoly over the production of nitrates, valued for their use in fertilizers and explosives. The high price of shipping nitrates to Europe, however, provided incentive for innovation. By the 1920s an artificial process for the production of nitrates had been invented in Germany. As a result, the price of nitrates fell so fast that even today rusty railroad cars filled with nitrates remain on the track—still waiting to be shipped to port (Minnis and Mackenzie 2004). Rising natural resource prices, coupled with secure property rights and markets, induce conservation, substitution, and technological change, all of which mitigate against the worries of doomsayers.

Furthermore, most measures of human welfare show that, on average, the world's population is better off today than any other time in human history. Life expectancy is increasing, per capita income is

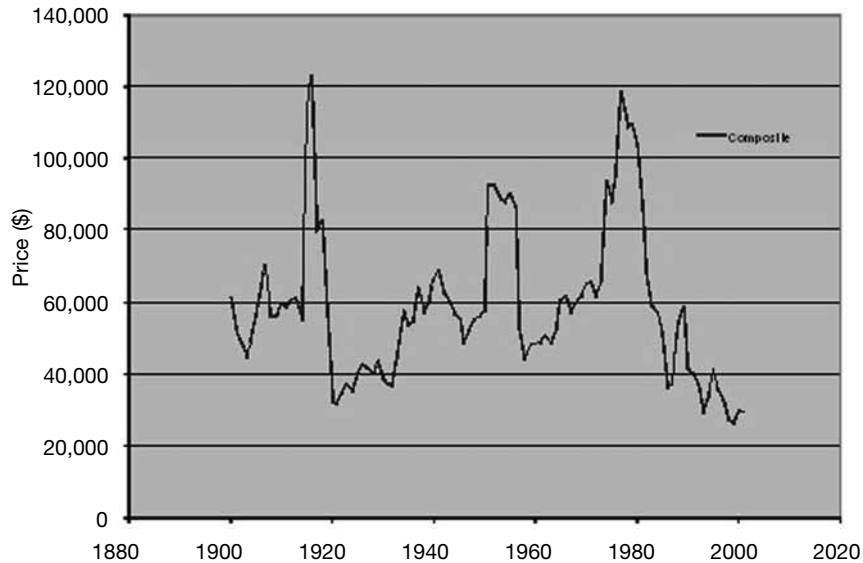


Figure 5. The Simon-Ehrlich Metals: Prices over the Century

Increased population does not necessarily cause an increase in the price of natural resources. The composite value of the metals decreased between 1980 and 1990. More people produced more ingenuity that overcompensated for increased demand, and therefore prices dropped.

Source: Ross B. Emmett and David McClintick. 2005. "Betting on the Wealth of Nature: The Simon-Ehrlich Wager." *PERC Reports* 23, no. 3: September.

rising, the air we breathe and water we drink are higher quality, and there is more food to eat.¹ Technology and human innovation have made life easier. These improvements have happened not just in the United States and other developed countries but are occurring across the entire globe.

1. The quality of water and air in the United States has greatly improved over the last twenty-five years as we will show later in the chapter. The introduction of chlorinated and filtered water to urban areas in the early twentieth century dramatically reduced the number of waterborne diseases such as cholera and typhoid.

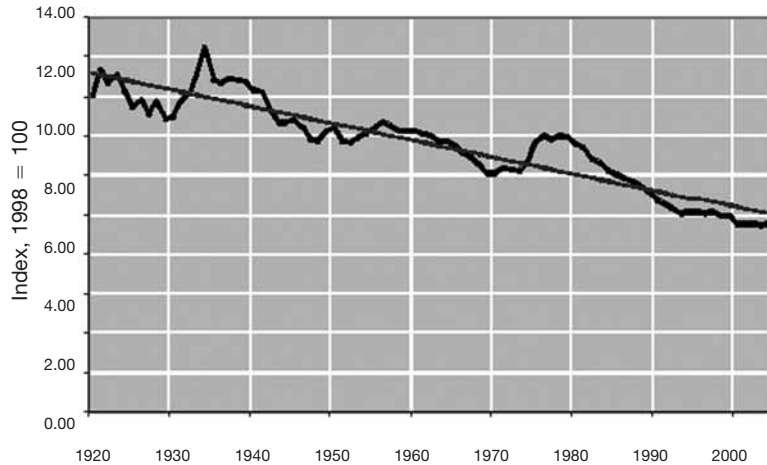


Figure 6. Industrial Minerals Price Index (1920–2004)

The Industrial Minerals Price Index is computed using data for cement, clay, crushed stone, lime, phosphate rock, salt, and sand and gravel. Together these seven minerals accounted for 88 percent of the value of all industrial minerals produced in the United States in 2004. All seven of these minerals show a declining trend in inflation-adjusted prices over the twentieth century. This declining price trend is a result of competition, reduced production costs, and adequate sources of supply (Sullivan, Sznoppek, and Wagner 2000).

Sources:

Thomas D. Kelly and Grecia R. Matos. Historical Statistics for Mineral and Material Commodities in the United States. Prepared for the United States Geological Survey. Online at <http://minerals.usgs.gov/ds/2005/140/> (cited July 24, 2007).

National Mining Association. Mining in the United States. Online at www.nma.org/pdf/states_04/us2004.pdf (cited July 24, 2007).

Daniel E. Sullivan, John L. Sznoppek, and Lorie A. Wagner. 20th Century U.S. Mineral Prices Decline in Constant Dollars. Prepared for the United States Geological Survey and the United States Department of the Interior. Online at <http://pubs.usgs.gov/of/2000/of00-389/of00-389.pdf> (cited July 24, 2007).

With few exceptions, especially in areas where property rights are secure and where incomes are high and growing, environmental conditions are improving by almost any measure. In the United States, for example, air and water quality have improved dramatically during the last few decades. To be sure, we have developed new contaminants, and more-stringent regulations. For example, arsenic standards for water quality have increased, which have forced watersheds out of

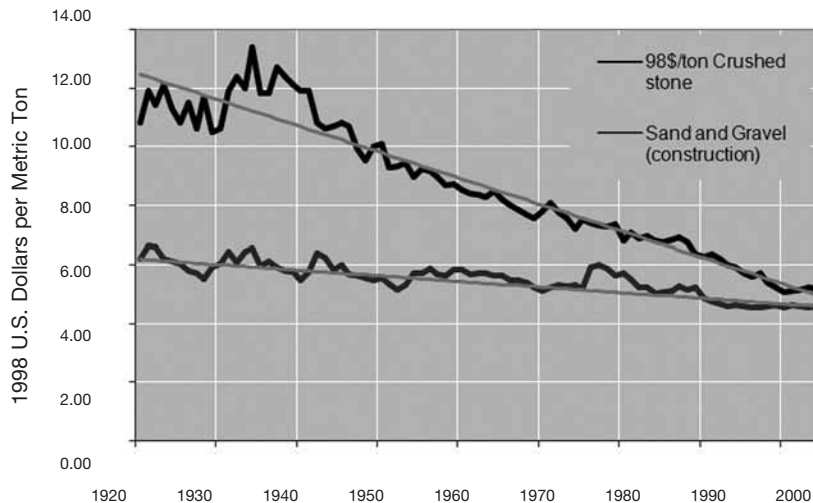


Figure 7. Price of Two Common Industrial Minerals (1920–2004)

The declining price trend of two of the most valuable industrial minerals can be seen in this figure. Crushed stone alone accounted for 29 percent of the value of all industrial minerals produced in the United States in 2004. Sand and gravel accounted for 20 percent of the value of industrial minerals produced. The declining trend in prices of these minerals suggests that they are becoming less scarce over time.

Sources:

- Thomas D. Kelly, and Grecia R. Matos. Historical Statistics for Mineral and Material Commodities in the United States. Prepared for the United States Geological Survey. Online at <http://minerals.usgs.gov/ds/2005/140/> (cited July 24, 2007).
- National Mining Association. Mining in the United States. Online at www.nma.org/pdf/states_04/us2004.pdf (cited July 24, 2007).
- Daniel E. Sullivan, John L. Sznoppek, and Lorie A. Wagner. 20th Century U.S. Mineral Prices Decline in Constant Dollars. Prepared for the United States Geological Survey and the United States Department of the Interior. Online at <http://pubs.usgs.gov/of/2000/of00-389/of00-389.pdf> (cited July 24, 2007).

regulatory compliance, but the general trend in air and water quality has been improving in the United States. For example, between 1980 and 2006, airborne lead declined by 96 percent, carbon monoxide dropped 75 percent, and sulfur dioxide fell 66 percent (Schwartz 2008). Furthermore, open space, wildlife habitat, parklands, and so on are all in greater abundance than they were decades ago.

Despite the positive trends in environmental quality, headlines are filled with reports of environmental gloom and doom. A *Newsweek*

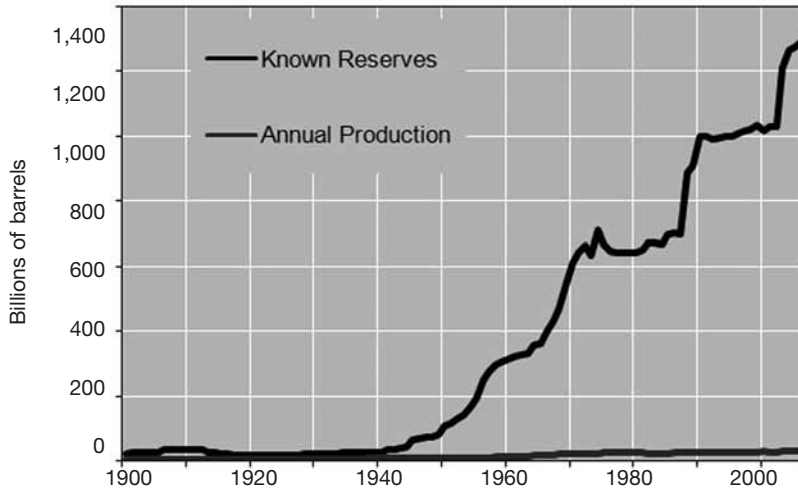


Figure 8. Known Oil Reserves and Annual Oil Production (1900–2006)

It is often claimed that the world is running out of oil. If crude oil was becoming more scarce, we would expect the amount of proven oil reserves to be falling. As the graph suggests, crude oil has become less scarce rather than more scarce. In fact, over the last century the growth of proven oil reserves has far outpaced the increase in production. Due to the expansion of oil reserves, annual production has fallen from 5 percent of reserves in 1950 to 2 percent of reserves in 2006. In 1950 you might have believed that the world would run out of oil in 20 years. So far market incentives have given us 86 more years of oil than we knew of in 1950.

Note: data from before 1944 is for the United States only.

Sources

Julian L. Simon, Guenter Weinrauch, and Stephen Moore. "The Reserves of Extracted Resources: Historical Data." *Non-Renewable Resources* 3, no.4 (May 15, 1994), 325–40. (Data for 1900 to 1978)

Marilyn Radler. *Oil and Gas Journal* 98–100, 104 (2000–2002, 2006).

Oil and Gas Journal 79–95, 101–103 (1981–1997, 2003–2005).

Auldridge, Larry. *Oil and Gas Journal* 76–78 (1978–1980): 75, 67, 99.

article entitled "Here's Dr. Doom: A Founding Father of Environmentalism Has Embraced Fatalism—and the Public Loves It" (Underhill, April 24, 2006) reviewed the latest environmental disaster tome by James Lovelock (2006). Or what about the *National Geographic's* "By 2050 Warming to Doom Million Species, Study Says" (Roach, July 12, 2004) or *Time International*, "Look Out Below: Tourism and Global Warming Are Destabilizing Europe's Biggest Glaciers, with Potentially Disastrous Results" (Skari, July 29, 2002).

Is our natural world truly deteriorating that badly? As we shall see, the data do not support the gloom-and-doom mongering.

Malthus Meets Computers

The source of the gloom and doom can be traced to faulty reasoning and equally faulty data. Malthus argued that human population growth would ultimately run into constraints imposed by fixed natural resources, especially land for food production, which, in turn, would lead to famine and pestilence.² His theory fit the data of the time, namely, the population declines that occurred with the “Black Death” (1328–51).

His theory, which became known as “Malthusian cycles,” captured the minds of modern environmentalists. A French riddle makes Malthus’s point. Imagine a lily pond with lily pads growing so fast that the number doubles every minute. Suppose that the pond is half covered at one minute before noon. When will the pond be fully covered? Noon, of course. Now suppose you came upon the pond at 11:50 and found it only one tenth of one percent covered, will the lily pads still cover the pond by noon? Yes, with a doubling of pads every minute, the pond would be fully covered in ten minutes. And suppose you could instantly double the size of the pond, how much time would it take to cover the larger area? One minute.

By analogy, exponential population growth and rising demands for the earth’s resource base will not be recognized until it is too late to act. Before a Malthusian crisis occurs, it will appear that there is no problem—the pond is less than one tenth of one percent covered at 11:50. And note that technology (the analogy to doubling the size of the pond) only buys a short amount of time.

Scientists armed with computers have refined the estimates of when crisis might set in. In 1972, a group known as the Club of Rome

2. For details on Thomas Malthus’s ideas on human population growth, see his 1798 article “An Essay on the Principles of Population.”

published a small book entitled *The Limits to Growth*. Using computer models programed with parameters similar to those of the lily pond analogy, the Club of Rome set precise dates when we would run out of resources. For example, it predicted that gold would be depleted in 1981, mercury and silver in 1985, petroleum in 1992, copper in 1993, and natural gas in 1994. The report concluded that, if the growth rates in population, industrialization, pollution, food production, and resource depletion continued, there would be “a rather sudden and uncontrollable decline in both population and industrial capacity” (Meadows et al. 1972, 56). Scary stuff.

To these predictions, Paul Ehrlich added *The Population Bomb*, a book that also said rapid population growth and consumption would lead to crises. Ehrlich wrote, “If the optimists are correct, today’s level of misery will be perpetuated for perhaps two decades into the future. If the pessimists are correct, massive famines will occur soon, possibly in the 1970s, certainly by the 1980s” (1971, 24–25).

To drive the final nail into the coffin, President Jimmy Carter commissioned the *Global 2000 Report*. Again scientists, having plugged exponential population and consumption growth rates into their computers, predicted that the world would be in miserable straits by the turn of the century. The opening line of the report says, “If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now” (Barney 1980, 1).

Whether based on lily pond riddles or sophisticated computer estimates, none of these predictions has come to pass. We have not had famine and pestilence. Rather, the percentage of the population that is starving has decreased from 35 percent to 18 percent (Lomborg 2001, 25). Wheat and corn prices have marched downward (see figure 9), and grain production is higher than ever (National Agricultural Statistics Service 2007). For the past century, innovation and technological progress have allowed the world to grow more food at a lower cost. India was perhaps, of all the developing nations, the most

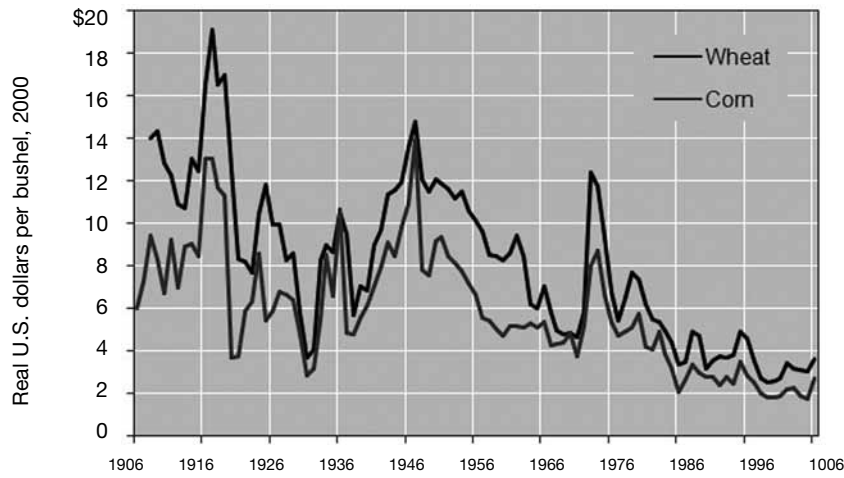


Figure 9. U.S. Wheat and Corn Prices (1906–2006)

The 1940s to the 1970s saw a revolution in food production that has allowed farmers to provide the world with more food at lower prices. The prices for grains are at all-time lows and production is higher than ever. In the United States, the real price for a bushel of corn in 2006 was \$2.75, up from an all-time low of \$1.77 in 2005. And the real price of a bushel of wheat in 2006 was \$3.66, up from an all-time low of \$2.53 in 1999. Worldwide wheat production in 2007 at 612 million metric tons, slightly down from an all-time high in 2004 of 628 million metric tons. Worldwide corn production is projected to hit an all-time high of 777 million metric tons this year (Foreign Agricultural Service 2007). The predictions of widespread famine have not come to pass.

Sources:

Foreign Agricultural Service. Grain: World Markets and Trade. Prepared by the Foreign Agricultural Service, a department of the United States Department of Agriculture. Online: at www.fas.usda.gov/grain/circular/2007/07-07/grainfull0707.pdf (cited July 18, 2007).

National Agricultural Statistics Service (NASS). Statistics by Subject: Crops and Plants. In *QuickStats* database. Washington: NASS, a department of the United States Department of Agriculture. Online at www.nass.usda.gov/QuickStats/indexbysubject.jsp?Text=1&site=NASS_MAIN&select=Select+a+State&Pass_name=&Pass_group=Crops+%26+Plants&Pass_subgroup=Field+Crops (cited June 27, 2007).

successful at modernizing its agriculture production in recent times. The largest famine in modern history occurred in Bengal in the early 1940s, but, by the end of the 1970s, India had become a net exporter of wheat. The main exceptions to improved productivity are countries where tyrannical governments, not resource constraints, have destabilized economic and political institutions. Zimbabwe, for example, thanks to its despotic dictator Robert Mugabe, went from being a nation that once fed itself and exported corn and wheat to its neighbors to being one of the least productive countries in southern Africa. (Rothberg 2002).

Pound the Data

When statistician Bjørn Lomborg published his book, *The Skeptical Environmentalist*, he was attacked for finding that the environmental litany of gloom and doom does not hold up against the data. As he puts it, “When you have the data, pound the data; when you don’t, pound the table.” Amid the continued crescendo of table pounding, let us consider the data on various measures of natural resource use and environmental quality.

Terrestrial Resources

As noted, a combination of genetically designed high-yield crops, improved irrigation techniques, better fertilizers and pesticides, and scientific crop management has resulted in a continuous increase in agricultural productivity. According to data from the Food and Agriculture Organization (FAO) of the United Nations, world wheat production has tripled since 1961. Wheat production in 2005 was just shy of the all-time high of 2004. Wheat production in developing countries has increased from twenty-seven kilograms per capita in 1961 to fifty-three kilograms per capita in 2003—a 96 percent increase. Coarse grain production has also gone up in developing countries. In 1961, developing countries produced sixty-eight kilograms per capita; production had increased to eighty-two kilograms per capita

by 2003. And increases in crop yield per acre accounted for more than 80 percent of the increase in food production in developing countries from 1961 to 2000 (Evenson and Gollin 2003, 760).

The revolution in agriculture continues to increase productivity per acre, leaving more acres for other uses, including open space and wildlife habitat. In India, for example, the *Atlantic Monthly* reported that from the 1960s through the 1980s “Green Revolution advances saved more than 100 million acres of wild lands” (Rauch 2003, 106). In fact, between 1981 and 2000 the area under cultivation in Latin America decreased 0.5 percent; overall production increased 1.6 percent (Evenson and Gollin 2003, 760). More recently, higher yields from genetically modified crops have reduced and in some cases stopped forest clearing in Honduras and the Philippines. One agricultural expert, Dennis Avery of the Hudson Institute, says that, absent improvements in farming techniques and yields since 1950, the world would have lost an additional 20 million square miles of wildlife habitat, most of it forest, to agriculture. About sixteen million square miles of forest exist today, so in a sense advances in agriculture “have saved every square mile of forest on the planet,” says Avery (quoted in Rauch 2003, 106).

Indur Goklany, in his book *The Improving State of the World*, shows that, even in the face of population growth, the amount of land used for agriculture has come nowhere close to matching the growth rate in population. From 1961 to 2002, world population increased 102 percent; the land used for agriculture increased only 13 percent worldwide. One of the neo-Malthusians’ greatest concerns is that population growth will require such a large amount of land to be used for agriculture that land for habitat will be lost and degraded. Such predictions of doom, once again, are not supported by the data. Advances in technology have significantly reduced the amount of land needed to feed a growing population. Goklany shows that, across the world, cropland per capita decreased by 44 percent from 1961 to 2002

and that, over the same period, food supplies per capita actually increased 24 percent (2007, 123–25).

Some of the loudest table pounding has been over deforestation. A 1998 press release from the Worldwatch Institute titled “Accelerating Demand for Land, Wood, and Paper Pushing World’s Forests to the Brink” warned of a “global catastrophe.” What do the data say? The FAO’s *Global Forest Resource Assessment* for 2005 reports that the yearly change in forest cover has gone from –0.22 percent from 1990 to 2000 to –0.18 percent from 2000 to 2005. In many parts of the world, forest cover is increasing. The United States had more than 298 million hectares of forest cover in 1990. By 2005, that number had grown to more than 303 million hectares. Other countries, such as New Zealand, Chile, Uruguay, Spain, Russia, India, and China, have also increased their amount of forest cover during 1990–2005. The cries of a “global chainsaw massacre” (Serrill 1997) are simply not true.

Regarding endangered species, in Norman Myers’s 1979 book *The Sinking Ark*, Myers estimated that 40,000 species would become extinct every year for the next twenty-five years. Myers arrived at this figure by “presuming” that one million species would become extinct over the next twenty-five years and then simply divided one million by twenty-five to get 40,000 per year. There were no data to support this presumption. Nevertheless, this number has become the official estimate of the table pounders.

Each year the World Conservation Union publishes its *Red List of Threatened Species*, the publication of record for threatened and endangered species. The 2004 edition reported that, in the past twenty years, twenty-seven species have become extinct, with another 208 possibly having gone extinct (there are no data to support that possibility). Either way, this is nowhere near the Meyers presumption of 40,000 a year. The World Conservation Union also reports that, from 2003 to 2004, 352 species were moved to a higher threat category (i.e., became more vulnerable), but 363 were moved to a lower threat cat-

egory (2004). Once again the table pounding has drowned out the data pounding.

Aquatic Resources

Water covers approximately three-quarters of the earth. About 97 percent of water is found in the oceans; just over 2 percent makes up the polar ice caps, leaving less than 1 percent of earth's water available for human consumption and use. Humans currently use 18 percent of this accessible water every year (Postel, Daily, and Ehrlich 1996, 787). The World Bank's *World Development Report 1994* reported that, in 1970, 34 percent of the population of developing countries had access to safe drinking water. In the year 2000, a U.N. report by Secretary-General Kofi Annan stated that 78 percent of the population of developing countries had access to drinking water. In other words, in thirty years the percentage of the population with access to safe drinking water has more than doubled.

In addition to more people having access to water, the quality of water has improved. In the United States, the Environmental Protection Agency (2003) reported that, in 2002, 94 percent of the population got its water from systems that had no health violations, an increase from 79 percent in 1993. Also, the lakes and rivers of the United States have become cleaner. The Great Lakes, for example, which contain 20 percent of all the fresh surface water on earth, have seen a steady decline in chemical pollution since the early seventies. Between 1974 and 2005, levels of DDE, PCBs, and HCB (as measured by concentrations in herring gull eggs) declined by a minimum of 87 percent and a maximum of 99.5 percent in the various Great Lakes.³

3. Dichlorodiphenyldichloroethylene (DDE) is a breakdown product of DDT, which was used as an insecticide in the United States until 1972. DDE has been shown to cause liver and thyroid tumors in animals and is a probable carcinogen (Environmental Protection Agency 2007d). Polychlorinated biphenyls (PCBs) are cooling and insulating fluids. PCB production was outlawed in the United States in 1977. PCBs cause a variety of adverse health effects, including cancer and diseases of the immune system, nervous system, and reproductive system (Environmental Protection Agency

Dissolved oxygen, an essential ingredient for aquatic species and one of the best indicators of water quality, has also increased in most major rivers and lakes. For example, dissolved oxygen levels in New York Harbor have steadily improved since the 1970s (NYC Department of Environmental Protection 2003). Long Island Sound, a major area of concern for its low levels of oxygen, has seen its levels of dissolved oxygen improve. From 1985 to 2005, the area (in square miles) and duration of low oxygen levels in the sound have exhibited a downward trend (Hayward and Kaleita 2007).

The proportion of low-quality rivers in the United States and the United Kingdom, as defined by the President's Council on Environmental Quality and the Environment Agency, has also steadily declined since the 1970s (Lomborg 2001, 204). According to the Environment Agency, the percentage of bad and poor-quality rivers in the United Kingdom fell from 9.7 percent in 1990 to 4.6 percent in 2005, whereas the ratio of good-quality rivers increased by 10.3 percentage points over the same period (2007). These data suggest that access to clean water and water quality have been improving.

Atmospheric Resources

Air quality in the United States has also improved. Based on EPA data, air quality in the United States has significantly improved since 1980. Levels of nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), carbon monoxide (CO), and lead (Pb) all dropped between 1980 and 2006 (see figure 10). Smog was once heard about every day in the popular press and media; today, smog is only a problem in lower-income developing countries.

In addition to these improvements, particulate matter, which is made up of small solid and liquid particles suspended in the ambient air and is associated with negative health effects, has also significantly

2007e). Hexachlorobenzene (HCB) was used as a pesticide in the United States until 1965. HCB, a likely carcinogen, also causes liver disease and is related to several other illnesses (Environmental Protection Agency 2007f).

Figure 10. Percent Reduction in Emissions

<i>Contaminants</i>	<i>1980 to 2006</i>	<i>1990 to 2006</i>
NO ₂	-41%	-30%
O ₃ (1 hr.)	-29	-14
O ₃ (8hr.)	-21	-9
SO ₂	-66	-53
PM ₁₀ (24 hr.)	—	-30
PM _{2.5} (24 hr.)	—	-17
CO	-74	-62
Pb	-95	-54

Air quality in the United States has improved significantly since 1980 as indicated by data from the EPA. The level of the common pollutants nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), carbon monoxide (CO), and lead (Pb) all fell over the period 1980 to 2006. Also, the level of both large and small particulate matter (PM₁₀ and PM_{2.5}) in the air such as ash and dust, which commonly aggravate respiratory problems, fell significantly over the period 1990 to 2006.

Source: Environmental Protection Agency. Air Quality and Emissions: Progress Continues in 2006. Online at www.epa.gov/airtrends/econ-emissions.html (cited June 4, 2007).

decreased. Particulate matter comes from various sources, such as residential wood burning, coal- and oil-fired power plants, and dust particles from roads and fields. The EPA estimates that particulate matter has decreased by more than 30 percent during the past twenty-five years (2007b).⁴

The Mother of All—Global Warming

No environmental issue—terrestrial, aquatic, or atmospheric—is as powerful at mustering greener-than-thou regulations than global warming. Because greenhouse gases emitted into the atmosphere know no political boundaries and because the predicted results of global warming will affect the entire earth, the call for regulatory action is loud and clear: it is imperative that we act decisively to reduce greenhouse gas emissions. Support for this call became even stronger

4. More specifically, the EPA estimates that particulate matter, including particles smaller than 2.5 micrometers, has decreased by 30 percent over the past twenty-five years and that particulate matter smaller than 10 micrometers has fallen by 31 percent since 1988 (Environmental Protection Agency 2007b).

with the dire hyperbole presented in Al Gore's book and movie, *An Inconvenient Truth* (Gore 2006). Adding fuel to the fire, the third report of the United Nations' Intergovernmental Panel on Climate Change (IPCC) concludes that world temperatures are increasing and that humans are "very likely" responsible for rising temperatures (2001).

The debate over how much the earth will warm and whether the warming is caused by humans undoubtedly will continue well into the future, but whatever "the inconvenient truth," the same forces that have been improving human welfare and environmental quality throughout the world will play a crucial role in how we deal with global warming. To wit, market signals and incremental adjustments to the impacts of temperature change will dictate how catastrophic global warming will actually be. Such adjustments will come in the form of new technologies, new crops, new locations for production, and many more that are yet to be discovered.

One particularly important adjustment will come from carbon sequestration. To understand the importance of carbon sequestration, consider the difference between gross and net carbon emissions (see Anderson and McCormick 2007). Imagine two people of equal age, height, sex, and weight. Individual A consumes 3,500 calories a day, and individual B, 1,500 calories a day. On that basis, one might conclude that A is eating too much and will get fat. But suppose that A is a marathon runner and B is an office worker in a wheelchair. Without subtracting calories burned from calories consumed, we can't make predictions about whether a person will or will not gain weight. Gross intake is only half the equation.

The same is true for gross greenhouse-gas emissions. It is true that U.S. emissions have grown exponentially for at least a hundred years, but gross emissions are only half the story. The economic engine that emits greenhouse gas also sequesters it. For example, the farmer's tractor planting cotton seeds emits carbon dioxide, but the cotton seeds take up carbon as they grow. The cotton cloth produced from

the seed sequesters carbon, at least temporarily and perhaps even permanently, depending on what happens to the cloth. Similarly, a growing tree consumes carbon from the atmosphere; the two-by-fours cut from that tree sequester that carbon when they are used in building homes. Instead of accusing the person who builds a second or third home of consuming too many resources, perhaps we should give him or her a sequestration award. Carbon sequestration is just as much a natural product of many commercial, industrial, and even recreational activities as carbon emissions.

Interestingly, carbon emissions per capita in the United States have been constant for the past twenty-five years (see figure 11), partly because the U.S. economy uses fossil fuels so efficiently. Hence our electricity generators, light bulbs, automobiles, and so on emit less carbon per person than in other parts of the world, and those emissions per unit of output produced have been declining.

Americans sequester nearly 40 percent of the carbon they emit (see figure 11 and McCormick, 2004). Although this has not been true for the whole of the Industrial Revolution, for the past four decades, American ingenuity and efficiency have increased the amount of carbon sequestered, thus offsetting a significant portion of U.S. emissions.

Examples of such sequestration abound. For instance, because genetically modified "Roundup ready" cotton seeds and other crops require less tilling, less carbon is disturbed in the topsoil and thus less is released into the atmosphere. Similarly, landfills, as they are managed in the United States, are enormous sequesters of carbon because the waste deposited there decays slowly; newspapers from early in the twentieth century have been dug up in virtually the same condition as when they were dumped. Those newspapers sequestered carbon that was, before the tree grew, in the air.

Although there is no guarantee that new technologies will significantly reduce gross carbon emissions or that sequestration will overtake emissions, the good news is that there is time to adjust. T. M. L. Wigley, a climatologist with the National Center for Atmospheric

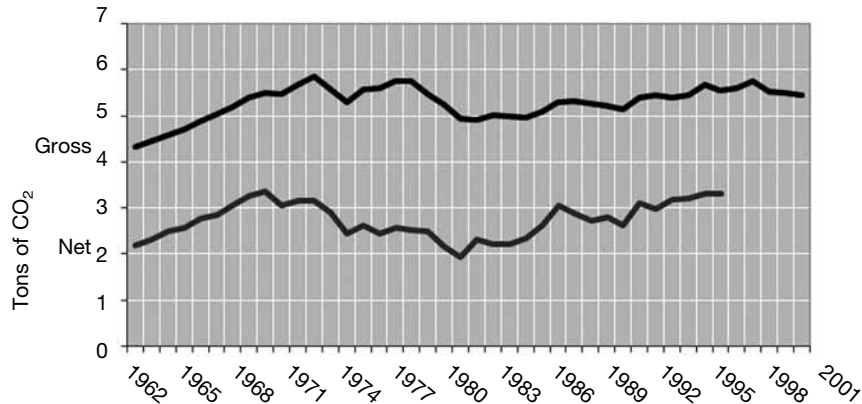


Figure 11. Gross and Net Carbon Emissions per Capita in the United States

The top line shows that carbon emissions per capita have remained relatively constant over the past forty years in the United States. Indeed, total emissions have been increasing, but the U.S. economy uses fossil fuels so efficiently that carbon emissions per capita have remained constant. Still, all the carbon released does not remain in the atmosphere. During photosynthesis, plants take in carbon dioxide and release oxygen. Thus, plants act as natural filters of carbon, a process called carbon sequestration. As a result of agriculture and forestry, the United States sequesters around 40 percent of the carbon it emits. The second line of the figure reveals that net carbon emissions are much lower than gross carbon emissions per capita.

Sources:

Terry L. Anderson and Robert McCormick. "More Inconvenient Truths." *Hoover Digest*, no. 2 (2007): 54–62.

G. Marland, T. A. Boden, and R. J. Andres. "Global, Regional, and National CO₂ Emissions." In *Trends: A Compendium of Data on Global Change* (Oak Ridge, TN: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, 2002). Online at http://cdiac.esd.ornl.gov/trends/emis/tre_coun.htm (cited July 25, 2007).

Robert E. McCormick. "The Relation between Net Carbon Emissions and Income." In Terry L. Anderson, ed., *You Have to Admit It's Getting Better: From Economic Prosperity to Environmental Quality* (Stanford, CA: Hoover Institution Press, 2004).

Research, concludes in *Geophysical Research Letters* (1998, 2288) that the impact of reducing carbon emissions to 5 percent below 1990 levels as called for in the Kyoto Protocol “would be undetectable for many decades”; he estimates that implementing the Kyoto reductions would reduce the predicted warming from 2.5 degrees Centigrade during this century by only 0.08 to 0.28 degrees. He also states that “the prospects for stabilizing sea levels over the coming centuries are remote.” Importantly, there have been no subsequent estimates to refute Wigley’s conclusions.

Given that humans can do little to slow the predicted impact of carbon emissions on global temperatures and that the predicted increases in temperatures continually fall as climate models improve, the key to dealing with global warming is adaptation. Warming will occur over a long period, and humans can be remarkably adaptable if confronted with price signals from land markets, housing markets, financial markets, and insurance markets. If predictions of sea level increases are correct, the cost of living on beachfront property will increase, inducing people to move inland. Financial markets will discount rates of return for investments that do not account for the impact of global warming. And increasing weather-related insurance rates will induce people to change where and how they live.

There is already evidence of adaptation. For example, wine producers in Germany are seeing opportunities resulting from climate change. Cabernet sauvignon and merlot grapes are migrating northward, seeking cooler temperatures, which allowed German consumers to increase their consumption of locally made reds from 17 percent to 27 percent between 2002 and 2006. Complex financial instruments known as derivatives, catastrophe bonds, and sidecars allow people to hedge against volatile weather patterns (“Come Rain or Come Shine; Weather Risk,” 2007). Traditionally, those instruments have been based on measures of rainfall and temperature, but they are evolving to include sea levels, wave heights, and humidity.

The challenge for greener-than-thou policymakers will be to let

markets do what they do best—send price signals to consumers and producers who have secure private property rights. Politicians' responses to announcements by insurance companies that they will raise rates and cancel hurricane insurance policies in Florida and Mississippi, however, suggest that the temptation to meddle with the economy is too great. The Florida legislature, for example, considered capping insurance rates, limiting policy cancellations, and creating a \$4 billion state insurance fund. Distorting such market signals is not the way to encourage adaptation. In short, we should not try to fool markets any more than we should try to fool Mother Nature.

With Every Mouth Comes Two Hands and a Brain

Just as Adam Smith's ideas might be thought of as the antidote to Malthus, the late Simon's thinking is the antidote to neo-Malthusians such as Ehrlich. Like Smith, Simon's confidence in human ingenuity came from each person's hands and brain being motivated by information and incentives. Information about increasing scarcity comes in the form of higher prices; higher prices motivate individuals to think of ways of dealing with growing scarcity; and secure property rights to scarce resources reward owners for taking action. As discussed previously, faced with the proper incentives created by property rights and markets, people conserve natural resources and improve environmental quality.

Moreover, secure property rights and markets lead to economic prosperity, which in turn provides the wherewithal for people to be environmentalists. Virtually every measure of environmental quality related to human health demonstrates a consistent relationship with income. In the early stages of economic development, environmental quality may deteriorate as citizens prefer sacrificing clean water, clean air, open space, and wildlife habitat to having food, clothing, shelter, and other consumer goods. As economic growth proceeds, environmental goods rise in citizens' priority list. With full stomachs and

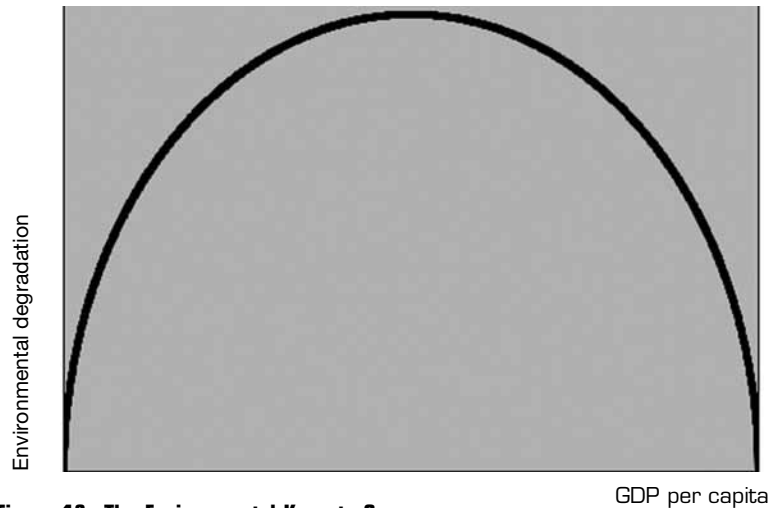


Figure 12. The Environmental Kuznets Curve

The curve shows the relationship between economic growth and environmental degradation. The curve suggests that, in the early stages of economic growth, people may be willing to degrade the environment in return for higher incomes. As income increases, however, people demand environmental quality and are willing to pay for it.

decent clothing and shelter, people begin to demand such things as clean water and air.

The relationship between economic growth and environmental quality is known as the “Environmental Kuznets Curve” (see Yandle, Vijayaraghavan, and Bhattarai 2002), named after economics Nobel laureate Simon Kuznets (see figure 12). The curve shows that in the early stages of economic growth people may be willing to give up environmental quality in return for higher incomes. But as incomes increase, people demand environmental quality and are willing to pay for it. Like it or not, we can only be environmentalists when we are wealthy enough to afford to be. Until people reach a threshold standard of living, the environmental standards to which wealthy people are accustomed are as far out of reach as fancy cars. Greener-than-thou environmental regulations that undermine prosperity undermine environmental quality, especially in the developing world. Wealthy economies such as the United States can suffer some diminished ec-

onomic productivity without significantly offsetting the environmental gains, but the same cannot be said for less-vibrant economies. Hence the key to being green is promoting economic prosperity.

Ehrlich's Revenge?

When Simon and Ehrlich bet on the future of commodity prices, the data were with Simon, who was sure they would decline, but oil and food prices in 2007 and 2008 might suggest that Ehrlich would win now. Oil prices have hit all-time record highs, well over \$100 per barrel, making American automobile drivers feel the sting at the gas pump. Between 1998 and 2007, the price of West Texas intermediate crude oil, a standard measure of oil prices, rose dramatically, from \$55 per barrel in early 2007 to \$120 in mid-2008. And rising food prices in the first half of 2008 have led to headlines announcing a "food crisis." Was Malthus right? Is the insatiable human demand outstripping Mother Nature's ability to supply?

The answer is, undoubtedly, no; Mother Nature is not the problem. Start with oil supplies. Proven reserves in the world are at an all-time high, and at current rates of consumption will last for more than a century. "We are looking at more than four and a half trillion barrels of potentially recoverable oil. That number translates into 140 years of oil at current rates of consumption, or to put it another way, the world has only consumed about 18 percent of its conventional oil potential. That fact alone should discredit the argument that peak oil is imminent and put our minds at ease concerning future petrol supplies" (Jum'ah 2006). Of course, this longevity of oil reserves depends on rates of consumption and discovery. World per capita consumption has been steady for the last quarter century, though population growth could increase total consumption and put upward pressure on prices.

On the discovery side, it is not so much a reflection of too few dinosaurs giving their lives so that we can drive but rather a reflection of political considerations. Proven reserves continue to increase. For

decades, OPEC countries, which control the vast majority of the world's oil supplies, have been limiting production to keep prices high. Coupled with this is the political instability in the Middle East which thwarts supplies and drives up prices. Iraq ranks third in proven reserves, but the Iraq war disrupted oil flows enough to influence global oil prices.

Like higher oil prices, the food crisis is partly blamed on Malthusian constraints—namely, demand outstripping supply. Again, however, such explanations are naive. On the supply side, there is nothing to suggest that agricultural productivity is declining. The level of U.S. farm output in 2004, for example, was 167 percent above the 1948 level for an average annual rate of growth of 1.74 (USDA 2008). Although higher food consumption in the developing world is being felt in the marketplace, a more likely cause of demand-side pressure is ethanol. Coupled with higher oil prices, efforts to combat carbon emissions by subsidizing ethanol production have wreaked havoc on food markets. Again, it is more politics than Mother Nature that is causing the so-called food crisis.

So if environment quality is generally improving, why is there so much environmental gloom-and-doom? At a time when more and more people are enjoying economic growth, political freedom, longer and healthier lives, more free time, and cleaner natural environments, why is there an environmental litany filled with fear? The short answer is that gloom-and-doom provides a pulpit for greener-than-thou regulatory environmentalism. This is not to say that some environmental regulations have not improved environmental quality, but it does not follow that maintaining or further improving environmental quality requires more stringent regulation.

Because there has been so much environmental improvement, new sources of environmental gloom-and-doom have risen to the surface, and global warming has become the “mother of all environmen-

tal problems.” It touches us all and has become the rallying cry for “green patriotism” (Friedman 2007). As we shall see, the growing environmental bureaucracy and the special interests it serves are more often the beneficiaries of environmental regulations even when the environment is not.