



IIASA

options

Spring '98

International Institute for Applied Systems Analysis

RISKY BUSINESS:

WHO WILL

PAY

FOR THE GROWING

COSTS OF

GLOBAL

CHANGE?



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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

Global Change and Climate Catastrophes:

IIASA Explores Policy Issues of Risk Management

The impacts of global climate change are conventionally discussed in terms of global and yearly average temperature changes and of the rise in mean sea level.

This emphasis on means or averages has badly distorted the climate change debate. Critics of the global warming hypothesis are quick to point out that the estimated warming 50 years hence, one or two degrees Celsius, is much smaller than the differences in average temperature between cities and surrounding rural areas or between points located a few hundred kilometers north or south. A myriad of economic analyses show that shifts in temperature of one or two degrees will have relatively small economic consequences.

Discussions of climate change have placed much less emphasis on anticipated changes in weather variability than on changes of mean weather. Of particular importance are extreme events such as windstorms, hurricanes, floods, and droughts. These events can lead

to large economic costs and social disruptions. Whether the frequency and intensity of extremes will increase or decrease in a warmer world is not known; the spatial scales of most extreme events are much too small to be captured in current climate models.

However, a small increase in the surface temperature of the oceans will undoubtedly lead to increased water content of the atmosphere, because the vapor pressure of water rises exponentially with temperature. Thus, it is highly likely that at least some regions of the globe will experience higher precipitation in a warmer world.

Building on IIASA's long tradition in risk theory, the Risk, Modeling and Policy (RMP) Project is exploring the implications of future catastrophic events on society in general and on the insurance and financial institutions in particular. Considerations of catastrophic weather-related events raise numerous difficult policy issues. How should the private and public sectors best share the risks associated with extreme events? What measures can and should the insurance industry take that would lead the private

sector to lower its potential exposure to extreme events? What relative roles do the public and private sectors play in monitoring the oceans and atmosphere in order to alert the public to impending catastrophes?

Providing insight into these and related issues will require the combined efforts of geophysicists, actuaries, economists, sociologists, demographers, modelers, mathematicians, and legal experts. Because risks and the perception of risk vary geographically, international participation is essential. IIASA is well situated to provide the interdisciplinary, international team to explore these issues.

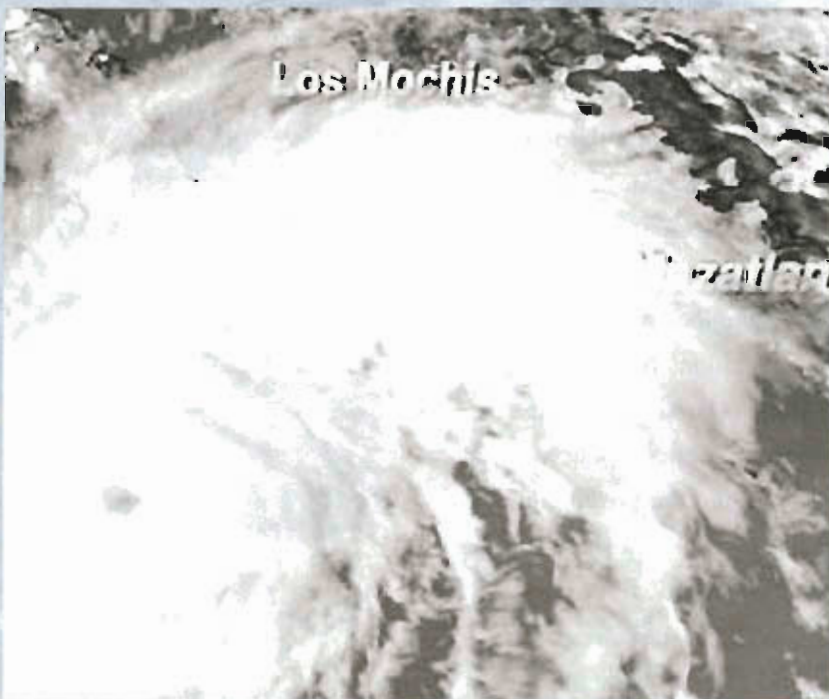


Gordon J. MacDonald

Dr. Gordon J. MacDonald
IIASA Director

RISKY BUSINESS:

WHO WILL PAY FOR THE GROWING COSTS OF GLOBAL CHANGE?



No other decade in history has hosted as many natural disasters as the 1990s. The list of catastrophic weather events—from Hurricane Andrew in Florida in 1992 to the recent flooding in Central Europe and Peru—reflects an alarming increase in the rate of events that, in the case of devastating floods, were thought to happen only once every few hundred years.

Behind many of these disasters lurks the specter of human-induced global change. Indeed, the Intergovernmental Panel on Climate Change (IPCC) concluded in its Second Assessment Report that the increased greenhouse gases due to human activity "are projected to change regional and global climate and climate-related parameters such as temperature, precipitation, soil moisture and sea level."

This increase of greenhouse gases, says the IPCC, will heat up the Earth's temperature, causing seas to rise and increasing the occurrence of, among other things, severe floods and droughts. Furthermore, the Second Assessment Report states that increased population density in sensitive areas leaves more humans vulnerable to natural catastrophes.

The global economic losses and human suffering from natural disasters are high and increasing. How best to address the costs and complexities surrounding the occurrence and aftermath of these disasters requires an interdisciplinary, international approach. Ideally, the approach should take into consideration the latest research advances on global change, as well as employ mathematical methods and computer modeling.

IIASA's Risk, Modeling and Policy (RMP) Project, with its history of risk and fairness analysis, as well as its long tradition of applying optimization techniques under uncertainties, is initiating such an approach. With an award-winning catastrophic risk model under its belt and an international network of researchers, public authorities, the insurance industry, and financial institutions at its disposal, the Project is poised to make IIASA a European center for catastrophic risk research.

Economic Losses are Mounting

Natural catastrophes during the past winter alone have resulted in millions of dollars in property damages. For example, in Peru, El Niño-related weather has devastated the fishing industry and has caused more than U.S.\$800 million in damage. In Europe during the past two years, unprecedented amounts of precipitation have inundated areas in Poland, Germany, Austria, and the Czech Republic. Over the past 50

years, floods normally associated with melting snow in the spring have shifted their occurrence to summer because of heavier summertime precipitation.

The high costs associated with these destructive acts of nature are becoming more and more commonplace. According to figures published by Munich Re, an international re-insurance firm, in the last decade the number of major natural catastrophes (e.g., floods, hurricanes, earthquakes, wildfires, avalanches, sea surges, hail storms, and volcanic eruptions) is three times as great, and cost the world's economies eight times as much as in the decade of the 1960s. In 1997, the most frequent natural catastrophes were windstorms and floods, which accounted for 82 percent of the economic losses and no less than 97 percent of the insured losses.

The mounting costs affect a wide range of entities, from individuals to federal governments to the insurance industry. How best to control these costs and protect against catastrophic risks is a problem of increasing urgency, says Joanne Bayer, co-leader of the RMP Project. "Our past research provides a strong base for examining a range of issues associated with climate change and catastrophic risk management," says Bayer.

The Issues

Natural and technological disasters raise many important research and policy issues about how societies can protect themselves against catastrophic risks. What mitigation and other measures can and should be taken to reduce the losses from high-consequence events occurring very infrequently? Is there sufficient evidence to link an increase in storm severity to climate change? What role does the insurance industry play in reducing and mitigating the cata-





strophic losses resulting from global change? Is there a risk of a mega catastrophe with widespread insurance insolvency, unpaid claims and a possible breakdown in the global insurance market?

These are just some of the issues the RMP Project has begun to address by examining the role of governments and the insurance industry in managing catastrophic events of all kinds.

The Model

The insurance industry is embracing computer models to aid their strategies for dealing with catastrophic risks by improving the insurability of rare events (with dependent claims) and reducing the vulnerability of the insurance industry to insolvencies.

Many of the models include "simulators" for various catastrophic events and their consequences. This approach is useful for analyzing possible alternative scenarios and the sensitivity of outcomes to frequencies of events, spatial patterns, and policy options. However, the large variety of "if-then" solutions generated by these models makes determining which strategy or policy to implement difficult.

The RMP Project has recently developed a model for catastrophic risk management that is concerned with choosing the best, most robust strategies without the user having to perform endless analyses of "if-then" strategies. The notion of "best, robust strategy" is explicitly specified in the model in terms of various indicators such as stability, insolvency, profits, losses, and available budgets. The model employs specific nonsmooth stochastic optimization techniques developed at IIASA to design the desirable strategies or policies.

The RMP Project's model can help improve industry-wide decisions on diversification, contracts and other decision variables. It can also generate policy strategies that decrease the risk of insurer insolvency and increase profitability, as well as

decrease insured losses. Because catastrophic risks are characterized by dependent losses, the model explicitly includes geographic diversification of insurance coverage. The model's simulations can be useful to insurers in decreasing their vulnerability, to the insured in increasing their security, and to regulators in gauging the amount of necessary intervention. This work received the Kjell Gunnarson Risk Management Prize from the Swedish Insurance Society at the annual meeting of the Society for Risk Analysis in June 1997.

Predictability of Natural Disasters

The RMP initiative includes work on a theory that may help to increase the predictability of natural catastrophes.

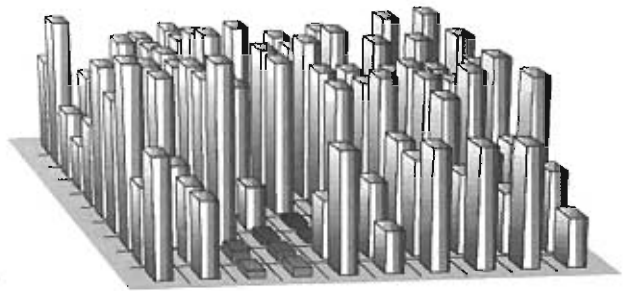
"The insurance industry assumes that big events are independent. This is incorrect for natural catastrophes," says IIASA Director Gordon MacDonald, who is also participating in the RMP initiative. MacDonald, a geophysicist, explains that natural catastrophes such as earthquakes and volcanoes happen in clusters due to memory of past events and so can be predicted to some extent. He is examining whether long-term prediction of catastrophic climate events is possible too.

MacDonald's historical analysis of catastrophic storms shows that there are time dependencies or inter-relationships for hurricanes and other destructive weather events. His research focuses on deep ocean currents as the driving force of time-dependent storms. "Atmospheric weather patterns allow us to predict what the weather will be in the near future," says MacDonald. For distant future predictions, he explains, "Ocean currents drive atmospheric conditions, but move much more slowly. By tracking these currents we could predict long-term weather patterns." He adds that last summer's severe flooding in Europe may be linked to Hurricane Hugo, which hit the U.S. nearly 10 years ago.

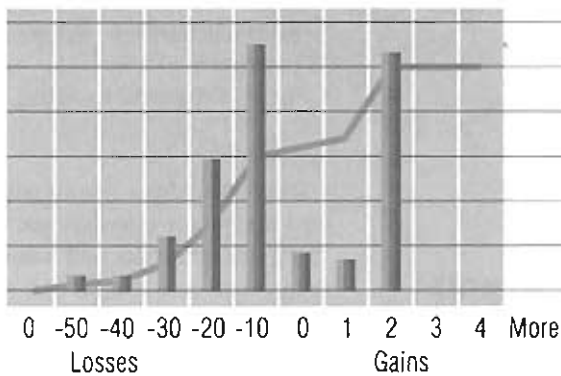




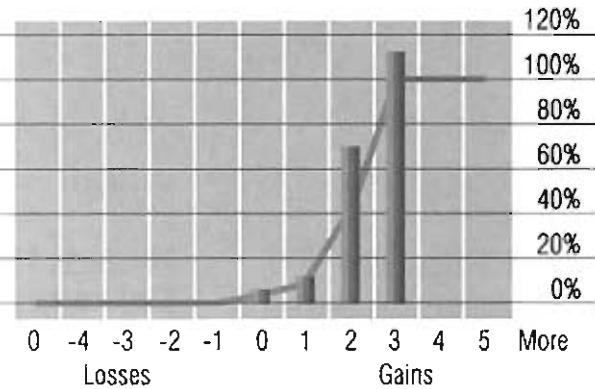
Landscape of property values



Landscape of damaged property values



Probability of an insurer's losses: Initial contracts



Probability of an insurer's losses: Improved contracts

The RMP Project's model for catastrophic risk management can help improve industry-wide decisions on diversification and other variables and can generate policy strategies that decrease losses.

MacDonald says that long-term predictions could provide plenty of lead time for nations to prepare for catastrophic natural events. A better prepared populace may mitigate the high costs associated with these disasters.

International Dialogue

In addition to its risk modeling work and the research on natural catastrophe predictions, the RMP Project is initiating a collaborative research program and policy dialogue on global change and catastrophic risk management in the U.S., Europe and Japan. The dialogue will involve the international research community, private industry, public officials and non-profit organizations. Initial collaborators include the Joint Research Center of the European Union (JRC) and the Center for Risk Management and Decision Sciences of the Wharton School, University of Pennsylvania.

IIASA's goal to become a leading European center for catastrophic risk research may be ambitious, but as the costs associated with natural catastrophes mount, a range of groups from the insurance industry to policy makers to insurance policy holders will be looking for ways to mitigate these expenses. Responding to this urgent problem is one more example of IIASA applying its wealth of global change knowledge—as well as its long tradition in environmental risk management—to develop practical solutions.



NASA's proposed activities would initially focus on the United States, Japan and Europe.

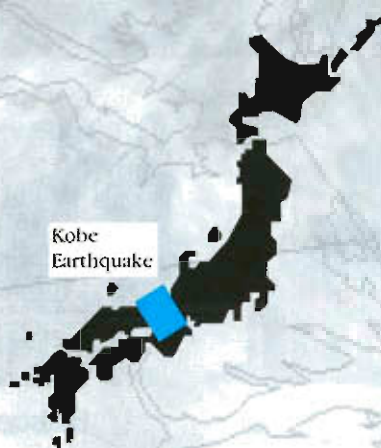


United States

Recent Natural Catastrophic Events:
Hurricane Andrew
Northridge Earthquake

Issues:

The social costs of disasters and the vulnerability of the insurance industry have raised difficult policy issues on the role of the private market and public authorities in reducing the damages from catastrophes and in equitably and efficiently spreading the losses.



Japan

Recent Natural Catastrophic Events:
Kobe Earthquake

Issues:

Limited private insurance, as well as limited mitigation measures, such as strict building codes, and the high concentration of certain types of industries, are factors contributing to Japan's vulnerability to catastrophic risks. An important policy issue is reducing this vulnerability through prudent risk management strategies, including siting decisions to avoid industry clustering, building codes and other mitigation measures, and financial diversification through insurance.



Europe

Recent Natural Catastrophic Events:
Windstorm Daria
Central Europe Flooding

Issues:

Catastrophic losses from natural and man-made disasters are worrying governments and insurers for several reasons. First, governments in Europe have traditionally taken primary responsibility for disaster aid and victim compensation, which has led to a reliance on the public authorities and little private responsibility for mitigating the risks. Second, many of these governments do not have the financial resources for compensating the victims of large disasters; yet, for institutional and other reasons, these risks are often not spread across the industrial countries or even across Europe. The regulatory patchwork in Europe creates high costs for private insurers to enter the market on a large and geographically dispersed scale. ■



NEW MODEL, SOFTWARE UNDER DEVELOPMENT

New Model Assists Local Land-Use Policy Development

In many regions, the process of land-use change is mainly governed by universal driving forces such as population increase, urbanization and industrialization. It also depends on local characteristics such as inherent socioeconomic and natural conditions and behavioral characteristics of the people. To develop effective policy recommendations, researchers need land-use change models that are sensitive to local characteristics for scenario evaluation.

A team of Japanese scientists associated with IIASA's Land-Use and Land-Cover Change Project has applied a new land-use model to the Kansai district of Japan. The model builds on previous work by the Land Use and Global Environment Conservation project at the National Institute of Environment Studies, Japan, which dealt with theoretical and statistical aspects of modeling and analyzing land-use change. The model framework consists of four main steps: statistical land-use analysis, estimation of a land-use ratio function, calibration of a driving force prediction model, and simulation and evaluation of policy implications.

By applying the model to the case study area, researchers were able to evaluate the probable impacts, both direct and indirect, of eight different land-use policies through the year 2050. The resulting simulation showed that each policy measure would cause quite distinct land-use changes. The researchers concluded that the model accurately reflected conditions in the case study area and that the results could be used effectively to develop local land-use policy based on targeted land-use patterns.

For more information, contact:
Günter Fischer,
e-mail: fischer@iiasa.ac.at

Software Showcases Adaptive Dynamics

The wide acceptance of evolutionary theory is based on its capacity to explain certain otherwise highly improbable phenomena. Yet, classical theories of evolution cannot account for many important biological facts, because of the difficulty in incorporating how individuals affect the ecological environment they live in. By incorporating this essential factor, the theory of adaptive dynamics can offer new mathematical and conceptual techniques for understanding the evolution of complex adaptive systems inside and outside the biological realm.

The Adaptive Dynamics Network (ADN) Project currently is developing the Adaptive Dynamics Integrated Simulation Environment (ADISE), a software tool that provides easy access to adaptive dynamics methods. Users will be able to specify a particular ecological environment and the interactions of the species living within it. The influences of adaptive traits on ecological interactions can then be examined and the course of potential evolutionary change can be pre-

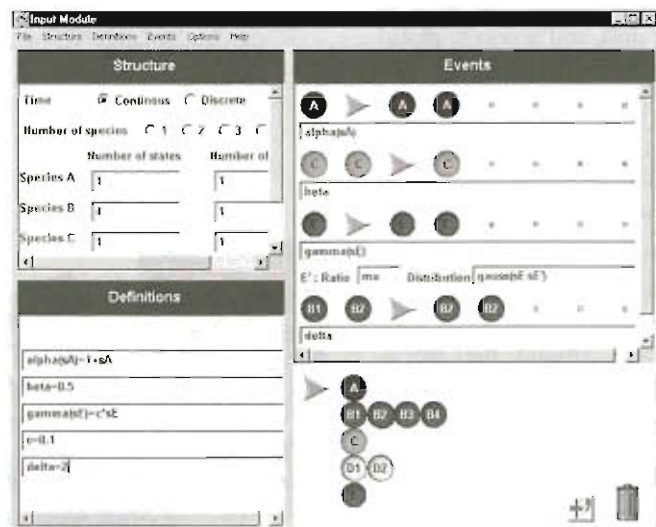
dicted. Various output types and visualization techniques accompany a simulation kernel that integrates a suite of evolutionary models used in the scientific literature. Of particular interest are "pairwise invasibility" plots, indicating which adaptive traits can invade a range of resident populations.

The software package is being designed according to the following profile:

- cross-platform portability
- easy-to-use graphical user interface
- high-performance simulations
- modularization and expandability
- accessibility via the Internet

These characteristics will make ADISE a useful simulation tool for biologists, ecologists, mathematicians, physicists, computer scientists, and any other users interested in analyzing the adaptive changes occurring in our biotic environment.

For more information, contact:
Ulf Dieckmann,
e-mail: dieckman@iiasa.ac.at



ADISE provides easy access to adaptive dynamics methods.

I I A S A N E W S IIASA'S COMPUTING ENVIRONMENT

Effective computer services and infrastructure have traditionally served researchers well at IIASA. But computing technology is changing more rapidly than ever before. Thus, IIASA is doing more to ensure up-to-date computing conditions. The demands of scientific study, internal and external communication and changing administrative processes have been the catalyst for this upgrading. New steps underway in this ongoing process reaffirm the Institute's efforts to facilitate advanced scientific research.

The move to the Windows NT operating system and the improvement of the Internet connection (speed increased by a factor of 31) as well as other hardware improvements have been the most significant recent changes. These factors and the Institute's international electronic connectivity provide internal and external users with a series of advantages to better facilitate collaboration (see below).

Electronic Connectivity to the International Research Community

IIASA is connected to the Internet, which allows remote login, remote file transfer, worldwide exchange of electronic mail, and access to global Internet information services (i.e., World Wide Web, Usenet, and Archie). Under special circumstances, external login privileges through Telnet can be granted to IIASA collaborators.

IIASA is also connected to an Austrian X.25 public data network, which provides access to other public networks around the world. Remote login is the primary service available through this network.

WWW Information Server

Since 1994, IIASA has maintained a Web site at www.iiasa.ac.at to showcase its programs and research.

New pages present research updates and current research plans. The IIASA publications, *Policy Research Newsletter* and *Options* magazine, are on-line, as are project newsletters such as *POPNET* and *PINPoints* (www.iiasa.ac.at/Media). More and more research results are now on-line, including samples from the land-use and land-cover change geographic information system (www.iiasa.ac.at/Research/LUC), data from IIASA's population projections, and results from the Institute's population, development and environment analyses in Botswana, Mozambique, and Namibia (www.iiasa.ac.at/Research/POP). Also, numerous IIASA-constructed research tools are available on the web (www.iiasa.ac.at/Research/docs/IIASA_Models_Software.html), such as:

- **RAINS-Europe**, an "easy-to-use" tool for analyzing alternative strategies to reduce acidification and eutrophication of ecosystems in Europe; and
- **RAINS-Asia**, a model to assess sulfur deposition and ecosystems protection levels resulting from different energy pathways and different emission control strategies in Asia;
- Analytical support software, including a tool for multiple-criteria model analysis (MCMA) and a modular optimizer for mixed integer programming (MOMIP), and much more.



Using FTP to Transfer Files between IIASA and Remote Sites

Anonymous FTP is a file transfer program that enables the unrestricted exchange of information, programs, and data between IIASA and remote sites. Files to be transferred are stored temporarily in an FTP read- and/or write-protected directory hierarchy on the IIASA network. Both ASCII (plain text) and non-ASCII (binary) files can be transferred.

Connecting to IIASA's FTP Server from a Remote Site

To connect to IIASA's FTP server from a remote site, type:

```
ftp ftp.iiasa.ac.at
```

The IIASA FTP server will prompt you to enter a username. Enter the user name **ftp** or **anonymous** (either is valid). Next you will be prompted to enter a password. Enter your full e-mail address as your password and you are in the top-level file storage directory on the IIASA FTP server.

Retrieving a File from IIASA

The publicly accessible FTP directories on the IIASA FTP server are named **outgoing** and **pub**. The **outgoing** directory contains a subdirectory for each research project and department and is designed for short-term storage of files.

To retrieve a file from one of the subdirectories of the **outgoing** directory, type **cd outgoing** to change to that directory. Type **ls** to reveal a list of the abbreviations for IIASA projects. Move to the desired subdirectory by typing **cd dirname**, as in **cd ecs**. When you have located the desired file(s), type **get filename** (or **mget ***) to retrieve the file(s) to your current directory.

Sending a File to IIASA

A remote user can deposit a file at IIASA in the **incoming** directory. As in the outgoing case, this directory contains subdirectories for IIASA projects. Connect as described before. Move to the appropriate subdirectory by entering **cd incoming/dirname**, as in **cd incoming/ecs**. Deposit your file by entering **put myfile** where **myfile** is the file you wish to deposit

on the IIASA FTP server. Files in the directory will not be visible to outside users.

Remote Login to the IIASA LAN

Remote login to IIASA's computer Local Area Network is possible through Internet or through dial-up. The Internet address is **gate.iiasa.ac.at**. In order to use the dial-up lines please contact IIASA's

Computer Services Department by telephoning +43 2236 807 333

In both cases, the external user connects to the "gate" machine and should telnet to some of the other IIASA UNIX or Windows NT systems. The accounts on gate are only temporary and are granted upon request from IIASA Project leaders to staff members and external collaborators.

SWEDISH-BULGARIAN WORKSHOPS REFLECT IIASA RESEARCH THEMES

In the spirit of international cooperation for which IIASA is renowned, the Institute's Swedish National Member Organization (NMO), the Swedish Council for Planning and Coordination of Research (FRN), together with Bulgarian collaborators, sponsored and organized two workshops in Bulgaria during October. This was an effort to forge new bonds over issues common to both countries, most notably air pollution and energy.

Energy Strategies and Market Behavior

FRN and the Bulgarian Academy of Sciences co-organized a workshop on "Energy Strategies and Market Behavior" in the Black Sea town of Varna from 5-7 October. Participants from IIASA, the World Energy Council, Sweden, and Bulgaria gave presentations in seven sessions devoted to selected themes within the overall workshop focus. Lively discussions among the participants from academia, government, and industry followed the presentations.

Long-Range Air Pollution

The second workshop focused on issues of "Long-Range Air Pollution: From Models to Policies." FRN

teamed up with the Bulgarian Academy of Sciences/National Institute of Meteorology & Hydrology (BAS/NIMH) and IIASA to organize this event in Sozopol, on the Black Sea coast, from 20-22 October.

More than 30 scientists from Bulgaria, Sweden, Russia, and Germany, as well as researchers from IIASA, convened for plenary sessions, keynote speeches, ad hoc working group meetings, and visits to field sites. Advanced modeling of atmospheric processes and related environmental policy issues formed the basis of deliberations that significantly enhanced Bulgarian-Swedish relations in environmental science.

New Momentum

Both workshops were successful in contributing to new momentum in energy-related and environmental sciences on the part of the Bulgarian collaborators, and to a revival of IIASA-related activities in Bulgaria. The workshop proceedings will document the advances of Bulgarian-Swedish collaboration in environmental science and the suggestions for integrated research on atmospheric pollution and impacts.

Professor Dimiter Syrakov and Dr. Ekaterina Batchvarova and their colleagues at BAS/NIMH, in cooperation with FRN (Professor Arne Jernelöv and Dr. Bo Wiman) and IIASA (Dr. Janusz Cofala), lead this effort.

SWEDISH NMO DELEGATES VISIT IIASA

Friday, 5 December 1997, was Sweden Day at IIASA. To demonstrate ongoing support and interest, as well as to further strengthen already excellent relations, the members of the Swedish NMO came to IIASA to obtain more detailed knowledge of the Institute's research. The 17-member delegation was led by its chairman, Arne Jernelöv (also Sweden's member on the IIASA Council) and Berit Ornevall (Swedish NMO Secretary).

After an introduction by IIASA Director Gordon MacDonald, each of the Institute's 11 project leaders made half-hour presentations of the studies currently underway; the participants then discussed results, policy implications and future plans. Informal talks continued at the lunch and dinner, organized in a typical Austrian "gemütlich" atmosphere, where committee members mingled with both IIASA scholars and administrators. In his dinner toast, Arne Jernelöv praised IIASA's quality research and indicated how valuable it was for his entire group to hear about IIASA's work first-hand and on-site, as well as to meet the people behind the studies. All those involved felt such an event would be a good precedent for other NMOs.



The Swedish NMO-organized workshops in Bulgaria on energy and air pollution attracted both researchers and policy makers.

INSIDE IIASA

MEETINGS

IIASA hosted and/or organized a number of meetings and conferences during the past six months. For more information please contact the person listed.

Workshop on Growth and Adaptation in Evolutionary Systems

October 17-19, 1997
 Contact: Arkadii Kriajimskii,
 e-mail: kryazhim@iiasa.ac.at

IIASA-LOS Centre Workshop on Environmental and Social Security

November 21-22, 1997
 Contact: Landis MacKellar,
 e-mail: mckellar@iiasa.ac.at

European Union vs. the Rest of the World: Complements or Substitutes for Central and Eastern Europe?

December 4-6, 1997
 Contact: Janos Gacs,
 e-mail: gacs@iiasa.ac.at

Workshops on Virulence Management: Mathematical Models of Virulence Evolution

December 11-13, 1997
 Contact: Ulf Dieckmann,
 e-mail: dieckman@iiasa.ac.at

Between Theory and Experiment

December 18-20, 1997
 Contact: Ulf Dieckmann,
 e-mail: dieckman@iiasa.ac.at

Third DAS Roundtable and Eighth Workshop of the DGOR Working Group: Decision Theory and Support

February 25-27, 1998
 Contact: Gregory Kersten,
 e-mail: kersten@iiasa.ac.at

Global Population Aging, Social Security, and the International Economy

March 9-14, 1998
 Contact: Landis MacKellar,
 e-mail: mckellar@iiasa.ac.at

AWARDS AND APPOINTMENTS

Wolfgang Lutz of the Population (POP) Project has been elected as general secretary of the International Union for the Scientific Study of Population (IUSSP). The Belgium-based organization has 2000 members in 140 countries and has organized a number of world population conferences. Lutz will fill this honorary position from 1998 until 2001.

David Victor of the Environmentally Compatible Energy Strategies (ECS) Project will serve as an area editor of the Oxford University Press *Encyclopedia of Global Change* (mnemosyne.oup-usa.org/acadref/egc.html). Comprising contributions from the world's leading researchers, this new electronic reference work will be useful for researchers, policy-makers, students, educators, and anyone interested in global change issues.

Crawford S. ("Buzz") Holling, director of IIASA from 1981 to 1984, will serve as director of the Conservation Ecology Program of the Ecological Society of America, which aims to enhance dialogue among leaders in ecology, business, and policy, allowing ecological findings to be reflected in policy in a timely manner and stimulating more policy-relevant research. He is also editor-in-chief of the Program's electronic journal, *Conservation Ecology* (www.consecol.org/Journal).



Wolfgang Lutz



David Victor



Crawford S. Holling

Distinguished IIASA alumnus Winfried Lang has been appointed Austria's ambassador to Belgium. He was long affiliated with IIASA's Processes of International Negotiation Project and continues to serve on its steering committee. An Austrian career diplomat, he previously served as Austria's ambassador to International Organizations in Geneva and chairman of the OECD Transfrontier Pollution Group, and presided over several major UN conferences.

Rafael L. Bras, who was involved in IIASA's Project on Impacts of

Human Activities on Environmental Systems from 1982-1983, was appointed head of the Department of Civil Engineering at the Massachusetts Institute of Technology, effective July 1, 1997.

Former IIASA researcher **Mahendra Shah** has been appointed executive secretary of the CGIAR (Consultative Group on International Agricultural Research) System Review Secretariat.

The CGIAR is an informal association of public and private sector members supporting a network of 16 international agricultural research centers. Its mission is to contribute to promoting sustainable agriculture for food security in developing countries. Shah was a member of IIASA's National Agricultural Policies Program from 1979 to 1985.

Former staff member **Jerome A. Feldman**, professor of electrical engineering and computer science

at the University of California at Berkeley, has received an honorary Doctor of Science degree from the University of Rochester. As a member of the Systems and Decision Sciences Project in 1973-74, Professor Feldman was part of the original IIASA staff. He is currently the director of the International Computer Science Institute at Berkeley.

On February 16, 1998, Professor **Bert Bolin** was honored by the American Association for the Advancement of Science (AAAS) for his extraordinary contributions to furthering international cooperation in science and engineering. The award, formally referred to as the AAAS International Science Cooperation Award, was presented to Professor Bolin on the occasion of the AAAS Awards Ceremony and Reception held during the Association's annual meeting, which took place this year in Philadelphia, Pennsylvania. Bolin is Professor Emeritus of

Meteorology at Stockholm University in Sweden. He has been associated with IIASA for many years in various functions, most notably as chairman of the Evaluation Committee on Global Environmental Change since its inception in 1992.

IN MEMORIAM

Maria Mothershead Rogers, a former scientific editor at IIASA, died on October 13, 1997, of cancer. From 1977 to 1983 she worked as an editor in the Human Settlements and Services Area, as well as in the Communications – Editorial Group and the Publications department. Her husband Andrei Rogers was a researcher at IIASA from 1975 to 1983, heading the Human Settlements and Services Area and later working in the Population Project.

NEW STAFF

Last Name	First Name	Project	Country
Amendola	Aniello	RMP	Italy
Compton	Keith	RAD	USA
Conesa	Emmanuelle	TED	France
Davoodi	Gita	ECS	Iran
Ermolieva	Tatiana	SSR	Ukraine
Fujie	Yoshiyuki	ECS	Japan
Hellmuth	Molly	POP	USA
Inclan Garza	Rodrigo	INS	Mexico
Jacob	Merle	RMP	Trinidad and Tobago
Jonas	Matthias	FOR	Germany
McCluskey	Mark	LUC	USA
McDonald	Alan	ECS	USA
Ney	Steven	RMP	Germany
Öskog	Alf	FOR	Sweden
Prommer	Isoide	POP	Austria
Sekiya	Takeshi	RMP	Japan
Syri	Sanna	TAP	Finland
Tchirkov	Vadim	RAD	Russia
Vetschera	Rudolf	DAS	Austria
Warner	Nicholle	FOR	USA
Wendt	Daniel	FOR	USA

RESEARCH GRANTS

PROJECT	<i>SPONSOR</i>	STUDY
Adaptive Dynamics Network (ADN)	Austrian Federal Ministry of Science and Transport	Virulence Management Workshop
	French National Scientific Research Center (CNRS URA)	
	Austrian Federal Ministry of Science and Transport	The Study of Adaptation and Self-Organization
Environmentally Compatible Energy Strategies (ECS)	Tokyo Electric Power Co. Inc. (TEPCO)	The collaborative study "Future Potential of CO ₂ Removal by Innovative Technologies"
	European Commission, DG XII	Energy Technology Dynamics and Advanced Energy System Modeling
	National Bureau of Economic Research Inc., USA	International Workshop on Induced Technological Change
Economic Transition and Integration (ETI)	Bank Austria	The Mixed Blessing of Financial Inflows – Transition Countries in Comparative Perspective
	GiroCredit Bank	
	The Swedish Ministry for Foreign Affairs	European Union vs. the Rest of the World Workshop
Sustainable Boreal Forest Resources (FOR)	The Swedish Council for Planning and Coordination of Research	Remote Sensing Analyses
	Natural Resources Institute, UK	Institutional Analysis of the Forest Resources Project Inventory System for the Russian Forest Resources
Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia (LUC)	Food and Agriculture Organization of the United Nations	Global Agro-Ecological Zone (GAEZ)
Transboundary Air Pollution (TAP)	European Commission, DG XI, Environment, Nuclear Safety and Civil Protection	Economic Assessment of Priorities for a European Environmental Policy Plan Estimating Emission Ceilings for Large Combustion Plants in Europe
	Austrian Federal Ministry for the Environment, Youth and Families	UN/ECE Seminar on Integrated Assessment Modeling for Multi-Pollutant/Multi-Effect Abatement Strategies for Europe
	Central Research Institute of Electric Power Industry (CRIEPI), Japan	A Comprehensive Assessment of Large-Scale Environmental Problems in East Asia
	The Federal Office of Environment, Forests and Landscape, Air Pollution Control Division, Switzerland	Scenario Calculations for the Second NO _x Protocol
ECS, FOR, LUC, TAP	Central Research Institute of Electric Power Industry (CRIEPI), Japan	Integrated Research: Global Energy Supply and Demand and Their Environmental Effects
PIN (Processes of International Negotiation) Network	The Swedish Council for Planning and Coordination of Research (FRN)	Processes of International Negotiation

YSSP REWARDS TOP SCHOLARS

Each year about 60 graduate and post-doctoral students participate in IIASA's Young Scientists Summer Program (YSSP). The visiting scholars take part in ongoing research projects and work with a world wide network of experts for a period of three months, broadening both their research skills and their career perspectives in IIASA's unique international environment. To recognize particularly outstanding work, the YSSP awards scholarships annually that allow the winners to return to IIASA for three additional months to continue their research. On the basis of their scholarly achievements, innovative and substantial contributions to IIASA's research, and overall contribution to the Institute's and the YSSP's objectives, the following three young researchers were awarded the 1997 scholarships:

Peccei Scholarship winners:

Tatiana Ermolieva of the University of Vienna

Ermolieva joined the Risk, Modeling and Policy Project (RMP), where she focused on producing a general framework for the insurance industry in responding to catastrophic risks. Her work demonstrated the importance of geographic diversification for increasing the stability of insurers and their profits and for the financial protection of the population.

In addition to the Peccei Scholarship, Ermolieva and others in the RMP Project were recently awarded a major prize by the Swedish Insurance Society for their model simulating catastrophic events in a region and calculating an optimal diversification strategy for insurance companies.

(See page 6 and *Options Summer/Fall 1997, Awards.*)

Keigo Akimoto of Yokohama National University

As a member of the Environmentally Compatible Energy Strategies Project, Akimoto investigated important factors, such as carbon emissions, for stabilizing the future global climate. His analysis of the long-term effects and costs of energy systems revealed that the uncertainty associated with climate models precludes their direct use in determining short- to near-term emissions levels to meet long-term targets for climate stabilization.

The Peccei Scholarship was established in memory of Dr. Aurelio Peccei, a founder of IIASA and former president of the Club of Rome, in an effort to recognize and further his aim of finding creative opportunities for young people to influence a shared future.

Mikhalevich Scholarship winner:

Mikko P. Heino of the University of Helsinki

Heino took part in the Adaptive Dynamics Network Project. He investigated the management of fish stocks and the possible influences of evolutionary change on fishing yields. His results indicated that harvesting patterns can directly affect the relationship between evolutionary change of fish and sustainable yields of fish harvests.

The Mikhalevich Scholarship was established in memory of Academician Vladimir S. Mikhalevich, former Soviet (subsequently, Ukrainian) NMO representative to IIASA and Chairman of the IIASA Council, as well as Academician of the Ukrainian and Russian Academies of Sciences and Professor at Kiev University.

The Scholarship is an effort to recognize and further his goal of supporting young researchers.

For more information about the Young Scientists Summer Program, please visit the YSSP web site at www.iiasa.ac.at/YSSP or contact:

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Tatiana Ermolieva



Keigo Akimoto



Mikko P. Heino



ANNUAL REPORT ON THE WEB



IIASA's Annual Report for 1997 is now available on-line and in print. To view it on the IIASA web site, go to www.iiasa.ac.at/AR97.

If you do not have access to the World Wide Web and would like a

paper copy of the report, please send an e-mail request to molina@iiasa.ac.at, or write to the Publications Department, IIASA, Schlossplatz 1, A-2361 Laxenburg, Austria (fax: 0043-2236-73148).

NEW BOOK

The Implementation and Effectiveness of International Environmental Commitments – Theory and Practice

ISBN 0-262-72028-0

Edited by David G. Victor, Kal Raustiala, and Eugene B. Skolnikoff. Co-published by MIT Press and IIASA.

Because environmental problems do not respect borders, their solutions often require cooperation among states. The contributors to this book examine how international environmental agreements are put into practice. Their main concern is effectiveness—the degree to which such agreements lead to changes in behavior that help to solve environmental problems. Their focus is on the process that turns commitments into action, at both domestic and international levels.

The book is divided into two parts. Part I looks at international systems for implementation review, through which parties share information, review performance, handle non-

compliance, and adjust commitments. Part II looks at implementation at the national level, with particular attention to participation by governmental and nongovernmental actors and to problems in states with economies in transition. The book includes 14 case studies that cover eight major areas of international environmental regulation.

David G. Victor and Eugene B. Skolnikoff were co-leaders, and Kal Raustiala was a member of, IIASA's former Project on Implementation and Effectiveness of International Environmental Commitments.

To order, visit the MIT Press web site at www.mitpress.mit.edu.

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Bulgaria*

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The Finnish Committee for IIASA

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The Association for the Advancement of IIASA

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