



options

IIASA Celebrates
a Quarter-Century
of International
Research
SUCCESS

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Options is a magazine featuring the activities of the International Institute for Applied Systems Analysis (IIASA), located in Laxenburg, Austria. IIASA is an interdisciplinary, nongovernmental research institution sponsored by a consortium of National Member Organizations in Asia, Europe and North America. The Institute's research focuses on sustainability and the human dimensions of global change. The studies are international and interdisciplinary, providing timely and relevant information and options for the scientific community, policy makers and the public.

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International Institute for
Applied Systems Analysis

4 October
1972

IIASA Celebrates a Quarter-Century of International Research Success

IIASA was founded 25 years ago on the principle that global problems require global solutions. Back then, advanced societies faced the same global problems as now: scarcity of natural resources, problems of energy and water, pollution of the atmosphere, and climate changes.

Searching for global solutions to the problems meant disregarding geopolitical boundaries to bring together the best scientists from both East and West. At a time when East-West relations were still in a deep freeze, IIASA was able to bridge the differences. Putting aside political ideologies, IIASA's international group of researchers have tackled global issues from all geographical angles and from a multidisciplinary perspective.

It was clear early on that scientists from both sides of the bridge had a deep understanding of the global nature and implications of the prob-

lems related to sustainability and the human dimensions of global change. "The global nature of every major problem - energy, food supply, soil fertility, pollution, resource distribution, climate, weather - all these are global problems that cannot be managed by any one nation; nothing will work but international cooperation," said Philip Handler of the U.S. National Academy of Sciences, one of the founding national member organizations of IIASA, in a radio interview shortly after IIASA opened its doors in Vienna.

One of the key Soviet figures in negotiating the establishment of IIASA, Jermen Gvishiani, underscored, in that same interview, the importance and effectiveness of creating not only an international institute, but also one that is at the same time non-governmental. "It is important to understand not only some of those potential problems in isolated form, but I think it is important to see interrelationships, interdependencies, because all these problems are really complex. That is why the founders of IIASA decided to create such an international, interdiscipli-

nary, and at the same time non-governmental institute to have in function an independent expert assessment of these processes," said Gvishiani, the former deputy minister of the Soviet State Committee for Science and Technology.

Twenty-five years later, the international, interdisciplinary, non-governmental IIASA continues to assess these complex, global problems and to provide scientifically sound solutions for policy makers and others. Although the societal problems that brought about the Institute's founding are still with us, IIASA has achieved much toward improving the political and scientific responses to these issues and has forged a reputation as a valuable contributor to science and policy communities around the world.

With a successful quarter-century behind it, IIASA enters the new millennium at the forefront of policy-relevant research that will help people meet the changing demands of an uncertain future, and that will contribute to global solutions for the benefit of mankind.

S I G N I N G O F T H E I I A S A C H A R T E R

Professor P. Handler,
U.S. National Academy of Sciences

Lord S. Zuckerman,
U.K. Cabinet Office

Dr. A. Bykov,
U.S.S.R. State Committee
for Science and Technology

Dr. P. Warren,
U.K. Cabinet Office

Professor J. Gvishiani,
U.S.S.R. State Committee
for Science and Technology



NEW RESEARCH INITIATIVES

At last June's Denver Summit of the Eight, the world's major industrialized democracies renewed their commitment to global prosperity and peace. Much of the dialogue addressed issues related to population aging, climate change and sustainable development. In addition, special attention was given to the economic and environmental development of Africa.

As an international research institute focused on sustainability and the human dimensions of global change, IIASA has been a leader in researching the very topics that most concern global leaders. IIASA's timely and policy-relevant research has contributed to major global-change-related policy, including the Framework Convention on Climate Change and the 1994 Second Sulfur Protocol.

Recently, two of IIASA's 11 ongoing research projects — as well as one currently in a one-year feasibility phase — hosted conferences directly related to some of the Denver Summit's major themes. The objectives of those projects, as well as results from the conferences, are summarized below.



IIASA's Newest Initiative: Social Security Reform

The final communiqué of the Denver Summit recognized that increased life expectancy, along with lower birth rates, is producing a significant increase in the average age of populations. This aging trend is causing great concern among many nations about the long-term financial stability of current social security schemes. Social security reform will remain a top priority for political action in the years to come.

In response to these concerns, IIASA has initiated a project on social security reform. The objective of the Institute's Social Security Reform (SSR) project is to improve policy making in this area by deepening the research base and contributing to policy dialogue.

To that end, IIASA recently hosted a workshop, titled "Global Population Aging, Social Security and the International Economy," to take a closer look at the international economic dimensions of social security arrangements. Participants proposed a study, to be conducted under the broader framework of the SSR project, that would examine the impacts of projected changes in population age structures on the world economy under baseline and alternative assumptions about the social security arrangements in force. The study will perform simulations using linked economic-demographic models in a globally consistent framework. Due to the long-term nature of social security reform, the study will place special emphasis on incorporating uncertainty into its analysis.

Meeting participants examined the impacts of population aging and

social security arrangements in five areas: private savings, fiscal accumulation, labor markets, asset markets, and exchange rates and capital flows. The next meeting will be held at IIASA in February 1998.

Partnership for Development: Population and Sustainable Development in Namibia, Botswana and Mozambique

Among the many global concerns addressed by the Denver Summit communiqué, the region of Sub-Saharan Africa emerged as a clear focal point for international development assistance. In February 1997, IIASA's Population project embarked on a new series of Population-Development-Environment (PDE) case studies in southern Africa,



sponsored by the Commission of the European Union (DG VIII). The project initially centers on Namibia and Botswana, and will later concentrate on Mozambique, where more preparation is needed.

The primary goal of IIASA's PDE case studies is to improve understanding of the complex interactions among population trends, socioeconomic development and the environment. Another goal is to provide a computer-based tool for facilitating interdisciplinary scientific discussions and science-policy dialogue.

The African studies include a multidisciplinary descriptive analysis of past trends and the current situation. In each of the three countries, IIASA will collaborate with national institutions to assemble a comprehensive database for that country, identify the most important future challenges, design and specify a computer simulation model for evaluating alternative scenarios over the coming decades, and train young scientists.

In June, IIASA hosted a task force meeting on population and environment in Namibia, Botswana and Mozambique. Government representatives and researchers from the study region gave presentations on the relationships between population, the economy and the environment in their countries. Based on these discussions, the Population Project is currently developing computer simulation models on the PDE interactions.

The Economic, Environmental Effects of Technological Change

The Denver Summit of the Eight's communiqué acknowledged in several instances the importance of technological innovation within the global economy. Technological change is a central theme of the Institute's project on Environmentally Compatible Energy Strategies (ECS).

The overall objective of the ECS project is to identify and analyze strategies that can assure adequate levels of energy services and increase them to support development worldwide, while achieving further decarbonization of global energy systems and minimizing emissions of other pollutants to the atmosphere.

In June, the ECS project, in conjunction with the National Science Foundation, Yale University, and the National Bureau of Economic Research, sponsored the International Workshop on Induced Technological Change and the Environment. The workshop attracted experts in the areas of endogenous technological change, modeling technological processes, the history of technology, technology policy and environmental economics. Participants reviewed some of the more innovative research directed at integrating technological change in long-term development strategies, especially in the energy and the environment areas.

The workshop program highlighted the project's study on the dynamics of technology. The study is based on the premise that technological change and the diffusion of fundamentally new clusters of energy technologies and infrastructures are central to future productivity and economic growth. So too are the associated environmental impacts, as well as possible remedies.

The study considers the diffusion of individual technologies and also the formation of clusters of interacting technologies. Examples include the "hydrogen economy" and impacts of combinations of new technologies in developing countries that are independent of existing and costly networks. The study examines issues such as future technological trajectories, especially in developing countries; the potential of future technologies to alter environmental stresses; technological strategies that decrease vulnerability to environmental change; and the potential of technological change for offsetting demand growth for new goods and services.

Current study activities include the development of a new version of the energy-economy-technology model MESSAGE to reflect endogenous technological change. This will help ECS develop more policy-relevant scenarios of future economic and technological development to understand the appropriate mix of measures and policies needed to reduce the environmental impact of these developments. ■

RESEARCH UPDATES

CONSUMERS DRIVE DECARBONIZATION

Atmospheric CO₂ helps regulate the Earth's temperature. Human-induced carbon emissions, such as those caused by energy use, lead to higher atmospheric CO₂ concentration and are a potential cause of global warming and climate change.

In ongoing work on energy and emissions scenarios in the Environmentally Compatible Energy Strategies project, IIASA researchers have completed a study analyzing the long-term decarbonization of the global energy system, i.e., the decrease of the carbon emissions per unit of primary energy consumed. The study indicates that the Earth's historical trend of decarbonization is a continuous 0.3 percent per year. At this rate the study predicts that the fossil fuel age will draw to a close late in the 22nd century.

The study emphasizes that the changes in the structure of the energy system (energy supply and end use) are under-represented in most models and analyses of long-term energy-environment interactions. The conclusions indicate that, on the structural side, the driving forces of decarbonization include both continued technological change in all domains of energy production, conversion and end use as well as the quest for higher flexibility, convenience and cleanliness of energy services demanded by consumers, especially as incomes rise. Accelerated rates of decarbonization will not result from "autonomous" structural change toward more carbon-free energy systems, but will require deliberate and ambitious technological and policy changes.

For information, contact:
Christoph Schneider
(e-mail: schneid@iiasa.ac.at)

MANAGING CATASTROPHIC RISKS

The severity of natural and human-made catastrophes depends on various factors, including their geographical patterns, property values, mitigation measures and regulations, and insurance coverage. The Swedish Insurance Society recently awarded a major prize to a group of IIASA scholars for their ongoing risk-related research on the role insurance companies can play in protecting society against increasing risks (see Awards, page 18).

This path-breaking IIASA work of the Risk, Modeling and Policy project goes beyond the traditional boundaries of catastrophe modeling and its common "trial and error" approach. The research team has developed a general methodological framework to gauge the potential of an insurance industry's response to catastrophic risks. This framework is based on the explicit inclusion of geographic diversification of property values and insurance coverage due to the dependencies between damages in different locations. As illustrated in numerical experiments, the inclusion of geographic diversification is important for increasing the stability and profits of insurers and for the financial protection of the population; in addition, it has implications for the level of governmental intervention necessary for dealing with catastrophic risks. This new method to search for a desirable combination of policy variables uses special optimization techniques that avoid the need for an infinite number of separate evaluations. These experiments also show the possibility of different approaches for the design of new policies.

For information, contact:
Yuri Ermoliev
(e-mail: ermoliev@iiasa.ac.at)

MODELING INDUSTRIAL EVOLUTION

The static nature of much contemporary economic theory has meant the neglect of dynamic aspects when analyzing competitiveness in industries. Researchers of IIASA's project on Systems Analysis of Technological and Economic Dynamics (TED) are applying the principles of evolutionary economics to shed light on the properties and outcomes of competitive changes in industries. Using a baseline model of industry evolution specifically developed for this purpose, the researchers achieved results which prove that prices, quantities and market shares stem from an explicitly dynamic process combining persistent technological differences, differential growth of individual firms and turnover.

The model also demonstrates that no firm will survive forever; it is 100 percent certain that all firms are destined to die in a finite period of time. Results show that new firms entering an industry cause continuing turnover in the overall firm population, and that the size distribution of firms emerges as a consequence of the combination of their differences (i.e., efficiencies) and firm turnover in the industry. In the long term, the proportions of firms with different efficiency levels reflect the interplay between selection forces and entry rates. Based on results determined with the TED model, these outcomes of the competitive process verify that conditions of entry and diverse techniques of production determine "centers of gravity" around which prices, quantities and profitabilities persistently fluctuate. ■

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(e-mail: kanior@iiasa.ac.at)

IIASA 25th ANNIVERSARY



"... convinced that science and technology, if wisely directed, can benefit all mankind ... believing that international cooperation between national institutions promotes cooperation between nations and so the economic and social progress of people ..."

(from the IIASA Charter, 1972)



International Institute for
Applied Systems Analysis

After more than a quarter of a century of valuable contributions to science and policy, IIASA continues as a reputed center for innovative research, for international, interdisciplinary collaboration, for conferences and workshops, and for networking with other groups of scientists around the world.

IIASA's neutrality and impartiality guarantee non-political and unbiased perspectives particularly valued by policy makers, scientists and the general public.

IIASA Statistics 1972-1997



- 2,287 alumni from more than 60 countries
- about 900 participants in the Young Scientists Summer Program from more than 40 countries
- 14,273 visitors
- 24,170 participants attending 860 conferences
- 163 books
- 593 scientific reports
- 2,731 working, collaborative and professional papers and interim and status reports
- more than 7,200 media articles and television and radio broadcasts

I I A S A T H E N

THE ORIGINAL GOAL:

1972

To initiate and support collaborative and individual research in relation to problems of modern societies arising from scientific and technological development. To this end, the Institute shall undertake its own studies into both methodological and applied research in the related fields of systems analysis, cybernetics, operations research and management techniques.

THE PROJECTS:

Water Resources

Design and Management of Large Organizations

Energy Systems

Urban and Regional Systems

Bio-Medical Systems

Ecological Systems

Computer Systems

Automated Control of Industrial Systems

Organization and Control of Complex Dynamic Systems



IIASA NOW

1997

THE RE-FOCUSED GOAL:

To conduct international and interdisciplinary scientific studies to provide timely and relevant information and options, addressing critical issues of global environmental, economic, and social change for the benefit of the public, the scientific community, and national and international institutions. To this end, the Institute focuses on sustainability and the human dimensions of global change.



THE PROJECTS:

Adaptive Dynamics Network*

Decision Analysis and Support

Dynamic Systems

Economic Transition and Integration

Environmentally Compatible Energy Strategies

Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia

Population

Radiation Safety of the Biosphere

Risk, Modeling and Policy

Social Security Reform*

Sustainable Boreal Forest Resources

Systems Analysis of Technological and Economic Dynamics

Transboundary Air Pollution

* as of 1 January 1998.



I I A S A TIME-LINE OF INSTITUTE

1972:

On October 4, representatives of 12 nations from Europe, Asia and North America meet in London to sign the charter establishing IIASA.



1974:

George Dantzig (below left), winner of the U.S. National Medal of Science, is joined at IIASA by Nobel Prize laureates Tjalling Koopmans (USA) and Leonid Kantorovich (USSR) to expand IIASA's study of advanced systems science and methodology.



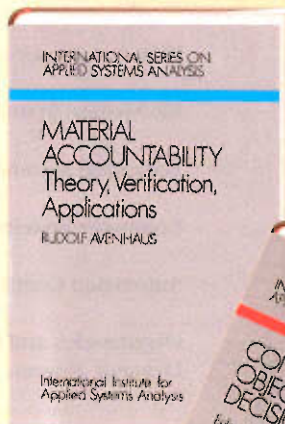
1975:

A new research field, Adaptive Ecosystem Policy and Management, is founded at IIASA based on results of a study relating forest conditions to pest propagation that had implications for forest management policy throughout North America and Scandinavia.



1977:

IIASA publishes the first two volumes of a series on applied systems analysis to acquaint the world community of scientists and decision makers with the current state-of-the-art of this topic.



1977:

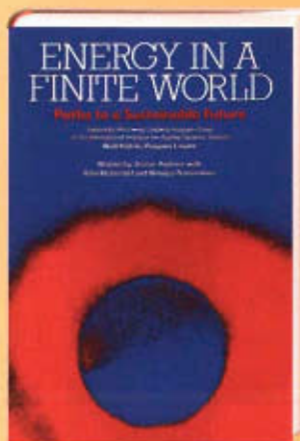
IIASA establishes the Young Scientists Summer Program (YSSP). Also, the first issue of the Institute's quarterly magazine *Options* comes off press.



E-RELEVANT EVENTS AND

1981:

IIASA publishes the first comprehensive, truly global assessments of energy issues resulting in the internationally acclaimed report, *Energy in a Finite World*.



1982:

IIASA researchers complete a study on eutrophication and water management, the results of which influence water policy in Italy, Japan, USA and USSR.



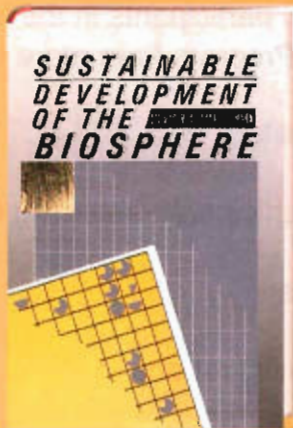
1983:

IIASA scientists lead the international research community in developing an integrated approach to impact assessment: A network of 200 experts is assembled to conduct the most comprehensive interdisciplinary study of its time on social effects and potential responses to the impact of climatic variations on global agriculture.



1986:

IIASA scholars publish *Sustainable Development of the Biosphere*, which is quickly accepted by the science community as a



new perspective on future research on resource development in a world of ecological uncertainty and surprise.

1988:

In response to mounting tensions regarding global food issues, IIASA creates an unprecedented computer model that links national agricultural models. Named the Basic Linked System, the model is an operationally useful tool in the international debate on determining the effectiveness of policies to eliminate hunger and the impacts of agricultural trade liberalization.



1991:

IIASA's Governing Council approves a new strategic plan re-focusing the Institute's goal to studying

sustainable development and the human dimensions of global change in the post Cold War period.



1991:

The serious international issue of "chemical time bombs" is defined on the basis of IIASA studies on potential long-term impacts of the accumulation and mobilization of toxic and environmentally harmful chemicals in the environment, as well as economic and health effects.



A N N I V E DISTINGUISHED IIASA RE

1991:

IIASA researchers complete the first consistent, continent-wide assessment of forest resources in Europe and the European regions of the former Soviet Union, revealing alarming consequences of air pollution for European forests.



1992:

Based on the success of a project that began in 1989 to bring together top-ranked Western economists and the Eastern architects of economic reform, the Russian Federation and IIASA sign an agreement under which IIASA holds a series of economic seminars for Russian cabinet ministers, government officials and scholars.



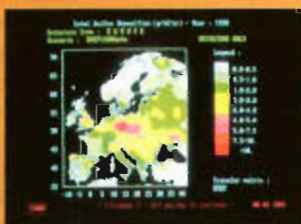
1994:

IIASA's Population project builds a unique model to link population, development and environment for policy purposes. The first case study of Mauritius is so successful that the analysis is applied to other countries in Africa and Latin America.



1994:

In June, 33 European governments use a scenario developed by IIASA's Regional Acidification Information and Simulation (RAINS) model as the basis for signing the Second Sulfur Protocol under the Convention on Long-range Transboundary Air Pollution.



1994:

At the United Nations International Conference on Population and Development, implications of IIASA's global population projections motivate delegates to change the preamble of the concluding document.



1994:

On October 30, 22 years after IIASA was established, high-level government officials from countries home to IIASA's national member organizations meet in Laxenburg to reaffirm their commitment to the Institute and its work.

1995:

Funded by the World Bank and the Asian Development Bank, the RAINS model is

extended to facilitate the analysis of SO₂ pollution in Asia and is presented to energy planners and government officials in 18 Southeast Asian nations.



1995:

At the 16th Congress of the World Energy Council, IIASA scholars present their joint report with WEC experts on "Global Energy Perspectives to 2050 and Beyond" to more than 5,000 energy industry leaders from all over the globe.



R S A R Y SEARCH ACHIEVEMENTS

1995:

The Austrian Ministry of Environment and the U.K. Department of Environment commission IIASA to carry out a study on the "Effectiveness of International Financial Instruments for Environmental Investment in CEE Countries: Recipients' Perspective," which is presented by the Austrian Environment Minister at the Conference of Environment Ministers of the UN/ECE.

1996:

The Forest Resources project completes the most comprehensive study of Siberian forests ever undertaken. Results are presented to ministers and high-level government officials responsible for the management of Russian economic affairs.



1996:

As of November, IIASA's project on Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia hosts the Focus III office of the LUCC Core Project, a joint research effort of the IGBP and IHDP.



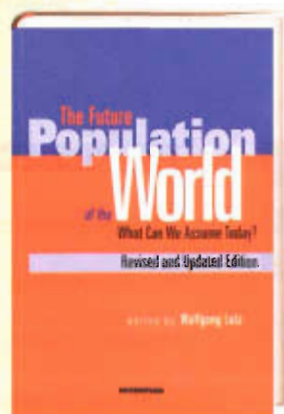
1996:

Contributions by nine IIASA scientists are included in the publication of the Second Assessment Report of the Intergovernmental Panel on Climate Change.



1996:

A second edition of the IIASA book *The Future Population of the World. What Can We Assume Today?*, which includes the first-ever completed probabilistic population scenarios (predicting world population will probably never double again) and new findings on population aging, attracts much attention from international media and policy communities.



1997:

As of 1997, IIASA's technology inventory database, CO2DB, contains more than 1,600 technologies. CO2DB



is a unique, computer-based inventory of technological options for reducing energy-related emissions of greenhouse gases. Already more than 100 individuals and organizations around the world are using CO2DB.

1997:

After successful exploratory work, IIASA expands its efforts on new initiatives concerning social security reform, population-development-environment in southern Africa, and technological change and the environment.



SCIENCE IN A TIME OF DOWNSIZING



Gordon MacDonald

What challenges does the future hold for IIASA and other research institutes? IIASA Director Gordon MacDonald writes that the biggest challenge is the cut of public funding for pure science. But he suggests that rather than bemoaning this fact, researchers should look at it as a chance for innovation in solving society's most complicated issues.

As industries and governments downsize in country after country, their leaders increasingly call upon scientists to deliver a larger number of tangible benefits to the public at lower cost and more rapidly. This demand comes as a perplexing and unwelcome surprise to many in the scientific community.

Not many decades ago, private support, or very minimal public support by today's standards, enabled scientists to achieve many superb results that form the basis of today's science. However, science on the scale that exists and is essential today can be maintained only with large amounts of funding. In today's eco-

nomie climate, science and technology can expect such support only if their results meet critical social needs. Unfortunately, intellectual progress alone, as measured by advances in specific scientific disciplines, no longer suffices to generate the necessary funding. Although public funding for pure science may be wise policy, governments do not consider it necessary. Therefore, the issues high on the public agenda must become high on the agenda of the scientific community.

So, what is high on the public agenda? Citizens of all countries expect better health care, better education, and economic security, particularly for older age groups. They also expect progress towards the reduction, if not the outright elimination, of poverty, disease, illiteracy, and environmental degradation. So far, as we have seen, such progress has been slow and very expensive. My reading indicates that both governments and citizens have become frustrated with both the high costs and the long time scale for achieving any noticeable results.

While dissatisfaction with government grows, industry's need to control cost and increase productivity has also had a profound impact on people's lives. Persistent wage stagnation, career stagnation, and job insecurity have many workers struggling to hold their economic ground, even in those countries that have a technically healthy economy with low inflation and low unemployment. These conditions have stunted middle-class aspirations and crushed the ambitions of many of the less fortunate. The situation has produced volatility in public opinion and a mood that reflects a lack of confidence in the ability of government and other sectors of society — including science and technology — to address fundamental social needs adequately.

It would be a serious mistake to think that the need to control cost has no consequences for the science and technology community. Science is becoming more expensive, given

the growing number of scientists and their need for high-technology equipment and facilities. But these increased costs are not the issue. The real issue is the potential for scientific and technical advances to improve the efficiency of all other activities. Overall, scientists can make a large contribution to controlling costs and advancing social interests, and the public expects the scientific community to make them. This constitutes an invitation for science to secure its own future. Budget cuts are inevitable. The question is whether they will be larger or smaller, and where they will fall.

It is up to the scientific community to play a constructive role in determining the outcome. The scientific community must find faster and cheaper ways to bring its activities to bear on industrial and financial problems, while preserving a capacity for deep innovation. This often requires work with long-term horizons. Researchers must also develop more powerful ways to evaluate risks and benefits, and hence costs, in applying technology in increasingly complex settings. The latter calls for fundamentally new science. Some would label it a science of complex systems, an activity central to IIASA since its founding.

This new science requires downstream planning of research, so that scientists organize their work with a focus on solving critical problems within a reasonable budget. This approach will work best if scientists are given — and accept — a major role in the planning process. To do this effectively, scientists must first understand the target problems very well. Because these problems are increasingly those of society, rather than those of theory, physical and biological scientists must work far more closely with social scientists, as well as with politicians.

The complex problems I have alluded to share a number of characteristics. They are almost always nonlinear, which means that small causes lead to large effects. That is, they show sensitivity to initial conditions, leading to a loss of deterministic probability. This requires scientists to accept a stochastic element in modeling complex phenomena. Applications of stochastic modeling include such diverse areas as probabilistic weather and climate prediction, as well as probabilistic decision making in finance.

The problems of evaluating environmental risk accurately and devising reasonable methods for environmental remediation illustrate the need for a scientific understanding of complex phenomena. The "thousand bulldozer" approach to environmental issues makes no more sense than would meeting today's military challenges with human wave attacks. The move from static equilibrium economics to dynamic economics provides a further example of complex phenomena that require new methods and approaches. One can look ahead — cautiously — to a predictive science of non-equilibrium economics.

Overall, we can meet the challenge of creating a predictive science of complex phenomena only with large databases, large computer networks, and large ideas. I do not know whether we will discover substantive complex principles underlying complex phenomena, but if we do, they will emerge through our struggles with real-life problems.

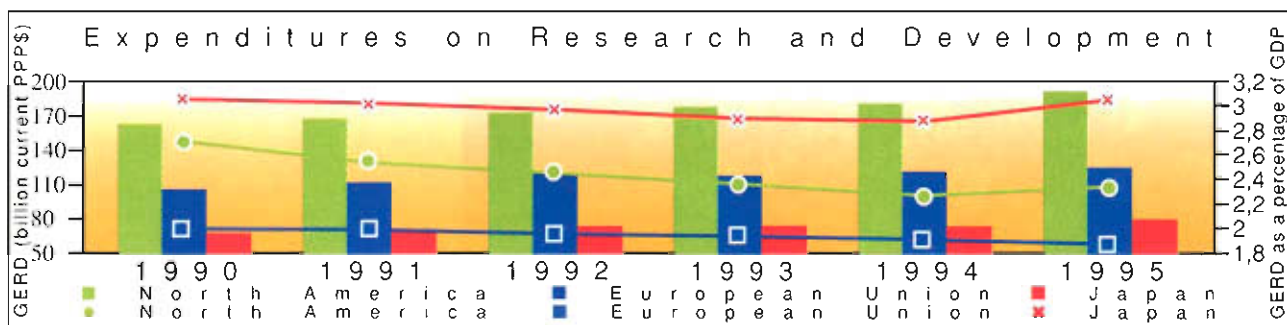
Introducing downstream planning or, equivalently, a focus on the customer, does not subtract from science; it adds to it. In dealing with politicians, the scientific community must go beyond telling the exciting story of science, and beyond mere

advocacy of specific disciplines or challenges. Such an approach may in fact prove counterproductive, because citizens and governments alike often view "science" as an esoteric activity with little connection to the real world. Disciplines that isolate themselves from the rest of science, let alone from the real world, do and will pay a price. The challenges originating directly from social needs demand the same major innovation and infrastructure development as pure scientific exploration.

In collaboration with the political sponsors of science, we must address the necessary balance between efforts to advance knowledge in various scientific disciplines and efforts to solve problems of direct concern to the public. These are hard questions, but we cannot evade them. They demand thinking that goes beyond the current science.

The scientific community should not focus solely on the painful effects of budget cuts, but instead look at the exciting opportunities for innovation and progress afforded by studying society's complicated issues. We must not become mired in pessimism associated with shrinking budgets and concerns about the vitality of the disciplines that defined science in the past. History shows that science has flourished when societies have called for the application of science to its problems. Thus, this time of downsizing should be a time of optimism for innovative scientists. The long-term vision of IIASA's founders emphasizing the need to understand society's complex systems remains the major challenge to science for the new century. ■

Gordon J. MacDonald



GERD: gross expenditure on research and development

GDP: gross domestic product

PPP: purchasing power parity

INSIDE IIASA

MEETINGS

IIASA continued to maintain its network of international collaboration through the following meetings, held at the Institute between March and September 1997. For more information, contact the person listed for check the Web edition of *Options* at:
<http://www.iiasa.ac.at/Options>.

**EU Project Meeting:
Potential Use of Renewable
Sources of Energy in Asia
and their Cost
Effectiveness in Air
Pollution Abatement**

4-7 March 1997
 Contact: Margret Gottsleben
 E-mail: gottsleb@iiasa.ac.at

**Workshop on Financial
Inflows to Transition
Economies**

9-10 May 1997
 Contact: János Gács
 E-mail: gacs@iiasa.ac.at

**1997 Open Meeting of the
Human Dimensions of
Global Environmental
Change Research
Community**

12-14 June 1997
 Contact: Ingrid Teply-Baubinder
 E-mail: teply@iiasa.ac.at

**AEAM Workshop on
Current Advances in
Environmental Decision
Making**

19-21 June 1997
 Contact: Helene Pankl
 E-mail: pankl@iiasa.ac.at

**Population and
Environment in
Namibia, Botswana
and
Mozambique**

23-25 June 1997
 Contact: Marilyn Brandl
 E-mail: brandl@iiasa.ac.at

**International Energy
Workshop and the
Energy Modeling Forum**

23-25 June 1997
 Contact: Angela Dowds
 E-mail: dowds@iiasa.ac.at

**International Workshop on
Induced Technological
Change and the
Environment**

26-27 June 1997
 Contact: Angela Dowds
 E-mail: dowds@iiasa.ac.at

**Working Group Meeting:
Social Security Reform**

27 June to 1 July 1997
 Contact: Helene Pankl
 E-mail: pankl@iiasa.ac.at

**UN/ECE Convention on
Long-range Transboundary
Air Pollution Seminar on
Integrated Assessment
Modeling for Multi-pollu-
tant/Multi-effect abatement
strategies for Europe**

4-5 September 1997
 Contact: Margret Gottsleben
 E-mail: gottsleb@iiasa.ac.at

**Advances in Methodology
and Software for Decision
Support Systems**

5-7 September 1997
 Contact: Helene Pankl
 E-mail: pankl@iiasa.ac.at



IIASA Deputy Director Jill Jäger welcomes participants to the 1997 Open Meeting of the Human Dimensions of Global Environmental Change Research Community.

RESEARCH GRANTS

During the middle of this year, the following IIASA activities received research grants:

Population Project from:

European Commission, DG VIII, Sustainable Development and Natural Resources to evaluate alternative paths for sustainable development in Botswana, Namibia and Mozambique.

Management Coordination and Development Project from:

European Commission, DG XII, Science, Research & Development, the Austrian Federal Ministry of Science and Transport, the Austrian Federal Ministry for Environment, Youth and Family, the National Science Foundation (USA), the Swedish Council for Planning and Coordination of Research (FRN), and the University of Bonn (International Human Dimensions Programme on Global Environmental Change, IHDP) for the "Open Meeting of the Human Dimensions of Global Environmental Change Research Community," **First Foundation for Central and East European Cooperation** for cooperation on the production of the ALFA TV Encyclopedia, Macropedia units and Micropedia clips.

Environmentally Compatible Energy Strategies Project from:

Lawrence Berkeley National Laboratory for technological diffusion data for the USA.

Sustainable Boreal Forest Resources Project from:

Swedish Council for Planning and Coordination of Research (FRN)

for biodiversity analyses;

Food and Agriculture Organization of the United Nations for the Global Fibre Supply Study.

Economic Transition and Integration Project from:

Swedish Council for Planning and Coordination of Research to study organizational issues of the Russian forest sector.

Systems Analysis of Technological and Economic Dynamics Project from:

Fujitsu Research Institute for Advanced Information Systems and Economics (FRI) for the comparative analysis and evaluation of the historical perspective of techno-metabolism in Japan, USA and Europe.

Risk, Modeling and Policy Project from:

Food and Agriculture Organization of the United Nations for development of the

Kenya Agro-ecological Zone software package;

Norwegian Research Centre in Organization and Management for work on population displacement and environmental security.

Adaptive Dynamics Network Project from:

Austrian Ministry for Science and Transport for the study of adaptation and self-organization.

IIASA from:

Swedish Council for Planning and Coordination of Research (FRN) for Swedish scientific cooperation and Processes of International Negotiations; **Alfa Bank (Russia)**, the **Netherlands Organization for Scientific Research**, the **Swedish Council for Planning and Coordination of Research (FRN)** and the **Austrian IIASA-Commission** to support nine participants of IIASA's Young Scientists Summer Program; **Ministry of Science-Academy of Sciences (Republic of Kazakhstan)** for the development of a database and geoinformational system for the Semipalatinsk test site and zone of its influence.

APPOINTMENTS

Last Name	First Name	Project	Country
Berte	Mariele	TED	ITA
Carlsson	Lars	FOR	SWE
Johnson	Anne	ECS	USA
Kersten	Gregory	DAS	CAN
Korhonen	Pekka	DAS	FIN
Michalowski	Wojciech	DAS	CAN
Rossmann	Charles	LUC	USA
Soismaa	Margareta	DAS	FIN
Wyzan	Michael	ETI	USA

DAS= Decision Analysis and Support

ECS= Environmentally Compatible Energy Strategies

ETI= Economic Transition and Integration

FOR= Sustainable Boreal Forest Resources

LUC= Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia

TED= Systems Analysis of Technological and Economic Dynamics

IN MEMORIAM: PETER DÖRFNER

Peter Dörfner, a former researcher with IIASA, died in March 1997 after a brief illness. Dörfner worked at IIASA during 1993 and 1994 in both the Environmentally Compatible Energy Strategies project and the Transboundary Air Pollution project. Dörfner's research interests included energy demand/supply modeling, trade-off/risk analysis, and power system expansion planning. While at IIASA he helped develop an interface between MESSAGE global energy consumption data and RAINS country data.



A W A R D S

IIASA Deputy Director **Jill Jäger** has been appointed to the Scientific Steering Committee for the Global Change System for Analysis, Research and Training (START) Framework Activity. START is jointly sponsored by the International Geosphere-Biosphere Programme, the World Climate Research Programme, and the International Human Dimensions Programme on Global Environmental Change.

Nebojša Nakićenović, leader of IIASA's project on Environmentally Compatible Energy Strategies, was nominated by the Austrian government to be Convening Lead Author for the Intergovernmental Panel on Climate Change's (IPCC) Special Report on New Emission Scenarios. The report is scheduled to be completed in 1999.

Tatiana Ermolieva, **Yuri Ermoliev** and **Vladimir Norkin** were awarded the "Kjell Gunnarson's Risk Management Prize" by the Swedish Insurance Society at the annual meeting of the Society for Risk Analysis, June 1997, for a paper they wrote titled "Spatial Stochastic Model for Optimization Capacity of Insurance Networks Under Dependent Catastrophic Risks: Numerical Experiments." Tatiana Ermolieva, who participated in this year's Young Scientists Summer Program, is the first author of the paper, along with her father, Yuri, co-leader of IIASA's Risk, Modeling and Policy project, and Norkin, an associate research scholar with the Glushkov Institute of Cybernetics, Kiev, Ukraine. The authors have developed a stochastic model that simulates catastrophic events in a region and calculates an optimal diversification strategy for insurance companies.

Hannes Porias, who was a member of IIASA's former energy systems project from 1975 to 1979, was appointed Austrian Ambassador to Hungary. Ambassador Porias began his term in January 1997.

Former IIASA Director **Peter de Jánosi** was awarded the Goldenes Ehrenzeichen (Golden Decoration) by the City of Vienna on May 21. The award cited the former director's many services to the city, especially in matters regarding IIASA. Also, on June 5, Dr. de Jánosi was awarded an honorary doctorate by the Budapest University of Economic Sciences for his "contributions to economics and his successful stewardship of IIASA in the difficult transition years of the 1990s."



Jill Jäger



Nebojša Nakićenović



Tatiana Ermolieva



Yuri Ermoliev

I N S I D E I I A S A

UNIQUE IIASA PROGRAM TURNS 20



For 20 years, IIASA's Young Scientists Summer Program (YSSP) has provided a unique opportunity for young scientists to gain hands-on research experience by working side-by-side with IIASA senior research staff. Since the program's inception in 1977, more than 900 scholars from 40 countries have completed the program.

The YSSP is organized to maximize young scientists' exposure to the international, interdisciplinary aspects of IIASA's research. For example, participants are required to present their research to each other and to IIASA researchers at a midsummer workshop. This gives the participants some insight into research conducted at IIASA, and encourages them to look beyond the projects they are assigned to.

"IIASA's YSSP offers the type of interdisciplinary training required to solve today's complex global environmental problems," says Program Dean Joanne Linnerooth-Bayer, explaining, "No other program in the world offers this kind of research opportunity in the type of setting that IIASA provides."

Each year, two or three outstanding YSSP participants receive awards that allow them to return to IIASA for an additional three months to continue their research. The awards are named after Aurelio Peccei, a founder of IIASA and former president of the Club of Rome, and Academician Vladimir Mikhalevich, a former Soviet Union and subsequently Ukrainian representative to IIASA and Academician of the Ukrainian and Russian Academies of Sciences.



For more information about IIASA's Young Scientists Summer Program, visit the YSSP web site at

<http://www.iiasa.ac.at/YSSP>

or contact:

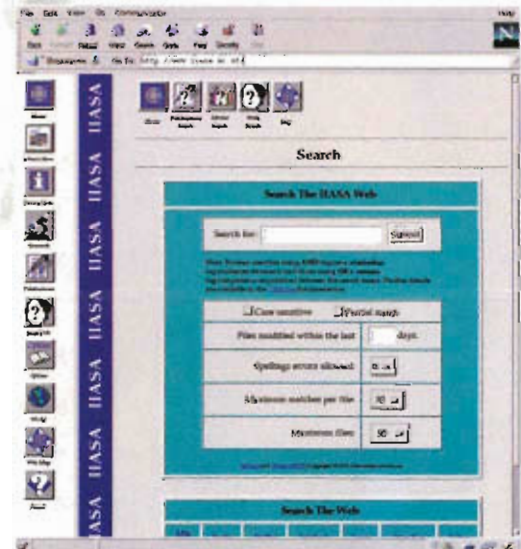
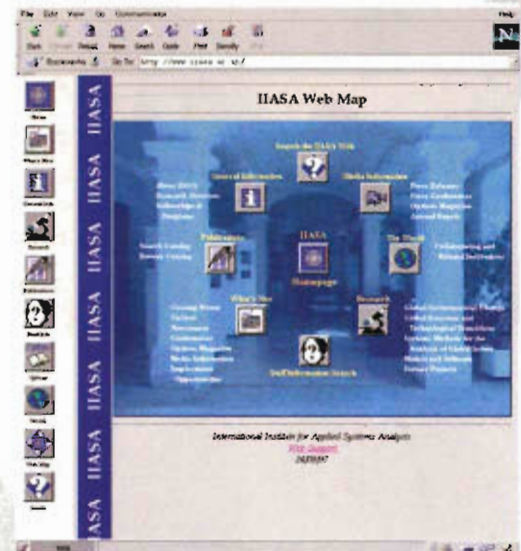
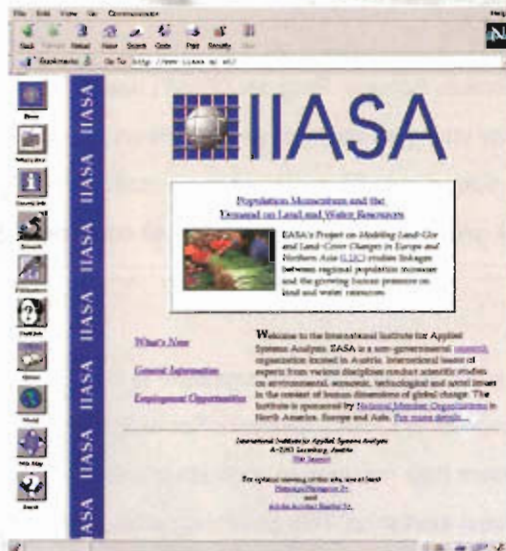
*Margaret Traber, YSSP Coordinator,
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Fax: +43 2236 71313

E-mail: traber@iiasa.ac.at

New Web Pages



IIASA National Member Organizations

Austria

The Austrian Academy of Sciences

Bulgaria

The National Committee for Applied Systems Analysis and Management

Finland

The Finnish Committee for IIASA

Germany

The Association for the Advancement of IIASA

Hungary

The Hungarian Committee for Applied Systems Analysis

Japan

The Japan Committee for IIASA

Kazakhstan

The National Academy of Sciences

Netherlands

The Netherlands Organization for Scientific Research (NWO)

Norway

Research Council of Norway

Poland

The Polish Academy of Sciences

Russia

The Russian Academy of Sciences

Slovak Republic

The Slovak Committee for IIASA

Sweden

The Swedish Council for Planning and Coordination of Research (FRN)

Ukraine

The Ukrainian Academy of Sciences

United States of America

The American Academy of Arts and Sciences



International Institute for Applied Systems Analysis