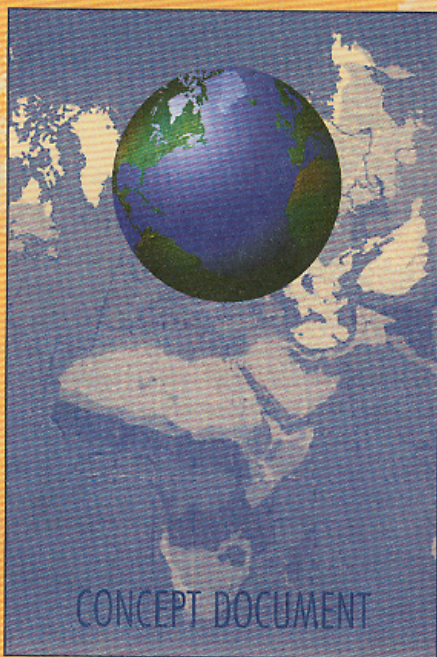


PROGRAM ON INFORMATION AND RESOURCES



COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK



The Columbia Earth Institute

The Program on Information and Resources (PIR) is part of the Columbia Earth Institute — a bold new initiative to promote collaborative, long-term planning that balances the needs of people, the environment and the economy. Recognizing that the problems and opportunities we face are too complex to be addressed by any single research field, the Earth Institute brings together earth scientists from all parts of the University — biologists, social scientists, economists, public policymakers, engineers and other scholars. Their goal is to find innovative strategies and technologies that will ensure our planet's health while continuing to advance our economic and technological development. The Earth Institute's guiding principles are to preserve the Earth *and* improve the quality of life on it — to avert catastrophic changes and to bring beneficial ones, as well.

Blending Finance and the Environment



PIR's mission is to develop new economic strategies that increase productivity in industrial and developing countries and simultaneously promote wise stewardship of the world's ecological resources. Using the tools of mathematics, economic theory and data analysis, PIR researchers assess the economic value of the ecological infrastructure that supports human societies. They analyze interactions between the economy and the environment, and design new financial and social institutions to manage the sustainable use of the biosphere. Working with the support of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and with a strong network of international partners and a multidisciplinary group of researchers, including world renowned resource economists and biologists such as Geoffrey Heal, Thomas Lovejoy and Peter Raven. PIR is rethinking the economic foundations of environmental decision-making.

A New Era for the World's Economy and Ecology

Founded in 1994, PIR seeks to merge the two most important trends of our time — the Knowledge Revolution[®] and the management of the planet's biosphere. The program has a unique perspective that perceives the intimate connection between the Knowledge Revolution[®] and the use of resources on a global scale, and that understands the crucial role financial markets can play in transforming environmental problems into profits.

Earth Management in the Era of The Knowledge Revolution[®]

A primary focus of PIR's research and education is the rapid innovation in information technology — which is changing patterns of production, employment and consumption and revolutionizing the world economy. The rise of the computer, software, biotechnology, entertainment, financial, health, medical and other "knowledge-intensive" industries has created new opportunities — in which the creation, management and distribution of ideas and knowledge will replace land and oil as the natural resource for economic development. The Knowledge Revolution[®] holds great promise for continuing economic progress while avoiding environmental crises.



Undisturbed habitats are disappearing all over the world. More than half the Serengeti Plain ecosystem, home to elephants, lions, giraffes and other large animals, has been disrupted since 1920 by farming, poaching, and other human activities.



More than 11,000 people were killed in a 1993 earthquake in India, but only 60 died in a 1994 earthquake of similar magnitude in Northridge, California, where scientific and engineering expertise helped prevent building collapses.

A PIR Research Sampler

An International Bank for Environmental Settlements (IBES)

PIR recommended the creation of a new international bank to foster institutions through which communities can realize the values of their ecological resources while conserving them. PIR recommends that the bank implement the trading of pollution rights as an efficient way to encourage both industrialized and developing countries to cut greenhouse gas emissions. The bank would assess market values for the use of Earth's atmosphere and create a global market to trade rights to emit gases generated by the burning of fossil fuels.



Catastrophe Bundles[®]


PIR researchers have designed a new financial instrument to manage the economic risks of the reinsurance industry, which has sustained unprecedented losses in recent years because of unpredictable and highly destructive environmental events — hurricanes, earthquakes, droughts and floods. Catastrophe Bundles[®] combine a reinsurance package with securities such as environmental bonds that pay out more if losses increase, or less if they decrease. It creates a new market that provides profit-making opportunities for speculators, while reducing reinsurers' environmental risks.



Assessing Earth's Environmental Capital

In collaboration with UNESCO's Man and Biosphere program, the Smithsonian Institution, the Global Environment Facility, and the Center for Environmental Research and Conservation at Columbia University, PIR has launched an unprecedented effort to calculate dollar values for the benefits humans derive from the Earth's natural systems. Applying mathematical models and economic theory, the study will assess the economic value of fisheries for food, healthy soil for agriculture, forests for clean air, rain forests for genetic raw material, and watersheds for filtering drinking water in 371 critical natural systems around the world. The study will create a new financial foundation to attract public and private investment to protect and preserve essential ecosystems.



 *Dynamics of Economic and Environmental Systems*

PIR researchers — in collaboration with the Lamont-Doherty Earth Observatory of Columbia University, the NASA-Goddard Institute for Space Studies, OECD and the United Nations — have developed a global database and computer models for simulating interactions among economic, climate and ecological systems at the global level, and for studying

the effects of policies. They have addressed such complex issues as the effect of social and economic diversity on patterns of north-south trade; the ecological impact of economic institutions; and the relationships among social, economic and biological diversity.



The CO₂ concentration in the atmosphere is now 358 parts per million, 27 percent higher than it was in 1800. The burning of fossil fuels and deforestation releases 6 billion tons of carbon a year, and China is expected to burn much more coal in the future.

About the Director . . .

Graciela Chichilnisky, the director of the Program on Information and Resources, is UNESCO Professor of Economics and Mathematics at Columbia University. She has taught at Harvard, Essex and Stanford universities and from 1985 to 1989 was chair and chief executive officer of FITEL, an international financial telecommunications corporation. She has been adviser to the Organization of Economic Cooperation and Development, the United Nations, and the Organization of Petroleum Exporting Countries in international economics and environmental policy. She was a member of the Presidential Cabinet of the Central Bank of Argentina, and she holds doctorates in mathematics and in economics from the University of California at Berkeley. The author of five books and numerous articles, Professor Chichilnisky was the originator of the concept of economic development targeted at the satisfaction of basic needs, which was adopted by 150 countries in the UN Agenda 21 as the central element of their strategies for sustainable development. She is an internationally acknowledged leader in many fields, combining innovative mathematical theory and topical policy analysis.



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