

A · N · N · U · A · L    E · D · I · T · I · O · N · S

# ENVIRONMENT



96/97



# The Annual Editions Series

Annual Editions is a series of over 65 volumes designed to provide the reader with convenient, low-cost access to a wide range of current, carefully selected articles from some of the most important magazines, newspapers, and journals published today. Annual Editions are updated on an annual basis through a continuous monitoring of over 300 periodical sources. All Annual Editions have a number of features designed to make them particularly useful, including topic guides, annotated tables of contents, unit overviews, and indexes. For the teacher using Annual Editions in the classroom, an Instructor's Resource Guide with test questions is available for each volume.



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# To the Reader

In publishing ANNUAL EDITIONS we recognize the enormous role played by the magazines, newspapers, and journals of the *public press* in providing current, first-rate educational information in a broad spectrum of interest areas. Within the articles, the best scientists, practitioners, researchers, and commentators draw issues into new perspective as accepted theories and viewpoints are called into account by new events, recent discoveries change old facts, and fresh debate breaks out over important controversies. Many of the articles resulting from this enormous editorial effort are appropriate for students, researchers, and professionals seeking accurate, current material to help bridge the gap between principles and theories and the real world. These articles, however, become more useful for study when those of lasting value are carefully collected, organized, indexed, and reproduced in a low-cost format, which provides easy and permanent access when the material is needed. That is the role played by ANNUAL EDITIONS. Under the direction of each volume's *Editor*, who is an expert in the subject area, and with the guidance of an *Advisory Board*, we seek each year to provide in each ANNUAL EDITION a current, well-balanced, carefully selected collection of the best of the public press for your study and enjoyment. We think you'll find this volume useful, and we hope you'll take a moment to let us know what you think.

During the last two decades, and particularly during the late 1980s and early 1990s, the environmental predicament foreseen by scientists has begun to emerge in a number of guises: population/food imbalances, problems of energy scarcity, acid rain, toxic and hazardous wastes, water shortages, massive soil erosion, global atmospheric pollution, forest dieback and tropical deforestation, and the highest rates of plant and animal extinction the world has known.

These and other problems surfaced in spite of the increased environmental awareness and legislation that characterized the decade of the 1970s. The problems resulted, in part, from the misguided environmental "counterrevolution," which typified public policy of the 1980s and which favored the short-term, expedient approach to problem solving over longer-term economic and ecological good sense. In Africa, for example, the drive to produce enough food to support a growing population has caused the use of increasingly fragile and marginal resources, resulting in the dryland deterioration that brings famine to that troubled continent. Similar social and economic problems have contributed to massive deforestation in Middle and South America and Southeast Asia.

The economic problems generated by resource scarcity have caused the relaxation of environmental quality standards that have become viewed as too costly. The decrease in standards has been particularly apparent in Third World countries, striving to become economically developed. But even in the more highly developed nations, a prolonged recession, only recently ended, created an economic climate favoring the slackening of environmental ideals. In the name of jobs for the timber industry, for example, some of the last few areas of old-growth forests in the United States are threatened, and in the name of mineral resource development, one of the nation's treasures—Yellowstone National Park—is endangered by a proposed mining operation. In addition, concerns over energy availability have created the perceived need for military action to save the developed nations' access to cheap oil and have prompted increasing reliance on technological quick fixes.

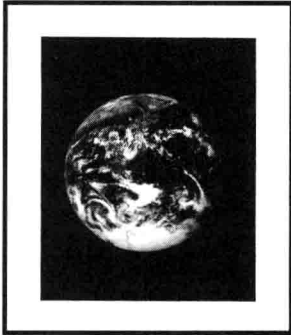
There are signs, however, that a new environmental consciousness is awakening. The dissolution of the Iron Curtain and the environmental horror stories that have emerged from Eastern Europe and the newly independent states that made up the former Soviet Union have given new incentives to international cooperation. Several major publications have claimed the 1990s "The Decade of the Environment," and there is growing public clamor to do something about environmental quality before it is too late.

The articles contained in *Annual Editions: Environment 96/97* have been selected for the light they shed on these and other problems and issues. The selection process was aimed at including material that will be readily assimilated by the general reader. Additionally, every effort has been made to choose articles that encourage an understanding of the nature of the environmental problems that beset us and how, with wisdom and knowledge and the proper perspective, they can be solved, or at least mitigated. Accordingly, the selections in this book have been chosen more for their intellectual content than for their emotional tone. They have been arranged into an order of topics—the global environment, population and food, energy, the biosphere, resources, and pollution—that lends itself to a progressive understanding of the causes and effects of human modifications of Earth's environmental systems. We will not be protected against the ecological consequences of human actions by remaining ignorant of them. Although the knowledge gained through the use of this book may not allow any of us to escape the environmental predicament, it should ensure that we do not continue to act and react in ways that will make that predicament worse.

Readers can have input into the next edition by completing and returning the postpaid *article rating form* at the back of the book.



John L. Allen  
Editor

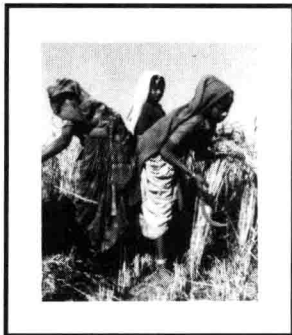


## Unit 1

### The Global Environment: An Emerging World View

Five selections provide information on the current state of Earth and the changes we will face.

To the Reader	iv
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1. The World Transformed, Lester R. Brown, <i>The Futurist</i> , May/June 1993. As a consequence of <b>environmental degradation</b> , living standards in many countries are falling sharply. Fortunately, scientists and policymakers are becoming increasingly aware of the changes in <b>economic and environmental policies</b> that are needed to halt the decline in both living standards and environmental quality.	6
2. Thought for the Morrow: Cumulative Threats to the Environment, Gordon Orians, <i>Environment</i> , September 1995. Some cumulative threats such as ozone depletion and global warming have received much attention from both the scientific community and the public. Other threats, such as the loss of <b>bio-diversity</b> , <b>landscape modification</b> , and the cumulative changes in <b>biogeochemical cycles</b> deserve more attention from both scientists and policymakers.	12
3. Ecosocietal Restoration: Reestablishing Humanity's Relationship with Natural Systems, John Cairns Jr., <i>Environment</i> , June 1995. Human society has evolved together with <b>natural systems</b> and has always modified those systems. But increased population and technology have created imbalances in the relationship between humans and the environment. What is required is <b>ecological restoration</b> through modification of environmental attitudes and control of population and technology.	21
4. Carrying Capacity: Earth's Bottom Line, Sandra Postel, <i>Challenge</i> , March/April 1994. Human societies have failed to discriminate between the kinds of <b>technology</b> that meet the needs of a <b>sustainable society</b> and those that harm Earth. The solution lies in the creativity and energy of people from all walks of life to join in the urgent mission of halting Earth's environmental decline.	28
5. Forging a New Global Partnership to Save the Earth, Hilary F. French, <i>USA Today Magazine (Society for the Advancement of Education)</i> , May 1995. Many of the <b>development and economic issues</b> that cause <b>environmental deterioration</b> are worsening. An <b>international effort</b> to stabilize the planet must be made before deterioration reaches a point that becomes irreversible.	37
	42



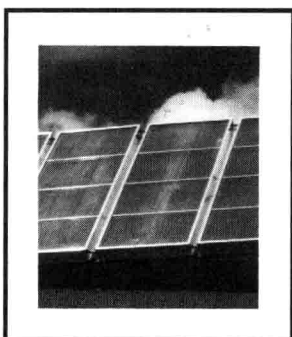
# Unit 2

## The World's Population: People and Hunger

Five selections examine the problems the world will have in feeding its ever-increasing population.

### Overview

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|  | 42 |
| 6. <b>How Many Is Too Many?</b> Charles C. Mann, <i>The Atlantic Monthly</i> , February 1993.  | 44 |
| Biologists have argued for more than a century that unchecked <b>population growth</b> will bring about the destruction of the <b>global environment</b> . Economists, on the other hand, have argued that both humans and markets will cope with the population increase and point to the fact that none of the biologists' predicted apocalypses have arrived.   |    |
| 7. <b>Reassessing the Earth's Population</b> , Lester R. Brown, <i>Society</i> , May/June 1995.  | 55 |
| The output of food from farms and the sea can no longer keep pace with <b>population growth</b> . New information on the <b>carrying capacity</b> of both land and oceanic food systems argues for a reevaluation of <b>population policies</b> . The population growth that has slowed humanity's progress is now reversing it.   |    |
| 8. <b>Putting the Bite on Planet Earth</b> , Don Hinrichsen, <i>International Wildlife</i> , September/October 1994.   | 59 |
| If human society does not succeed in checking <b>population growth</b> , the future will bring widespread <b>social and economic dislocations</b> as resource bases collapse. The time period for responding to the crises posed by growing populations, increased consumption, and shrinking resources is confined to the next two decades.   |    |
| 9. <b>Population, Poverty, and the Local Environment</b> , Partha S. Dasgupta, <i>Scientific American</i> , February 1995.   | 68 |
| As resources, including <b>water</b> and <b>wood</b> , become more scarce in agricultural areas of the <b>developing world</b> , more children are needed to aid in <b>resource extraction</b> . The demand for larger rural families places greater pressure on <b>marginal resources</b> , increasing the need for even more children in a cycle of increasing poverty, population, and environmental damage.              |    |
| 10. <b>Can Humanity Survive Unrestricted Population Growth?</b> Timothy C. Weiskel, <i>USA Today Magazine (Society for the Advancement of Education)</i> , January 1995.   | 73 |
| Scientists report that the planet is currently in the midst of a process of <b>global extinction</b> that equals or exceeds similar catastrophic episodes in the past. Past extinctions were the result of such extraterrestrial causes as meteor collisions, while the present extinction event is the consequence of the exponential <b>population growth</b> of humans and their <b>domesticated plants and animals</b> . |    |



# Unit 3

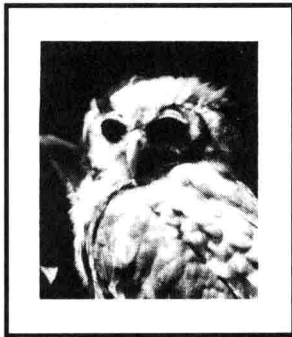
## Energy: Present and Future Problems

Five articles consider the problems of meeting present and future energy needs. Alternative energy sources are also examined.

### Overview

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|   | 76  |
| 11. <b>Renewable Energy Technology: An Urgent Need, a Hard Sell</b> , Keith Lee Kozloff, <i>Environment</i> , November 1994.  | 78  |
| Compared to other <b>energy technologies</b> , renewable energy generates far less environmental impact. Yet biomass, wind, solar, geothermal, and hydroelectric energy currently supply only 9 percent of U.S. energy requirements. A shift toward <b>renewable energy</b> would curb both conventional <b>air pollution</b> and the environmental damage that results from mining, transporting, and burning <b>fossil fuels</b> .  |     |
| 12. <b>The Great Energy Harvest</b> , Helena Li Chum, Ralph Overend, and Julie A. Phillips, <i>The Futurist</i> , May/June 1993.  | 88  |
| Acceptance of energy crops as a <b>global energy resource</b> is driven by such environmental concerns as the reduction of carbon dioxide emissions. But <b>economic development</b> is also a factor, as the emergence of "energy farming" could significantly revive rural economies in both the developed and developing countries.  |     |
| 13. <b>Here Comes the Sun</b> , Christopher Flavin and Nicholas Lenssen, <i>World Watch</i> , September/October 1991.   | 94  |
| The <b>energy technology</b> exists today to produce most of the energy needs of the world from <b>solar power</b> , <b>wind power</b> , and <b>geothermal energy</b> . Tapping into these <b>alternative energy</b> resources, however, will require a vigorous public commitment to push <b>renewable energy</b> into the mainstream. The key to overcoming political barriers to that commitment is the ability to demonstrate the advantages of alternative energy over <b>fossil fuels</b> . |     |
| 14. <b>Tilting toward Windmills</b> , Jon G. McGowan, <i>Technology Review</i> , July 1993.   | 102 |
| A <b>wind-power</b> industry flourished briefly in the aftermath of the energy crisis of the 1970s. With the worldwide drop in oil prices and the development of domestic policies that sharply curtailed funding for <b>renewable energy</b> research, interest in wind energy as a large-scale source of electricity almost disappeared. Now, however, wind power is making a comeback.   |     |
| 15. <b>Improving Energy Efficiency: Making a "No-Regrets" Option Work</b> , Thomas J. Wilbanks, <i>Environment</i> , November 1994.   | 109 |
| Recent efforts to improve <b>energy efficiency</b> have been based on "no-regrets" options: actions that benefit the environment and aid economic development without requiring painful sacrifices for developed or developing countries. The relative success of such options suggests that they should be the basis for future <b>energy policies</b> .   |     |





# Unit 4

## Biosphere: Endangered Species

Seven articles examine the problems in the world's biosphere. Not only are plants and animals endangered, but so are many human groups who are disastrously affected by deforestation and primitive agricultural policies.

Overview 120

16. The Origin and Function of Biodiversity, Otto T. Solbrig, *Environment*, June 1991. 122

Earth has an enormous variety of plants and animals. This **bio-diversity** is the ultimate source of human sustenance. Yet humans are endangering the immense richness of this diversity, and a reduction in the **genetic variety** of crops and wild species could seriously affect human welfare. Increased public awareness of humanity's depletion of biodiversity is necessary to stimulate national and international efforts to learn more about the role of diversity in the **ecosystem's** functioning.

### A. PLANTS

17. Rain Forest Entrepreneurs: Cashing In on Conservation, Thomas A. Carr, Heather L. Pedersen, and Sunder Ramaswamy, *Environment*, September 1993. 131

Worldwide, **deforestation** portends serious environmental consequences, including the reduction of **biodiversity** and an increase in **global warming**. Although the primary reasons for forest clearance are rooted in economics, mounting evidence suggests that deforestation is not only ecologically devastating but economically unsound.

18. An Explosion of Green, Bill McKibben, *The Atlantic Monthly*, April 1995. 138

The **reforestation** of the eastern United States is partly the result of **conservation** efforts and partly the result of accident. But the region's forest recovery can show the developing world how to make room for people, farming, industry, and **endangered species** and still maintain a viable ecosystem.

19. Plundering the Boreal Forests, Anjali Acharya, *World Watch*, May/June 1995. 149

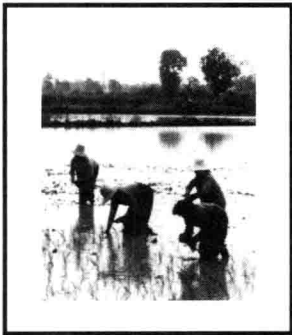
"**Deforestation**" almost always is taken to mean clearing of tropical forests. But another immense belt of forest land—the **boreal forests** of the far North—is disappearing at least as rapidly as tropical forests. These boreal forests are the world's largest terrestrial ecosystem and have become the world's main source of industrial wood and wood fiber. Slowing the rate at which they are being destroyed requires far-reaching changes in **government policy**.

### B. ANIMALS

20. A Time of Catastrophic Extinction: What We Must Do, Peter Raven, *The Futurist*, September/October 1995. 158

**Animal and plant species** will likely become extinct at the rate of 50,000 species a year during the next few decades. This will be the greatest mass extinction since the die-off of the dinosaurs. Of all **global problems**, this one is moving the most rapidly and has the greatest consequences. **Extinctions** and the loss of **bio-diversity** are completely irreversible.





# Unit 5

## Resources: Land, Water, and Air

Seven selections discuss the environmental problems affecting our land, water, and air resources.

21. **Flying into Trouble**, Howard Youth, *World Watch*, January/February 1994. 162

Because of their position in environmental systems, many species of birds are indicators of **environmental quality**. Worldwide, **bird populations** are in decline. The causes of population decline among birds—habitat loss, pesticides, chemical contamination, introduction of exotic species, and overhunting—will continue unless humans make profound changes in the ways they view their environments.

22. **Twilight of the Cod**, Robert Kunzig, *Discover*, April 1995. 171

The North Atlantic cod was once the symbol of the **environmental abundance** of the New World. Centuries of heavy fishing reduced the stock of breeding cod, and the advent of industrial fishing technology over the last hundred years has brought the apparently endless resource to the brink of **extinction**. Fishermen blame the demise of the cod on pollution or global warming—on everything but the fact that fish were caught more rapidly than they could reproduce.

### Overview 180

23. **27th Environmental Quality Review: A Year of Gridlock**, *National Wildlife*, February/March 1995. 182

The beginning of the Clinton administration brought environmental activists to hope for an “environmental president.” Despite early favorable signs, however, key elements of **environmental funding** were dropped from the administration’s budget proposals. In its annual update of **environmental quality** in the United States, *National Wildlife* suggests that little has changed in federal **environmental policy**.

### A. LAND

24. **Averting a Disaster**, *International Agricultural Development*, November/December 1993. 190

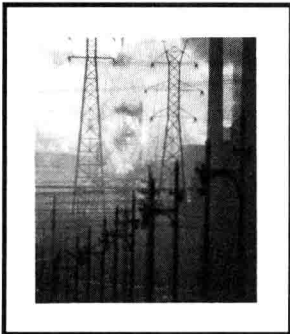
**Soil erosion** is accelerating nearly everywhere in the world as a result of **overgrazing**, destructive agricultural practices, and **deforestation**. Land that is needed to feed the world’s growing population is being degraded, and **food shortages** lie ahead, unless the loss of valuable topsoil is reduced.

25. **Stopping the Dry Destruction**, *International Agricultural Development*, March/April 1994. 194

According to the United Nations Environment Programme (UNEP), **desertification** is one of the most serious global environmental problems. The problem is not the spread of deserts but is the slow and steady deterioration of the world’s vast dryland areas that support grazing, grain cultivation, and one-sixth of the world’s population.

26. **Assault of the Earth**, Elena Wilken, *World Watch*, March/April 1995. 199

The world’s supply of productive soil is dwindling as a result of intensive farming. Virtually all of the world’s most fertile **farmland** is already in cultivation. As **population** grows, farmers will have to increase their yields, and this cannot be done without increasing already severe problems of **soil depletion**.



# Unit 6

## Pollution: The Hazards of Growth

Five selections weigh the environmental impacts of the disposal and control of pollution, unwanted radioactive waste, pesticides, and recycling.

### B. WATER

27. **Dying Seas**, Anne E. Platt, *World Watch*, January/February 1995. 204

Human civilization has always tended to cluster around the land-enclosed **seas** that provided easy transportation, food, and land rich with topsoil. In the last few decades, the growth of waterside civilization has accelerated to the point that the qualities that make the **seas** valuable—particularly their **food production**—are threatened.

28. **Freshwater Failures: The Crises on Five Continents**, Janet N. Abramovitz, *World Watch*, September/October 1995. 213

For centuries human societies have failed to understand that **freshwater** assets are not simple commodities to be tapped, channeled, or dammed at will, but complex living systems. As a result of that misunderstanding, many of these systems are facing severe **environmental problems**, ranging from reductions in water supply to lowering of water quality and disruptions of aquatic biology.

### C. AIR

29. **Getting Warmer: Looking for a Way Out of the Climate Impasse**, Christopher Flavin and Odil Tunali, *World Watch*, March/April 1995. 221

In 1992, at the Earth Summit in Rio de Janeiro, the world's governments signed the Climate Change Treaty. Since that time, however, governments have failed to respond effectively to the threat of **climate change**. Observers of **environmental policy** point out that action often requires real world crises. But climate change is a uniquely large and irreversible problem, and additional delay may have extreme consequences.

### Overview

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30. **Who Gets Polluted?** Ruth Rosen, *Dissent*, Spring 1994. 232

Over the last decade, a movement for **environmental justice** has been spreading across urban America. The basis for the movement is the fact that impoverished racial groups in inner city locations have endured the highest levels of **industrial pollution** in the United States. Minority communities are challenging corporate and governmental **environmental policies**.

31. **A Place for Pesticides?** Peter Weber, *World Watch*, May/June 1992. 239

With an eye on ecology, the world's farmers can control pests and reduce the mounting hazards of pesticide dependence in their agricultural systems. They will also liberate themselves from the treadmill economies of chemical agriculture if governments can develop **policies for sustainable agriculture** designed to both reduce pesticide use and increase crop yields.

32. <b>The Sudden New Strength of Recycling</b> , John E. Young, <i>World Watch</i> , July/August 1995.	246
<i>Recycling</i> is one of the key strategies for alleviating the pressure of human populations on resources. In North America, recycling began as a "do-good" activity for municipalities and then became a necessary burden. Now it has become a real revenue producer as the costs of <b>resource recovery</b> have gone down and the price of recycled materials has gone up.	
33. <b>Nothing Clean about "Cleanup,"</b> Linda Rothstein, <i>The Bulletin of the Atomic Scientists</i> , May/June 1995.	251
The end of the cold war has brought about a massive and expensive effort to stabilize the poisonous materials in a weapons complex that is no longer relevant. Experts estimate that the full cost of <b>nuclear weapons</b> disposal could amount to \$500 billion over a 75-year period. A major part of the problem is that cold war arsenals were built and stored with no regard for <b>environmental management</b> .	
34. <b>Environmental Nightmares: Russia's Total Mess</b> , Jörg Albrecht, Patricia Faller, Dick Kurbjuweit, and Walter Saller, <i>World Press Review</i> , February 1995.	258
Post-Soviet Russia faces a host of intractable problems, but the biggest of all may be the ghastly <b>environmental legacy</b> of reckless Soviet industrialization and military buildup. Tons of <b>atomic wastes</b> and crumbling nuclear power plants are time bombs threatening disasters far greater than Chernobyl—not just for Russia but for the entire world.	
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Fifteenth Edition

## Editor

**John L. Allen**  
University of Connecticut

John L. Allen is professor of geography at the University of Connecticut. He received his bachelor's degree in 1963 and his M.A. in 1964 from the University of Wyoming, and in 1969 he received his Ph.D. from Clark University. His special area of interest is the impact of contemporary human societies on environmental systems.

# A Annual Editions E

*A Library of Information from the Public Press*



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# Topic Guide

This topic guide suggests how the selections in this book relate to topics of traditional concern to students and professionals involved with environmental study. It is useful for locating articles that relate to each other for reading and research. The guide is arranged alphabetically according to topic. Articles may, of course, treat topics that do not appear in the topic guide. In turn, entries in the topic guide do not necessarily constitute a comprehensive listing of all the contents of each selection.

TOPIC AREA	TREATED IN	TOPIC AREA	TREATED IN
<b>Air Pollution</b>	11. Renewable Energy Technology	<b>Energy Efficiency</b>	15. Improving Energy Efficiency
<b>Alternative Energy</b>	13. Here Comes the Sun	<b>Energy Policies</b>	15. Improving Energy Efficiency
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<b>Bird Populations</b>	21. Flying into Trouble	<b>Environmental Funding</b>	23. 27th Environmental Quality Review
<b>Boreal Forests</b>	19. Plundering the Boreal Forests	<b>Environmental Justice</b>	30. Who Gets Polluted?
<b>Carrying Capacity</b>	7. Reassessing the Earth's Population	<b>Environmental Legacy</b>	34. Russia's Total Mess
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<b>Deforestation</b>	17. Rain Forest Entrepreneurs 19. Plundering the Boreal Forests 24. Averting a Disaster	<b>Environmental Problems</b>	28. Freshwater Failures
<b>Desertification</b>	25. Stopping the Dry Destruction	<b>Environmental Quality</b>	21. Flying into Trouble 23. 27th Environmental Quality Review 30. Who Gets Polluted?
<b>Developing World</b>	9. Population, Poverty, and the Local Environment	<b>Extinction</b>	22. Twilight of the Cod
<b>Development Issues</b>	5. Forging a New Global Partnership to Save the Earth	<b>Farmland</b>	26. Assault of the Earth
<b>Domesticated Plants</b>	10. Can Humanity Survive Unrestricted Population Growth?	<b>Food Production</b>	27. Dying Seas
<b>Dryland Areas</b>	25. Stopping the Dry Destruction	<b>Food Shortages</b>	24. Averting a Disaster
<b>Ecological Restoration</b>	3. Ecosocietal Restoration	<b>Fossil Fuels</b>	11. Renewable Energy Technology
<b>Economic Development</b>	12. Great Energy Harvest	<b>Freshwater</b>	28. Freshwater Failures
<b>Economic Policies</b>	1. World Transformed	<b>Genetic Variety</b>	16. Origin and Function of Biodiversity
<b>Ecosystem</b>	16. Origin and Function of Biodiversity	<b>Geothermal Energy</b>	13. Here Comes the Sun
<b>Endangered Species</b>	18. Explosion of Green		

TOPIC AREA	TREATED IN	TOPIC AREA	TREATED IN
Global Energy Resource	12. Great Energy Harvest	Population Policies	7. Reassessing the Earth's Population
Global Environment	6. How Many Is Too Many?	Recycling	32. Sudden New Strength of Recycling
Global Extinction	10. Can Humanity Survive Unrestricted Population Growth?	Reforestation	18. Explosion of Green
Global Problems	17. Rain Forest Entrepreneurs	Renewable Energy	11. Renewable Energy Technology 13. Here Comes the Sun 14. Tilting toward Windmills
Government Policy	19. Plundering the Boreal Forests	Resource Extraction	9. Population, Poverty, and the Local Environment
Industrial Pollution	30. Who Gets Polluted?	Resource Recovery	32. Sudden New Strength of Recycling
International Effort	5. Forging a New Global Partnership to Save the Earth	Seas	27. Dying Seas
Landscape Modification	2. Cumulative Threats to the Environment	Social and Economic Dislocations	8. Putting the Bite on Planet Earth
Marginal Resources	9. Population, Poverty, and the Local Environment	Soil Depletion	26. Assault of the Earth
Natural Systems	3. Ecosocietal Restoration	Soil Erosion	24. Averting a Disaster
Nuclear Weapons	33. Nothing Clean about "Cleanup"	Solar Power	13. Here Comes the Sun
Overgrazing	24. Averting a Disaster	Sustainable Agriculture	31. Place for Pesticides?
Pesticides	31. Place for Pesticides?	Sustainable Society	4. Carrying Capacity
Population	26. Assault of the Earth	Water Resources	9. Population, Poverty, and the Local Environment
Population Growth	6. How Many Is Too Many? 7. Reassessing the Earth's Population 8. Putting the Bite on Planet Earth 10. Can Humanity Survive Unrestricted Population Growth?	Wind Power	13. Here Comes the Sun 14. Tilting toward Windmills
		Wood Resources	9. Population, Poverty, and the Local Environment

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# The Global Environment: An Emerging World View

The celebration of Earth Day 1995, the 25th anniversary of the original Earth Day, came at a time when public apprehension over the environmental future of the planet reached levels unprecedented even during the activist days of the late 1960s and early 1970s. No longer were those concerned about the environment viewed as “eco-freaks” and “tree-huggers.” Many serious scientists joined the rising clamor for environmental protection, as did the more traditional environmentally conscious public interest groups. There are a number of reasons for this increased environmental awareness. Some of these reasons arise from environmental events. But more arise simply from the increase in global information systems and the maturation of concepts about the global nature of environmental processes. For example, the raising of the Iron Curtain that had separated East and West since the end of World War II and the fragmentation of the former Soviet Union brought the end of the cold war and hope for a more integrated global economy promised both peace and prosperity for the world’s peoples. But that same raising of the barrier to the flow of people, goods, and services has also allowed information and ideas to pass more freely between East and West. Much of what has been learned through this increased information flow, particularly by Western observers, has been of an environmentally ravaged Eastern Europe and Russia—a chilling forecast of what other industrialized nation will become in the near future unless strict international environmental measures are put in place. As distressing as the pictures and descriptions of forest destruction in eastern Germany and the Czech and Slovak republics or the devastation of the Aral Sea have been, they have had a positive value. For perhaps the first time ever, countries are beginning to recognize that environmental problems have no boundaries and that international co-operation is the only way to solve them. The subtitle of this first unit, “An Emerging World View,” is an optimistic assessment of the future: a future in which less money is spent on defense and more on environmental protection and cleanup. The authors of the Worldwatch Institute’s *State of the World* (a publication that has assumed a near-official status as the annual assessment of the global environment) have recently described a new world order in which political influence will be based more upon leadership in environmental and economic issues than upon military might. Perhaps it is far too early to make such optimistic predictions, to claim that the decade of the 1990s is indeed “The Decade of the Environment,” or to conclude that the world’s nations—developed and underdeveloped—will begin to recognize that Earth’s environment is a single unit. Nevertheless, there is growing

international realization—aided by the “information superhighway”—that we are all, as environmental activists have said for decades, inhabitants of “Spaceship Earth” and that, as such, we will survive or succumb together.

The articles selected for this unit have been chosen to illustrate this increasingly global perspective on environmental problems and the degree to which their solutions must be linked to political, economic, and social problems and solutions. In the lead piece of the section, “The World Transformed,” Lester Brown, director of the Worldwatch Institute, discusses not only the developing global perspective but the degree to which that perspective has given rise to increasing awareness of exactly what steps are necessary to solve pressing environmental problems. Brown points out that while the standards of living are falling in many developing nations as a result of environmental degradation, the very processes that are leading to economic and environmental dissolution are becoming more clearly understood. In particular, the concept of sustainable use of land and resources is becoming much more than a gleam in environmentalists’ eyes—it is becoming official government policy in some regions, with the corresponding creation of international agencies designed to administer environmental regulations that cut across national boundaries. The international character of environmental problems is also the subject of the second article in the section, although the focus of Gordon Orians’s “Thought for the Morrow: Cumulative Threats to the Environment” is a bit different from Brown’s. Orians, a well-known authority on agricultural ecology, notes that many of what he terms “cumulative threats”—those that result from repeated actions and have consequences in places often far removed from those in which the actions occurred—go largely unnoticed by the public and by policymakers. For example, the most widespread and important cumulative effect of human activities is landscape modification, an environmental effect that receives far less attention from scientists than the more “popular” threats of global warming and ozone depletion. Orians advocates a philosophical viewpoint on the more dramatic of the cumulative threats, suggesting that in dealing with such issues as the loss of biological diversity, we must take into account our responsibility to future generations. The third selection in the unit is also directed toward philosophies. In “Ecosocietal Restoration: Reestablishing Humanity’s Relationship with Natural Systems,” John Cairns Jr. adopts the position that solutions to environmental problems require that the natural relationship between human societies and environmental systems be restored. In humankind’s early years, the connections between peo-



ple and the environments they inhabited were direct and intimate. In more modern times, as these intimate relationships lessened, attitudes toward environmental systems began to change, and changing attitudes allowed greater negative impact. Cairns suggests that the full acceptance of an international "restoration ecology" program will not only lessen environmental modification but will also promote a healthier set of attitudes toward the environment.

The next selection also adopts a social perspective on the international scope of environmental problems and the necessity of developing sustainable systems to correct them. In "Carrying Capacity: Earth's Bottom Line," Sandra Postel, vice president for research at Worldwatch Institute, describes the difficult but necessary task of differentiating between technologies that meet our needs in a sustainable way and technologies that harm Earth. Postel notes the irony of our efforts to make Earth yield more to support a growing human population while, at the same time, those efforts diminish Earth's ability to sustain life of all kinds—including our own. She builds

her argument around the biological concept of "carrying capacity," the largest number of any given species that a habitat can support indefinitely. She claims that as a result of our population size, consumption patterns, and technology choices, we have surpassed the planet's carrying capacity. The challenge of reversing the inevitable decline in the quality of human life and the quality of the environment can be met, according to Postel, only if all people in all walks of life rise to meet it. Some ways in which people *are* rising to meet the challenge form the basis for the final piece in unit 1. Hilary F. French, like Postel a senior researcher with the Worldwatch Institute, provides a summary of the many ways in which members of the international community are responding to the environmental challenge, including the negotiation of treaties and other types of international accords and the emergence of powerful grass roots environmental movements. The prospects for the future of the global environment are considerably enhanced by such activities, notes French, but they must be maintained and even augmented if sustainable development is to come about. Only through sustainable development efforts can global ecological collapse and the inevitable social disintegration that would accompany it be avoided. If, on the other hand, international efforts generate talks and conferences and paper agreements but little action, the future, to French, does not look bright.

### Looking Ahead: Challenge Questions

What is the relationship between environmental degradation and economic systems? How has the growing awareness of environmental systems improved the chances for increased levels of environmental protection?

What are the most important cumulative threats to the global environment? How might such threats be addressed through international cooperation?

How have the relationships between human societies and environmental systems coevolved or changed with increasing human population and technology? How can the concept of "ecosocietal restoration" modify attitudes to help solve many of the world's most pressing environmental problems?

What is the relationship between technology and the concept of biological carrying capacity? How have new technologies strengthened the argument that a given environment can support only a finite number of a certain species?

Why are so many of the developmental and economic issues that cause environmental deterioration worsening? How can international efforts halt deterioration in air, soil, and water quality and in biological systems before the deterioration becomes irreversible?



# The World Transformed

## Envisioning an Environmentally Safe Planet

Lester R. Brown

**Living standards are falling in many countries due to environmental degradation.**

**Fortunately, the changes needed to halt the decline are becoming clear, and some areas are reporting remarkable successes.**

*Lester R. Brown is president of the Worldwatch Institute, 1776 Massachusetts Avenue N.W., Washington, D.C. 20036. This article is adapted from State of the World 1993 by Lester R. Brown et al. (W. W. Norton, 1993), which is available from the Futurist Bookstore for \$10.95 (\$9.95 for Society members), cat. no. B-1656.*

**M**any people have long understood, at least intuitively, that continuing environmental degradation would eventually exact a heavy economic toll. Unfortunately, no global economic models incorporate the depletion and destruction of the earth's natural support systems. Now, however, we can begin to piece together information from several recent independent studies to get a sense of the worldwide economic effects of environmental degradation. Among the most revealing are studies on the effects of air pollution and acid rain on forests in Europe, of land degradation on livestock and crop production in the world's dryland regions, of global warming on the U.S. economy, and of pollution on health in Russia.

These reports and other data show that the fivefold growth in the world economy since 1950 and the increase in population from 2.6 billion to 5.5 billion have begun to outstrip the carrying capacity of biological support systems and the capacity of natural systems to absorb waste without being damaged. In country after

country, demand for crops and for the products of grasslands, forests, and fisheries are exceeding the sustainable yield of these systems. Once this happens, the resource itself begins to shrink as natural capital is consumed. Overstocking grasslands, overcutting forests, overplowing, and overfishing are now commonplace. Every country is practicing the environmental equivalent of deficit financing in one form or another.

Perhaps the most visible environmental deficit is deforestation, the result of tree cutting and forest clearing that exceeds natural regrowth and tree planting. Each year this imbalance now costs the world some 17 million hectares of tropical forests alone. Over a decade, the destruction of tropical forests clears an area the size of Malaysia, the Philippines, Ghana, the Congo, Ecuador, El Salvador, and Nicaragua. Once tropical forests are burned off or clear-cut, the land rapidly loses its fertility, since most of the nutrients in these ecosystems are stored in the vegetation. Although these soils can be farmed for three to five years before fertility drops and can be grazed for five to 10 years before becoming wasteland, they typically will not sustain productivity over the long term.

Clearing tropical forests is, in effect, the conversion of a highly productive ecosystem into wasteland in exchange for a short-term economic gain. As timber resources are depleted in the Third World, transforming countries that traditionally