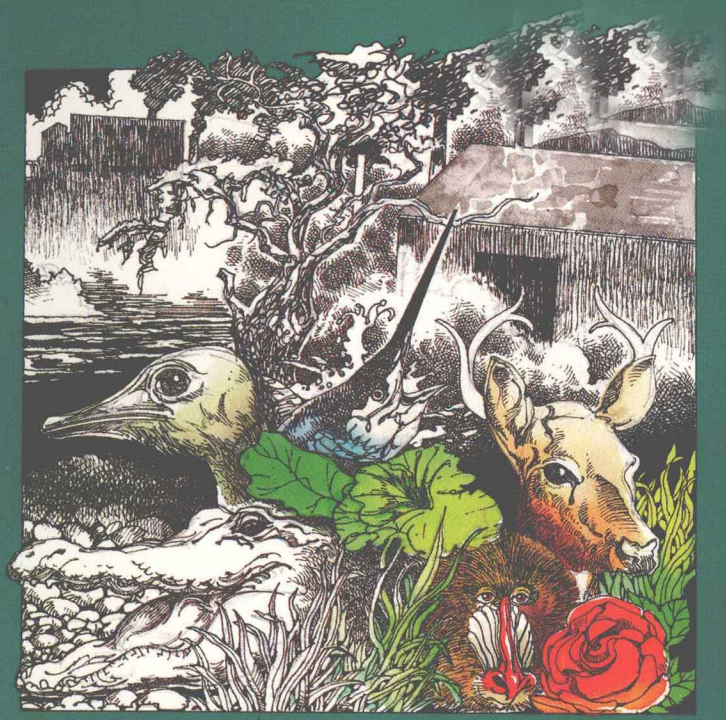
Annual Editions

ENVIRONMENT

94/95



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Editors/ Advisory Board

Members of the Advisory Board are instrumental in the final selection of articles for each edition of Annual Editions. Their review of articles for content, level, currentness, and appropriateness provides critical direction to the editor and staff. We think you'll find their careful consideration well reflected in this volume.

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 such as 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. The last half of the 1980s and the opening years of the 1990s have been characterized by drought and famine in Africa, a major environmental chemical accident in Bhopal, India, the burning and cutting of thousands of square miles of tropical rain forest, a near-meltdown of a nuclear power generator in Chernobyl in Russia, abnormally high temperatures and drought in the United States, several serious oil spills, including the infamous wreck of the Exxon *Valdez,* an energy-related military conflict in the oil-rich Persian Gulf that produced significant environmental disruptions, and unprecedented conflicts between advocates of the economic use of resources and the supporters of environmental protection. Moreover, the last few years have brought scientific validation of the concern that the life-protecting ozone layer is being destroyed, and that the long-term global climate changes (the human-enhanced greenhouse effect) that scientists have warned about may have already begun. These and other problems surfaced in spite of the increased environmental awareness and legislation that characterized the decade of the 1970s. They have resulted, in part, from the misguided environmental counterrevolution that characterized the last dozen years and favored the short-term, expedient approach to problem-solving over longer-term economic and ecological good sense. The drive to produce enough food to support a growing population, for example, has resulted in the use of increasingly fragile and marginal resources in Africa, which has produced the desert expansion that brings famine to that troubled continent. Similar social and economic problems have contributed to massive deforestation in Latin America and Southeast Asia. The economic problems caused 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, and has contributed to accidents such as that at Bhopal. But even in the more highly developed nations, prolonged recession has created an economic climate favoring the slackening of environmental ideals. For the sake of jobs in the timber industry, for example, some of the last few areas of old-growth forests in the United States are threatened. In addition, concerns over energy availability have created the need for military action to save the developed nations' access to cheap oil and have prompted increasing reliance on technological quick fixes—a Faustian bargain that creates conditions under which a terrifying Chernobyl accident can occur. 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 former Soviet Union have given new incentives to international cooperation. Several major publications have claimed the 1990s to be "The Decade of the Environment," and there is growing public clamor that something must be done about environmental quality before it is too late.

The articles contained in *Annual Editions: Environment 94/95* 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 do not engage in futile vilification of the species *Homo sapiens sapiens* as a fouler of its own nest. Accordingly, the selections in this book have been chosen more for their intellectual content than for their emotional tone.

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

John L. Allen
Editor

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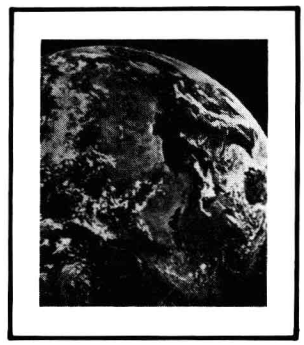
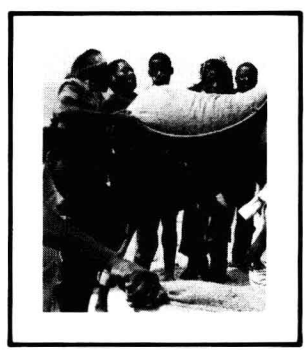


Unit 1

The Global Environment: An Emerging World View

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



Unit 2

The World's Population: People and Hunger

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

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1. **The World Transformed,** Lester R. Brown, *The Futurist,* May/June 1993. 6
   As a consequence of ***environmental degradation,*** living standards in many countries are falling sharply. Fortunately, scientists and policymakers are becoming increasingly aware of the changes in ***economic and environmental policies*** that are needed to halt the decline in both living standards and environmental quality.

2. **The Mirage of Sustainable Development,** Thomas J. DiLorenzo, *The Futurist,* September/October 1993. 12
   The riddle of achieving both ***economic growth*** and ***environmental protection*** has long puzzled both environmentalists and economists. Most models for ***sustainable development*** are based on the principle of ***international cooperation,*** overseen by cumbersome bureaucratic structures. Perhaps a better solution would be reliance on the concept of private property, a free market, and strong liability laws.

3. **The GATT: Menace or Ally?** Hilary F. French, *World Watch,* September/October 1993. 17
   Many ***environmental activists*** are concerned that the General Agreement on Tariffs and Trade (GATT) could pose grave dangers for the global environment, primarily by forcing the overturning of ***environmental regulations*** that might violate ***world trade*** rules. But if governments can work together to devise minimum rules of ***environmental protection,*** the potential for trade conflict over environmental issues will be greatly reduced.

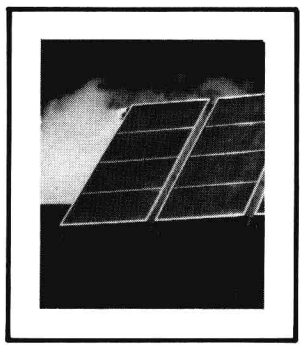
4. **The Environment of Tomorrow,** Martin W. Holdgate, *Environment,* July/August 1991. 25
   Throughout history, humans have adapted to ***environmental changes.*** In the world of today and tomorrow, when potential changes can occur with startling rapidity, the kind of adaptation that took place in the past may no longer be possible. If humanity is to have a ***sustainable future*** on this diverse planet, it can only be through a process of ***international cooperation.***

Overview 34

5. **How Many Is Too Many?** Charles C. Mann, *The Atlantic,* February 1993. 36
   Biologists have argued for more than a century that unchecked ***population growth*** will bring about the destruction of the ***global environment.*** 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.

6. **A New Strategy for Feeding a Crowded Planet,** David Norse, *Environment,* June 1992. 47
   Nearly two centuries have passed since British economist Thomas Malthus first raised doubts about the ***global carrying capacity*** and the consequences of rapid population growth. Although the grim future predicted by Malthus has not come to pass, many of the world's countries suffer from poverty and inadequate food supplies as a consequence of overpopulation.

The concepts in bold italics are developed in the article. For further expansion please refer to the Topic Guide, the Index, and the Glossary.



Unit 3

Energy: Present and Future Problems

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

7. **Population: The Critical Decade,** Sharon L. Camp, *Foreign Policy,* Spring 1993. **58**
   The 1990s are the decade of decision for one of the most basic of ***environmental problems:*** exponential ***population growth.*** Unfortunately, there has been relatively little ***political action*** in the direction of population control at either the national or international level.

8. **The Landscape of Hunger,** Bruce Stutz, *Audubon,* March/April 1993. **66**
   Many of the world's famines result from wars or civil strife. More commonly, however, the problem of ***world hunger*** grows from ***environmental degradation*** such as deforestation, desertification, and soil erosion that have devastating effects on ***food production. Population growth*** and refugee migration add to the problems of environmental degradation.

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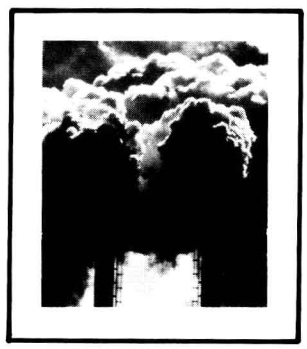
9. **The Great Energy Harvest,** Helena Li Chum, Ralph Overend, and Julie A. Phillips, *The Futurist,* May/June 1993. **74**
   Acceptance of energy crops as a ***global energy resource*** are driven by such environmental concerns as the reduction of carbon dioxide emissions. But ***economic development*** is also a factor as the emergence of "energy farming" could significantly revive rural economies in both the developed and developing countries.

10. **What Would It Take to Revitalize Nuclear Power in the United States?** M. Granger Morgan, *Environment,* March 1993. **81**
    The U.S. government has not yet responded to the threat of ***global warming*** with policy initiatives, but many people feel that the only logical steps are those involving the reduction of emissions contributing to the ***greenhouse effect. Public policy*** directed to this goal could take the direction of reviving the ***nuclear energy*** industry in the United States.

11. **Here Comes the Sun,** Christopher Flavin and Nicholas Lenssen, *World Watch,* September/October 1991. **87**
    The ***energy technology*** exists today to produce most of the energy needs of the world from ***solar power, wind power,*** and ***geothermal energy.*** Tapping into these ***alternative energy*** resources, however, will require a vigorous public commitment to push ***renewable energy*** into the mainstream. The key to overcoming political barriers to that commitment is the ability to demonstrate the advantages of alternative energy over ***fossil fuels.***

12. **Energy Crops for Biofuels,** Janet H. Cushman, Lynn L. Wright, and Kate Shaw, *The World & I,* August 1991. **95**
    The development of ***biofuels*** (crops grown for energy) may become as important as the development of more productive food crops. Research is now underway that aims to make cultivated grasses and trees an important source of fuel for the transportation and energy generation. The development of ***biotechnology*** as related to ***energy crops*** could have an enormous impact on both economic and environmental systems.



Unit 4

Pollution: The Hazards of Growth

Seven selections weigh the environmental impacts of the disposal and control of pollution, unwanted radioactive waste, pesticides, urban landfills, and acid rain.

13. **Tilting Toward Windmills,** Jon G. McGowan, *Technology Review,* July 1993. **102**
A ***wind-power*** 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 ***renewable energy*** research, interest in wind energy as a large-scale of electricity almost disappeared. Now, however, wind power is making a comeback.

14. **All the Coal in China,** Nicholas Lenssen, *World Watch,* March/April 1993. **109**
Unless the giant nation of China embraces a new strategy for ***energy production*** and use, the fast-growing Chinese economy and a corresponding increase in ***energy consumption*** could overwhelm virtually all international efforts to control ***global warming.*** China relies heavily on coal and therefore produces large amounts of greenhouse gases per unit of energy.

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15. **Facing Up to Nuclear Waste,** Nicholas Lenssen, *World Watch,* March/April 1992. **118**
The question of ***what to do with nuclear waste*** tears at many of the world's nations. The question may never be resolved until some international consensus is reached on the issue of nuclear power. The chief problem is that wastes from this industry far outlive even the oldest of existing political and economic institutions.

16. **A Place for Pesticides?** Peter Weber, *World Watch,* May/June 1992. **125**
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.

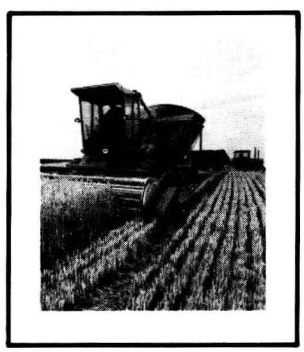
17. **Stewing the Town Dump in Its Own Juice,** Wendall Cross, *The World & I,* February 1992. **132**
Through the ***recycling of leachates or materials*** that wash out of landfills into water supplies, municipal waste facilities can be built as solid waste treatment centers for harvesting valuable gases, such as methane, containing the runoff of water pollution, and stabilizing the site.

18. **Where the Air Was Clear,** Pete Hamill, *Audubon,* January/February 1993. **136**
Since the 1950s, Mexico City has gone from a city of 3.5 million inhabitants, few automobiles, and sparkling air to one of the world's largest metropolises, choking on the worst ***air pollution*** in the world. ***Environmental planning*** efforts are being revived, and the city hopes to regain some of its former clean air ambiance.

19. **Ravaged Republics,** R. Dennis Hayes, *Discover,* March 1993. 143
The Czech and Slovak republics, countries that emerged from the literal ashes of once-communist Czechoslovakia, have inherited what may well be the world's worst ***environmental degradation*** with massive problems of air and water ***pollution.*** Much of the region's environmental future depends on outside forces and funding. Will this be enough to hold off an ecological catastrophe and the world's worse ***public health*** problem?

20. **Chernobyl's Lengthening Shadow,** David Marples, *The Bulletin of the Atomic Scientists,* September 1993. 146
After millions of words written on the ***nuclear disaster*** at Chernobyl, there is no agreement on the ultimate outcome of the event. The research of Western scientists aiding their counterparts in the former Soviet Union make it clear that Chernobyl is a disaster that is becoming more manifest with time.

21. **Common Threads: Research Lessons From Acid Rain, Ozone Depletion, and Global Warming,** Michael E. Kowalok, *Environment,* July/August 1993. 152
Environmental threats are identified by a laborious research effort involving scientists of numerous disciplines. The foremost problems of the world's atmosphere—***acid rain, ozone depletion,*** and ***global warming***—have, through the coordinated efforts of scientists, been found to have common elements, an indication that what was once perceived to be three major problems is now believed to be one monstrous one.



Unit 5

Resources: Land, Water, and Air

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

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22. **25th Environmental Quality Index: A Year of Crucial Decision,** *National Wildlife,* February/March 1993. 164
During the U.S. election year of 1992, ***environmental problems*** often took center stage in the political debate. As the debate raged, ***environmental assessment*** of seven crucial indicators—wildlife, air, water, forests, energy, soil, and the overall quality of life—showed that, in all areas, the ***environmental quality*** of the United States was worse in 1992 than in the preceding year.

A. LAND

23. **Beyond the Ark: A New Approach to U.S. Floodplain Management,** Jon Kusler and Larry Larson, *Environment,* June 1993. 172
Substantial progress has been made in the last quarter century in U.S. ***floodplain management.*** This progress is particularly evident in the increased public awareness of the ***natural hazards*** of floods and the ability of public agencies to predict flooding. But the management system has gone as far as it can go without a revision of its policies that would include technical revisions and, most importantly, a new partnership between local, state, and federal agencies.

24. Desktop Farms, Backyard Farms, or No Farms? Marc Zwelling, *The Futurist,* September/October 1992. **180**
How to feed the world's growing population without destroying the planet's resource base is a dilemma faced by policymakers, environmentalists, and ***food producers*** everywhere. The solution is in ***sustainable agriculture,*** but that term has many different meanings, and how it can be attained depends upon a myriad of ***environmental issues*** as well as political and emotional ones. Canadian policymakers have begun taking a look at the question for their own country.

B. WATER

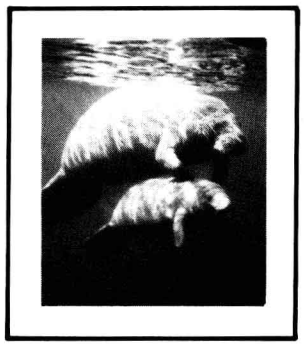
25. 20 Years of the Clean Water Act, Debra S. Knopman and Richard A. Smith, *Environment,* January/February 1993. **184**
It is time once again for the U.S. ***Clean Water Act*** to be reauthorized. As on previous occasions when this major ***environmental law*** has been considered, Congress and the administration are short on information about the true state of the nation's water quality. After spending over $541 billion on ***water pollution*** control, it would be desirable to know whether the act has worked.

26. Redeeming the Everglades, Mark Derr, *Audubon,* September/October 1993. **195**
For nearly a century, the reconfiguration and drainage of the ***wetlands*** of Florida's Everglades for purposes of ***economic development*** proceeded without regard for the environment. As a result, the waters and species of this former wilderness almost disappeared. Now, ***environmental activists*** and ***public policymakers*** have begun to correct the damage. For the first time in the United States, a ***public works project*** is being reversed to right an environmental wrong.

C. AIR

27. Global Warming on Trial, Wallace S. Broecker, *Natural History,* April 1992. **203**
The stakes in the debate over ***global warming*** and the enhanced ***greenhouse effect*** are extremely high, pitting society's short-term well-being against the future of all the planet's inhabitants. The debate, however, is only a skirmish marking the beginning of a far broader range of disagreements ranging from energy conservation, renewable resources, and the problems of population growth.

28. Exploring the Links Between Desertification and Climate Change, Mike Hulme and Mick Kelly, *Environment,* July/August 1993. **209**
Over three-quarters of the world's countries are suffering the consequences of ***desertification*** or land degradation in dryland areas. Social, economic, and ***environmental impacts*** have resulted in a great loss of productivity and nearly 20 percent of the world's population is directly affected. There is now growing concern that the environmental impact of dryland degradation is producing a ***climate change*** that will be felt worldwide.



Unit 6

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.

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29. **The Origin and Function of Biodiversity,** Otto T. Solbrig, *Environment,* June 1991. 224
There is an enormous variety of plants and animals on Earth. This ***biodiversity*** is the ultimate source of human sustenance. Yet humans are endangering the immense richness of species, 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 function.

A. PLANTS

30. **Rain Forest Entrepreneurs: Cashing in on Conservation,** Thomas A. Carr, Heather L. Pedersen, and Sunder Ramaswamy, *Environment,* September 1993. 233
Worldwide ***deforestation*** portends serious environmental consequences, including the reduction of ***biodiversity*** and increasing the tendency to ***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.

31. **Deforestation and Public Policy,** Patricia Parisi and Michael H. Glantz, *The World & I,* November 1992. 240
The effects of misguided policies toward the environment based on insufficient, if not incorrect, scientific information are felt immediately at the local, regional, and national levels. The effects of ***climate change*** resulting from ***forest clearance*** will most likely be felt only after many decades. In both cases, the future depends upon the development of sound policy in the present.

32. **Out of the Woods,** Jodi L. Jacobson, *World Watch,* November/December 1992. 245
Because of their role in gathering the fuel and food products of forest regions, the primary caretakers of the world's ***forests*** have been women. Yet, throughout the ***developing countries,*** women are being driven from the forests by plans for ***economic development*** that largely ignore their traditional role. Only if development strategies recognize and support the role of women in conserving forests can the related ***economic*** and ***environmental problems*** be solved.

B. ANIMALS

33. **Killed by Kindness,** Sharon Begley, *Newsweek,* April 12, 1993. 249
Many different forces combine to prevent the success of efforts to save ***wildlife,*** beginning with ***poaching*** and ***habitat destruction.*** Most disturbing is the tendency of ***conservationist and preservationist organizations*** to spend money to appease local government bureaucrats, often exacerbating the very situations these organizations are trying to correct.

34. New Species Fever, Patrick Huyghe, *Audubon,* March/April 1993. **253**

Scientists are rushing to discover new species before they cease to exist. The interest in new species has come from the global ***biodiversity*** crisis and the realization that to do anything about it, science has to know what ***species*** exist and which are threatened. Although some dramatic discoveries have been made, most new species are small creatures like insects.

35. Barnyard Biodiversity, Verlyn Klinkenborg, *Audubon,* January/February 1993. **258**

Agricultural breeds of animals, like wild species, are vanishing and taking with them a rich ***genetic heritage.*** The Food and Agriculture Organization of the UN estimates that nearly one-third of the existing breeds of ***domesticated animals*** (including fowl) are on the verge of ***extinction.*** Domesticated species are a tiny part of the Earth's ***genetic diversity,*** but they are an extremely important part.

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ENVIRONMENT 94/95

Thirteenth 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.

Annual Editions
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 studies. 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.

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Nuclear Waste	15. Facing Up to Nuclear Waste
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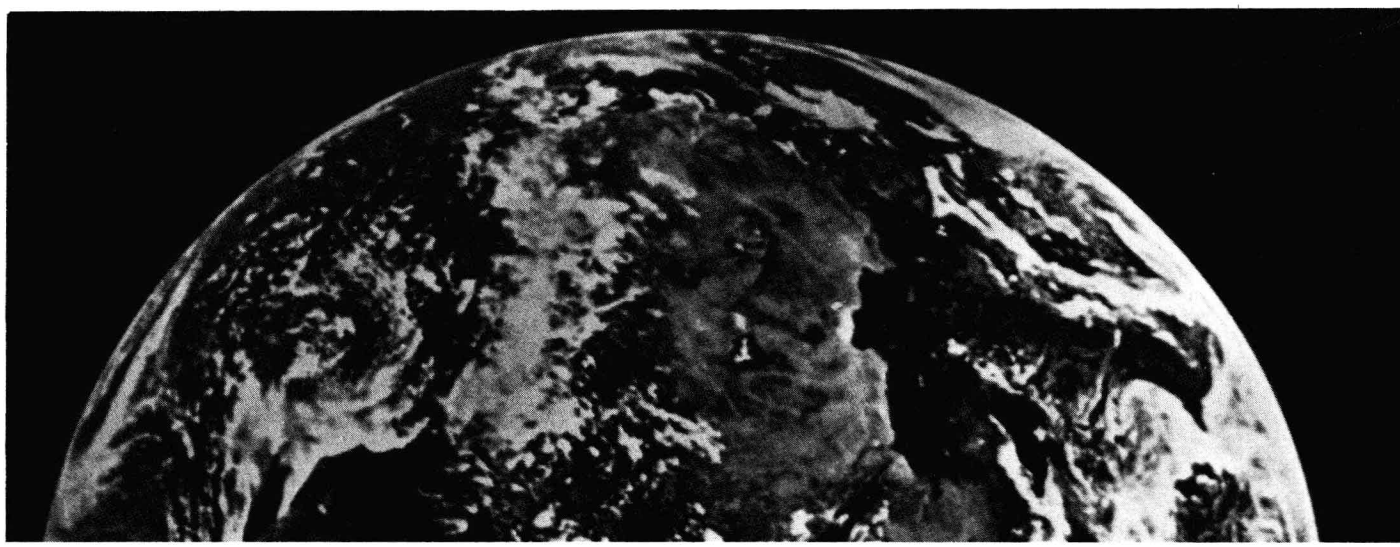
The Global Environment: An Emerging World View

The celebration of Earth Day 1990, the twentieth 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" as 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 such as drought, heat wave, fire, and famine. But more arise simply from the increase in information and ideas about the global nature of environmental processes. For example, the raising of the Iron Curtain that has separated East and West since the end of World War II and the fragmentation of the former Soviet Union brought visions of the end of the cold war, a reawakening of the democratic spirit in Eastern Europe, and a hope for a more integrated global economy promising both peace and prosperity for the world's peoples. And 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 nations 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 cooperation 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 will, indeed, be "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 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 environmental problems and their solutions are linked to political, economic, and social problems and solutions. In the lead piece of the section, Lester Brown, director of the Worldwatch Institute, discusses the developing global perspective and what steps are necessary to solve pressing environmental problems. In "The World Transformed," 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. Not all writers on environmental issues agree with Brown's optimistic assessment of where the world is going, in terms of developing the principles of sustained use, or in terms of the manner in which sustained use should be administered. In "The Mirage of Sustainable Development," Thomas DiLorenzo, an economist, argues that sustainable development and use of resources will never work if guided by the principles that seem to prevail among most proponents of the concept. Brown and other advocates of sustained use have long operated upon the assumption that centralized international bureaucracies and agencies are necessary to carry out the coordinated environmental action upon which the notion of sustainable systems supposedly depends. DiLorenzo, on the other hand, suggests that such an approach (what he calls environmental socialism) would bankrupt the global economy and would, therefore, actually be harmful to the environmental systems themselves as potentially destructive environmental actions would be forced by economic necessity. He suggests that the concept of private property, the maintenance of free

Unit 1



markets, and the enforcement of strong liability laws—all anathema to most proponents of sustained use—are essential for a sustained environmental system and a growing economy. The third article in the unit deals with such international legislation. In "The GATT: Menace or Ally?" Hilary French of the Worldwatch Institute describes the conflict between the proponents of the General Agreement on Tariffs and Trade and those who see international trading agreements as a "GATTzilla" monster capable of wreaking untold damage upon environmental systems. As a point of departure, French uses a recent GATT-driven ruling that countries have a right to export tuna regardless of how the fish were caught. Since at least some tuna fishing poses considerable hazards to dolphin populations, such a ruling in favor of free and unrestricted trade poses the potential for considerable damage to dolphin populations in areas where the fishing nations may be too poor or too unconcerned to engage in the kind of dolphin-friendly fishing activities necessary to preserve this marine mammal. As necessary as they might be, international agreements that blur economic boundaries might also be environmentally disruptive.

The next article in the unit ties together many of the threads in the previous articles, taking an historical approach and, at the same time, focusing on the future. In "The Environment of Tomorrow," Martin Holdgate, director general of the World Conservation Union, notes that people have always adapted to environmental change and that this adaptation has often been imperceptible except in retrospect. Such unconscious adaptation is no longer possible, given the rapidity of human-induced environmental change. If our species is to have a sustainable future on a diverse planet with many environmental inequalities, Holdgate asserts, it can only be through a process of international cooperation that transcends anything we see today.

Looking Ahead: Challenge Questions

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

What is the conflict between the two major viewpoints on the value of international cooperation and international bureaucracies in the development and implementation of policies directed toward sustainable use of environments?

What conflicts exist between the proponents of international trade agreements and environmentalist groups? Can apparently worthwhile international endeavors, such as free trade agreements, actually have negative consequences for environmental quality?

How can the process of international cooperation increase significantly the chances for the development of sustainable human society? Are there differences between the goals of developed and developing countries that make the achievement of international cooperation on environmental issues difficult, if not impossible?

The World Transformed

Envisioning an Environmentally Safe Planet

Lester R. Brown

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.*

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.

Many 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

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