

# State of the World

A Worldwatch Institute Report on  
Progress Toward a Sustainable Society

**Lester R. Brown**

and **William Chandler**

**Christopher Flavin**

**Sandra Postel**

**Linda Starke**

**Edward Wolf**

1984

# STATE OF THE WORLD 1984

*A Worldwatch Institute Report on  
Progress Toward a Sustainable Society*

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# Acknowledgments

The idea of a progress report first surfaced in a discussion with Larry Rockefeller, a trustee of the Rockefeller Brothers Fund, as we were casting about for projects that could “make a difference.” As we considered this particular possibility, it became more and more appealing, consistent with the interests of the Fund and a logical outgrowth of the Institute’s research program.

Obtaining funding for new projects these days is never easy but in this case the task was simplified by the willingness of Rockefeller Brothers Fund President William Dietel, who was instrumental in the Institute’s establishment several years ago, to lead the fundraising effort. This relieved me of the duties that so often absorb a project director’s time during the start-up period, enabling me to concentrate on producing this first annual edition of the report. Early commitments from the Rockefeller Brothers Fund, the Winthrop Rockefeller Trust, and David Rockefeller, meant the project could be launched even while the fundraising effort continued.

In addition to specific project funding, the report draws on ongoing Institute research that is supported by several foundations, including the Geraldine R. Dodge, George W. Gund, William and Flora Hewlett, W. Alton Jones, Edna McConnell Clark, Andrew W. Mellon, and Edward John Noble Foundations, and the United Nations Fund for Population Activities.

The personal interest of several key

people in the project facilitated its launching. Prominent among these were Orville Freeman and Andrew Rice, chairman and vice chairman respectively of the Worldwatch Board of Directors, who enthusiastically supported the *State of the World—1984* from the beginning. Besides William Dietel, two other foundation representatives, Scott McVay of the Dodge Foundation and Anne Firth Murray of the Hewlett Foundation, strongly endorsed the concept of such a report. And finally, the personal interest of George Brockway, board chairman of W.W. Norton, facilitated speedy publication.

Edward Wolf worked closely with me as project assistant from the time the project was launched until the manuscript went to the publisher. Ted helped with research, served as a testing ground for new ideas, and reviewed early chapter drafts. His many skills and commitment to the project made it immeasurably easier for me. Authors and readers alike are indebted to Linda Starke, who was for many years editor of the *Worldwatch Papers*, for bringing her exceptional editorial skills to bear on the project. As production coordinator, Linda also worried about such things as design, layout, and proofreading.

Dozens of outside reviewers have helped us strengthen individual chapters and refine our overall objective. Gerald O. Barney and Erik Eckholm reviewed the entire manuscript at short notice, and the final copy owes much to their

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sisted the research for the nuclear energy chapter and helped draft some early sections of the renewable energy chapter, while Paige Tolbert laid the groundwork for the geothermal section before the report was even begun. From New York, Milena P. Roos used her intimate knowledge of the United Nations system to gather research documents, some of them unpublished, for several chapters.

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*Lester R. Brown*

# Foreword

This is the Worldwatch Institute's first State of the World report. The intent is not merely to describe how things are, but to indicate whether they are getting better or worse. The yardstick by which we measure progress is sustainability—the extent to which our economic and social systems are successfully adjusting to changes in the underlying natural resource base.

The primary focus in *State of the World—1984* is on the interplay between the changing resource base and the economic system. Recent concern with this relationship was heightened by publication of *The Limits to Growth* in 1972 and dramatically underlined the following year by the OPEC oil price hike. The return of famine during the early seventies after nearly a quarter-century's absence raised questions about long-term food security. These and other issues led the U.S. Government to undertake a study of global resource issues facing the country as it approaches the twenty-first century, which culminated in *The Global 2000 Report to the President*, published in 1980.

In an effort to regularly monitor changing conditions worldwide, a number of organizations now issue annual reports. The International Monetary Fund, for example, publishes a *World Economic Outlook*. The World Bank produces the *World Development Report*, an annual review of economic conditions in developing countries. Several U.N. agencies compile yearly reports in their

special areas of responsibility, such as UNICEF's *State of the World's Children*. The United Nations Environment Programme publishes a state of the environment report. The Food and Agriculture Organization has been publishing for many years a *State of Food and Agriculture* and the U.N. Fund for Population Activities issues an annual report on population.

At the national level, some governments—Japan and Israel, for example—issue annual “state of the environment” reports. In the United States, the Conservation Foundation last year put out *State of the Environment—1982* in an effort to supplement the diminishing efforts of the U.S. Council on Environmental Quality. Half-a-world away this was paralleled by *The State of India's Environment—1982*, prepared by the Centre for Science and Environment in New Delhi. Within the U.S. Government, the Department of Energy issues an *International Energy Annual* and the Department of Agriculture maintains a steady flow of reports on the world food situation.

Worldwatch's contribution to this growing dialogue is an attempt to analyze not only the major developments and trends in these specific areas but also the way they relate to each other. The canvas on which this report is sketched is necessarily broad. Its purpose is not to replace any of the more detailed reports, but rather to supplement them and perhaps even to enhance their usefulness by integrating their

findings in a broader analysis. We try to determine, for example, how the depletion of oil reserves affects the global economy, both directly and indirectly. How will the shift from oil to renewable energy alter global economic structures? How does population growth affect soil erosion and what effect will erosion have on food production? Will population growth eventually be slowed by falling birth rates or by rising death rates? These questions may not yet be at the top of national political agendas, but we believe they are issues that will shape the human prospect.

The *State of the World—1984* tries to measure progress toward sustainability and determine why some countries are doing better on a given front than others. Is progress due to the play of market forces, tax incentives, public education, government regulation, the emergence of a new technology, or intelligent leadership? We try to convey what is working and why. We see the report as a vehicle for quickly disseminating news of innovative initiatives—whether it be Sweden's national plan to use reverse vending machines to recycle aluminum beverage containers, Thailand's innovative family planning incentives, or California's policies to spur a massive breakthrough in wind electrical generation.

The *State of the World* will not cover the same topics each year but rather will deal with the shifting constellation of issues that relate to sustainability. This year, for example, we have analyzed worldwide soil erosion; next year we may focus on the conversion of cropland to non-farm uses. This year we have a detailed analysis of deforestation and the various tree planting efforts that are under way. We may focus next on the condition of the world's grasslands, a major source of protein in the human diet. This year's chapter on renewable energy examines wind power, firewood, geothermal energy, and photovoltaics. In the 1985 re-

port, we anticipate covering hydro-power, solar collectors, alcohol fuels, and methane generation from biological wastes.

In general, this first assessment shows that existing priorities in the use of both fiscal and natural resources are not compatible with the long-term sustainability of society. A resumption of the broad-based improvements in the human condition that characterized the third quarter of this century will require a shift in development strategies and a reordering of priorities. A major purpose of this report is to provide a sense of that needed reordering and of new ways to evaluate improvements in the human prospect.

We have tried to design a report that will be useful to policymakers. For example, in analyzing energy trends we have sought to help national energy planners who are faced with difficult choices. The chapter on nuclear power economics is the most comprehensive international compilation currently available on the costs of nuclear power. Unfortunately, few energy planners have had access to these international cost data. The chapter that charts the reduced dependence on oil worldwide enables national energy officials to compare their progress with that in other countries.

One by-product of global assessments of this sort is the identification of basic information gaps. Our effort to analyze topsoil loss from erosion indicates that few countries have systematically gathered data on soil formation and loss on their croplands. Although soil is a basic resource, most countries lack the data needed for its intelligent management.

The analysis underlying the report is integrated, or what is sometimes described as interdisciplinary. We have consciously chosen not to consider issues exclusively in biological, economic, political, or other disciplinary frameworks. Rather, we attempt to examine issues in all their complexity, much as



policymakers must consider them. Anyone who has attempted to combine ecological and economic analysis understands the difficulties inherent in interdisciplinary research. Even the starting assumptions of the two disciplines conflict. Where ecologists see specialization as a risk, economists are inclined to see it as a virtue. Ecologists see the world in terms of cycles, such as hydrological and carbon cycles; economists are more likely to see it in terms of continuous exponential growth. Ecologists seek a yield that can be sustained over the long term; economists are more interested in maximizing short-term profits.

Given these differing frames of reference, the stumbling blocks in integrated research are obvious. Confining research on an issue to a particular discipline is obviously much more comfortable. Ecologists can wrap themselves in the principles of ecology and economists have their economic theories, but interdisciplinary researchers lack such a security blanket. They can selectively draw on theory from various disciplines, but when the theories do not mesh they must rely on judgment and occasionally even on intuition.

The tone of this report is not intended to be optimistic or pessimistic. Neither unfounded optimism nor undue pessimism provide a solid foundation for policymaking. Only realism will do.

\* \* \*

With this project, Worldwatch is responding further to a strong worldwide demand for policy-oriented interdisciplinary research, a demand that is reflected in sales of the 67 studies—57 Worldwatch Papers and 10 books—that the Institute has published during its first several years. For the first six Worldwatch books, where arrangements for foreign language editions have been largely completed, 74 publishing con-

tracts have been signed in some 24 languages. For several Worldwatch Papers the number of copies in print in all languages combined has passed the hundred thousand mark.

Sales of Worldwatch Papers and book royalties have helped put the Institute, a nonprofit research organization, in the unusual position of earning a large share of its financial support. Indeed, these earnings and the interest on earnings saved, which now account for nearly half of the Institute's budget, have provided some of the funding for this project.

The launching of this global assessment represents a natural evolution of the Institute's ongoing research program on energy, environment, food, population, and other global issues. In undertaking this progress report, the Institute has relied on its existing information-gathering networks, including publication exchanges with some 70 other research institutes around the world, and an extensive international network of contacts in agriculture, business, demography, economics, energy, environment, and science. The Institute has also taken advantage of its location in Washington, D.C., to tap the information sources of the U.S. Government, World Bank, International Monetary Fund, local universities, and other research organizations.

Since this is our first *State of the World*, we welcome suggestions on how to make succeeding editions more useful. Comments and queries may be directed either to me or to the authors of individual chapters.

Lester R. Brown  
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December 1983

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# 1

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## Overview

*Lester R. Brown*

The news headlines of the eighties describe the worst worldwide economic crisis in half a century. In many countries incomes are falling. Record budget deficits plague national and local governments on every continent. The external debts of several countries in the Third World and Eastern Europe verge on the unmanageable. Corporate bankruptcies in major industrial countries are more numerous than at any time since the Great Depression. Unemployment ratchets upward in both industrial and developing countries. More countries are threatened with famine than at any time in the modern era.

The belated U.S. economic recovery in 1983 notwithstanding, the world economy is in the worst crisis since the Great Depression. There are, however, major differences between the thirties and the eighties. The crisis of the thirties was almost entirely the product of economic mismanagement during the twenties, of ill-conceived economic policies that fueled an economic boom until it went out of control. On both sides of the Atlantic the boom psychology led to

financial speculation that eventually culminated in the Great Depression. Once under way, the Depression seemed to feed on itself as international trade declined and countries turned inward, adopting protectionist policies that further reduced trade.

Although the economic crisis of the eighties is exacerbated by economic mismanagement, its roots lie in the depletion of resources, both nonrenewable and renewable. During the fifties and sixties the world economy steadily boosted its use of oil, a finite resource, putting it on a path that by definition was not sustainable over the long run. The depletion of oil reserves, and its effect on world oil prices, is the most immediate threat to world economic stability, but the depletion of soil resources by erosion may be the most serious long-term threat. The unprecedented doubling of world food supplies over the last generation was achieved in part by adopting agricultural practices that led to excessive soil erosion, erosion that is draining the land of its productivity. After a point agriculture can no longer be sustained and the land is abandoned.

Sustainability is an ecologic concept with economic implications. It recog-

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Units of measurement are usually metric unless common usage dictates otherwise.



nizes that economic growth and human well-being depend on the natural resource base that supports all living systems. Technology has greatly expanded the earth's human carrying capacity, most obviously with advances in agriculture. But while the human ingenuity embodied in advancing technology can raise the natural limits on human economic activity, it cannot entirely remove them. A sustainable society is one that shapes its economic and social systems so that natural resources and life-support systems are maintained. Today we study the archaeological sites of earlier civilizations that failed to do so, depleting their soils, mismanaging their irrigation systems, or otherwise embarking on an unsustainable development path.

Humanity's newly acquired capacity to self-destruct with nuclear weapons has added another dimension to the concept of sustainability. Recent research by U.S. and Soviet scientists on the climatic and biological consequences of nuclear war indicates that a successful preemptive nuclear strike by either superpower would lead to a "nuclear winter," the end of civilization and quite possibly the end of human life on earth. Against the backdrop of this new potential for self-destruction, achieving sustainability presents unprecedented political and moral challenges.<sup>1</sup>

Nuclear weapons are not the only explosive force threatening civilization. As populations have multiplied, their demands have begun to exceed the sustainable yield of the economy's biological support systems. In country after country these thresholds have been crossed, leading to consumption of the basic resources themselves. Deforestation is reducing firewood and lumber supplies, driving up the cost of cooking fuel in Third World villages and the cost of housing everywhere. Overfishing and overgrazing have become commonplace as human claims on these major protein-

producing biological systems have spiraled.

Today's economic headlines describe a world that is finding it difficult to live within its means. Eager to maximize output today, we are borrowing from tomorrow. Our economic problems are of our own making, the product of shortsighted economic policies designed to promote expansion at any cost, of agricultural policies designed to boost food output at the expense of soils, and of failed or nonexistent population policies.

In our preoccupation with monthly economic indicators we have lost touch with the environmental resource base on which the economy rests. We keep detailed data on the stock of plant and equipment while virtually ignoring the condition of soils, the health of forests, and the level of water tables. Only when environmental deterioration or resource depletion translates into economic decline do we seem to notice it.

## GOOD NEWS, BAD NEWS

Over the past generation the world has yielded to an excessive dependence on oil, moved from farming soils to mining them, and begun to consume the economy's biological support systems. In short, the world economy has moved onto a development path that is unsustainable. Although at least some political leaders and their economic advisors are vaguely aware of this, the effort to return to a sustainable development path is not yet well defined. Most national governments, lacking a clearly defined sustainable development strategy, are attempting to "muddle through." As a result, successes are infrequent, often outnumbered by failures.

The essential components of a sus-