



# options

International Institute for Applied Systems Analysis

March '92

*Special Issue*

*Includes:*

ANNUAL  
REPORT  
1 9 9 1

**Mountain World in Danger**

S. Nilsson and D. Pitt

*This book discusses the potential problems caused by the changing climate in the high mountains and forests of Europe. Published by Earthscan Publications Ltd., London, in association with Alp Action. ISBN 1-85383-118-2*

**European Forest Decline:**

*The Effects of Air Pollutants and Suggested Remedial Policies*

S. Nilsson, Editor

*The papers presented in this book deal with the latest scientific information on the causes and effects of air pollution, the extent of forest decline, and projections on future developments and socioeconomic consequences. A joint IIASA/Royal Swedish Academy of Agriculture and Forestry InterAction Council publication.*

**Future Forest Resources of Western and Eastern Europe**

S. Nilsson, O. Sallnäs and P. Duinker

*This book records the detailed results of a four-year study of the effects of air pollutants, ineffective silvicultural practices, and forest policies in 24 European countries, and provides definitive information for development of forest policy. Published by Parthenon Publishing Ltd., Gamforth ISBN 1-85070-424-4*



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IIASA is an international research institution which draws on the scientific and financial resources of member organizations to address problems of global significance.

Used worldwide, IIASA's results and products have established IIASA as a front-runner in applying systems analysis to the examination of international issues.

#### National Member Organizations

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## EDITORIAL



This issue of *Options* contains only one feature article, but it concerns a subject of great importance. Migration, people's search for a place — any place — that offers a better life, is older than history. The study described in the next few pages makes no attempt to give a comprehensive view of the causes or the consequences of migration. What it does show is how a relatively simple modeling exercise can give relevant and sometimes surprising findings: it makes clear that the rate of integration of immigrants into society, rather than the number of immigrants, is in the long term the key factor determining the growth of identifiable immigrant groups.

The principal content of this *Options*, as indicated on the cover, is IIASA's 1991 Annual Report. The report's format is the same as in previous years, with short summaries of research projects during the past year.

One of the things that you will *not* find in it is reference to the many hours of discussion we had in 1991 about a reorganization of internal structures. One of the goals of the reorganization, which will take effect in stages through 1992, is to build on IIASA's special opportunity to form interdisciplinary and international research teams large enough to achieve a critical mass. Another goal is to break rigid program and project barriers and encourage more communication and collaboration among research teams.

Inadequate communication is not a problem for IIASA so much as it is a problem for modern science: academic and scholarly institutions tend to publicly endorse the idea of openness and interdisciplinarity, while in practice often rewarding disciplinary narrowness, specialization, and compartmentalization. IIASA has fought this tendency, with some successes and some failures, for nearly 20 years. We hope that our new organizational structures will encourage more collaboration among IIASA scholars and, ultimately, help them produce more innovative research. We will report on this in the next annual report, a year from now.

Peter E. de János  
Director

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## F E A T U R E

# Immigration and Integration in Western Europe

The following article summarizes a paper written by Wolfgang Lutz and Christopher Prinz for a conference (see photo page seven) on **Mass Migration in Europe — Implications in East and West.**

The rigorous analysis of migration is full of uncertainties. The death of a politician or the passing of a new law in a specific political constellation can trigger the migration of millions. The European experience of the past five years is full of examples of unpredicted and massive fluctuations in migration. What can demographers, who are asked to make population projections, do in the face of uncertainties that border on the chaotic?

This study makes no attempt to predict future migration levels. Rather, it compares six hypothetical immigration scenarios (chart); it is essentially a set of alternative if-then calculations. The aim is to determine which aspects of the population structure are sensitive to alternative immigration patterns and which would hardly be affected.

The study also considers the rate of integration of immigrants into Western European society, and demonstrates that this is a critical factor in determining the long-term growth of non-native populations.

Finally, by projecting the effects of different immigration levels on population age structures, it sheds light on the effect of immigration on social security schemes. Social security benefits for immigrants are an important and emotional point of controversy; too often the contribution of immigrants to these systems goes unmentioned.

The study uses multi-state population projection models which simultaneously project specified sub-populations. The three groups

specified within Western Europe (EC plus EFTA) are native West Europeans (97.5 percent in 1985), East Europeans (0.4 percent), and non-Europeans (2.1 percent). At each time and age, men or women from outside Western Europe enter the non-European and East European sub-populations (immigration) and move from these groups to the native sub-population (integration). Some selected results follow.

## Total population

Only the no-immigration scenario results in a long-term decline in the total population of Western Europe (top graph). Scenarios 3, 4, 5, and 6 all assume high immigration into

Western Europe and result in a significant increase of the population to between 500 and 553 million by the year 2050. Continued immigration around the present level (scenario 2), gives a more moderate increase to 419 million.

Under all scenarios, except the extreme case of high immigration and no integration (scenario 4), annual growth rates decrease. Even under assumptions of high immigration (scenario 3) the Western European population starts to shrink by 2050. This clearly demonstrates that in the long run the effect of low fertility will outweigh even strong immigration, if the immigrants adopt European sub-replacement fertility levels.

SCENARIO		①	②	③	④	⑤	⑥
LIFE EXPECTANCY AT BIRTH (ALL)	72 (men), 79 (women) linear increase by year 2050 to 90 (men), 95 (women)	●	●	●	●	●	●
	Europeans (both groups)	1.63	●	●	●	●	●
TOTAL FERTILITY RATE	Non-Europeans	2.00	●	●	●		
		3.00				●	●
						●	●
IMMIGRANTS PER YEAR	0	●					
	Eastern Europeans	500,000 until year 2000	●				
	500,000 until year 2010			●	●	●	●
	0	●					
	Non-Europeans	500,000		●			
	linear increase to 1.5 m by 2010				●	●	●
INTEGRATION RATE (%/y)	Eastern Europeans	10	●	●	●	●	●
	5				●		
	Non-Europeans	0	●	●	●		●
	10						●

### Population composition

Under all scenarios, except the no-immigration scenario, the proportion of non-Europeans in Western Europe increases, though at different rates depending on levels of immigration and integration (middle graph).

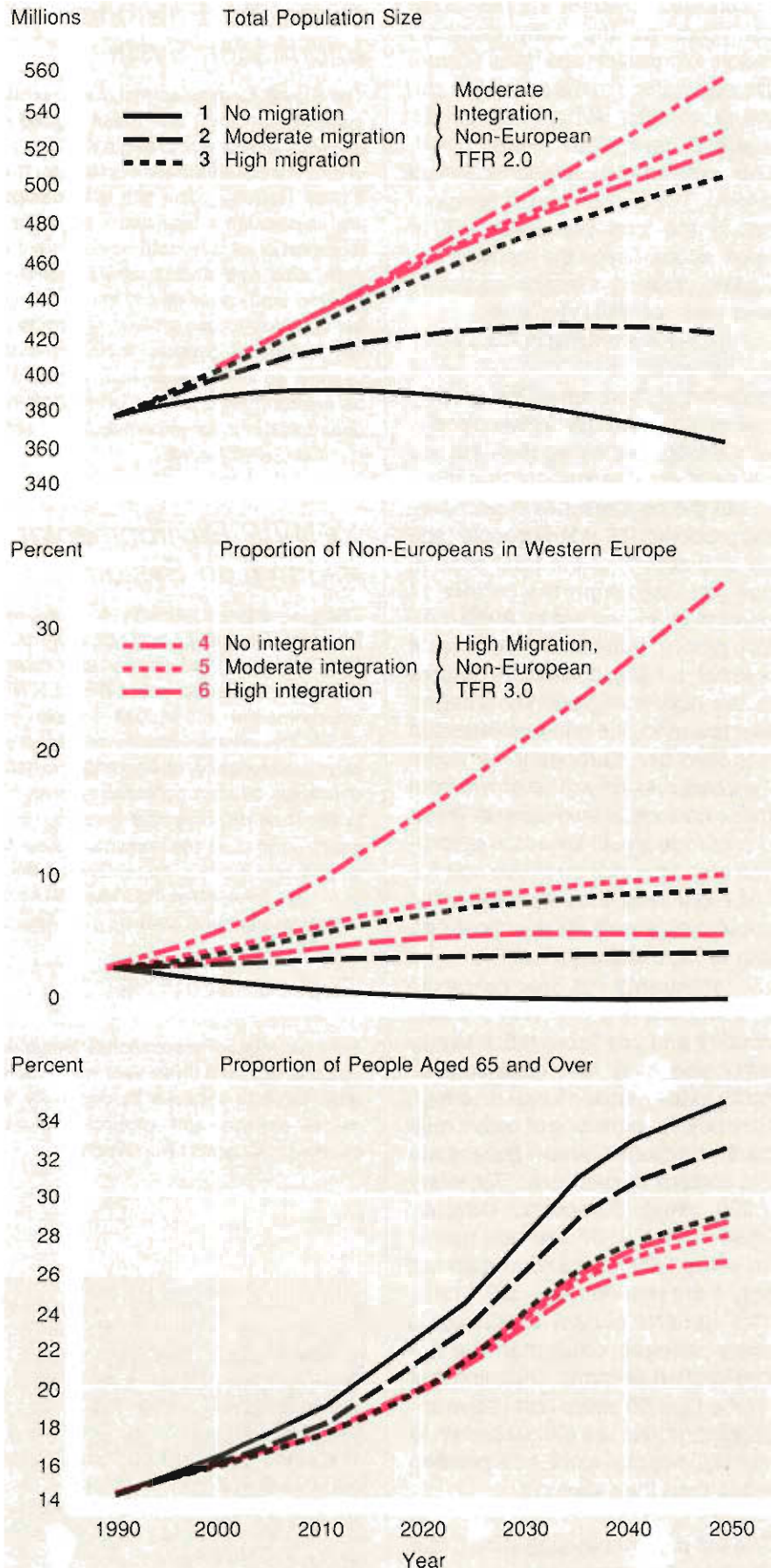
In the case of high immigration and no integration, together with a non-European fertility rate of 3.0, the proportion of non-Europeans rises by 2050 to one-third. This is the "horror scenario" frequently painted by some politicians and media, a society of two groups with little or no interaction. Comparison with other scenarios shows that this duality is attributable, not to high immigration levels, but rather to the lack of integration of immigrants into Western European society.

In scenario 6, which assumes the same high rate of immigration but 10 percent annual integration, only 4.9 percent of Europe is "non-European" by 2050 — roughly 1 person in 20, rather than 1 in 3. Scenario 2, which assumes a continuation of present immigration levels together with 5 percent annual integration, results in only a small increase in the proportion of non-Europeans to 3.6 percent of the population by 2050. This scenario should be easily manageable by society. It also offers economic advantages, as discussed in the following section, compared with a no-immigration scenario.

As for the Eastern European sub-population in Western Europe, our study suggests that their quantitative impact will be insignificant, mainly because of their undoubtedly higher integration rate and a lower total number of immigrants. In no scenario do they at any time comprise more than 1.6 percent of Western Europe's population.

### Age structure and social security

The ratio of economically active people to pensioners is steadily declining in Western Europe and will



## FEATURE

continue to do so for the next 30 to 50 years as the baby boomers reach retirement age (see *Future Demographic Trends in Europe and North America: What Can We Assume Today?*, 1991, edited by W. Lutz, published by Academic Press/IIASA). The percentage of pensioners in the total population will at least double over the coming decades, creating a major economic and socio-political challenge.

Because immigrants are usually young adults, they increase — at least in the short run — the proportion of economically active people. In the long run, immigrants too will age and draw retirement benefits.

In the no-immigration scenario, the proportion of elderly people (age 65 and above) of the total population increases from the current 14 percent to 35 percent by 2050 (bottom graph). In all other scenarios it is lower, ranging down to 26 percent in the high immigration/no integration scenario, the one that results in one-third non-Europeans by 2050. Two conclusions can be drawn from these findings: immigration to Western Europe would lower the proportion of the population above age 65, but, regardless, the proportion of the population above 65 is almost certain to increase significantly.

Immigrants not only contribute to economic production in the host country and pay taxes but, if legally employed, they also contribute directly to the pension funds. In effect, they pay the pensions of native residents, because few non-natives are yet entitled to pensions. For every 1,000 West Europeans currently aged 15 to 64, 37 are non-native; for every 1,000 aged 65 and above, only 4 are non-native — a 9:1 ratio. This general pattern continues in every scenario other than the no-immigration scenario, meaning that for the next 60 years non-native immigrant groups are almost certain to put significantly more into pension funds than they take out.

*The full paper is available as IIASA Working Paper WP-92-29.*

## NEW PROJECTS

### Slovakian Environmental Information System

The Slovak Commission of the Environment of the ČSFR and IIASA signed a one-year agreement to begin work on an environmental information system for the Slovak Republic. The aim is to design and implement a framework for the integration of all available environmental data, plus new data such as satellite-derived land-cover maps, into a coherent and easy-to-use system. The system will include a geographic information system, as well as analytical tools such as environmental simulation models or expert systems for impact assessment. (Contact: Kurt Fedra)

### XENVIS Environmental Information System

The Netherlands Ministry of Housing, Physical Planning, and Environment (VROM) has signed a one-year contract for further development of the XENVIS environmental information system by IIASA. The contract covers general program maintenance, new topological data structures offering potential extensions to the map displays and handling programs, and possible implementation of air pollution models, depending on data available, for each of the industrial sites in the data base. (Contact: Kurt Fedra)

### Thames Groundwater

Thames Water International Services Ltd. has signed a three-year agreement with IIASA to improve its capability to model surface and groundwater resources. (Contact: Kurt Fedra)

## Note

A few copies of the December '91 issue of *Options* were misprinted on the inside cover and on the first and last pages. Our printer informs us that they were part of an early press run and that few, if any, were mailed out. If you received a bad copy, please tell us, and we will send you a new one. We apologize for any inconvenience.

## CONFERENCES

**Third Exploratory Meeting for the Common House Alternatives on Long-term Energy Strategies under Global Environmental Concerns (CHALLENGE), Laxenburg, Austria, 30–31 January.**

The subject of this meeting was to present independently elaborated results of national and regional greenhouse-gas reduction studies, and to establish a common format for a further round of scenarios which will constitute the input for a globally comprehensive set of scenarios in harmony with the national results. The detailed work program for CHALLENGE will be guided by an international steering committee which will include representatives of the sponsors and of the proponents. Long-term funding for the project is still being sought. The next meeting has tentatively been set for November 1992 at IIASA. (Contact: Leo Schrattenholzer)

**Energy/Ecology/Climate Modeling and Projections, Laxenburg, Austria, 28–29 January.**

More than 50 participants attended this workshop to review the work of IIASA's Global Energy and Climate Change Project. The workshop included discussions of the background needed for global energy/ecology/climate modeling; analysis of the numerical results of energy/climate projections; and a discussion of new tools and approaches for energy/climate projection and policy analysis. (Contact: Iouri Siniak)

**Mass Migration in Europe — Implications in East and West, Vienna, 5–7 March.**

This conference was jointly organized by IIASA with the Institute for Advanced Studies, Vienna, and the Institute for Futures Studies, Stockholm; see photo. (Contact: Sture Öberg)

## Forthcoming Conferences

IIASA will sponsor or cosponsor the following conferences in 1992:

May 5–6: Transboundary Risk Issues, Laxenburg, Austria. (Contact: Joanne Linnerooth-Bayer or Yuri Ermoliev)

## CONFERENCES

May 12–13: IIASA '92: An International Conference on the Challenges to Systems Analysis in the Nineties and Beyond, Laxenburg, Austria. (Contact: *Claudia Heilig-Staindl*)

June 22–24: Advances in Decision Support Systems, Laxenburg, Austria. (Contact: *Marek Makowski*)

June 24–26: Support Systems for Decision and Negotiation Processes, Warsaw, Poland. (Contact: *Zbigniew Nahorski*, DNS '92, Systems Research Institute, Polish Academy of Sciences, Newelska 6, PL-01 447 Warsaw)

June 25–26: Workshop for Negotiation Trainers, Laxenburg, Austria. (Contact: *Bertram Spector*)

July 1: Power Assymetry and International Negotiation, Laxenburg, Austria. (Contact: *Bertram Spector*)

July 5–9: Modeling Techniques for Uncertain Systems, Sopron, Hungary. (Contact: *István Vályi*)

September 28–30: Cost Impacts and Possible Benefits of CO<sub>2</sub> Mitigation, Laxenburg, Austria. (Contact: *Nebojša Nakićenović*)



*The first major conference on Mass Migration in Europe — Implications for East and West* attracted 260 people from various scientific disciplines, mass media, the arts, and government, including government ministers from Austria and the Netherlands. Nearly 80 papers were presented covering economic, political, cultural, and historical aspects of East–West migration, micro- and macroeconomic theories of migration, and socio-geographic approaches. The papers will form the basis of three books and conference proceedings. A follow-up conference on migration to Europe, to include South–North migration and other factors, has been proposed for 1994.

## NEWS

*In Memoriam*

**Dianne Gail Goodwin** (Canada), a researcher with IIASA's Environment Program and Biosphere Project from 1982 to 1984, and with the Population Program in 1985, died on January 30, 1992 in Minneapolis, Minnesota, USA.

*Appointments*

**Janusz Cofala** (Poland), from the Institute of Fundamental Technological Research of the Polish Academy of Sciences in Warsaw, has joined the Regional Air Pollution Project.

**Maddumage D.U.P. Kularathna** (Sri Lanka), from the Department of Hydrology, Soil Physics, and Hydraulics of Wageningen Agricultural University, Netherlands, has joined the Water Resources Project.

**Kazimierz Salewicz** (Poland), an IIASA alumnus most recently with the Strobl Gruppe in Vienna, has joined the Water Resources Project on a part-time basis.

**Olli Antero Varis** (Finland), from the Laboratory of Hydrology and Water Resources Management at Helsinki University of Technology, has joined the Water Resources Project.

*Alumni Appointments*

**Petr Aven**, on leave from IIASA's Economic Transition and Integration Project, has been appointed Minister of Foreign Economic Relations for the Russian Federation.

**Muhammad Jameel** (Pakistan), a scholar with IIASA's Energy Systems Program in 1980 and 1981, has been appointed Director of Research and Planning for the Pakistan Atomic Energy Commission in Islamabad.

*Awards*

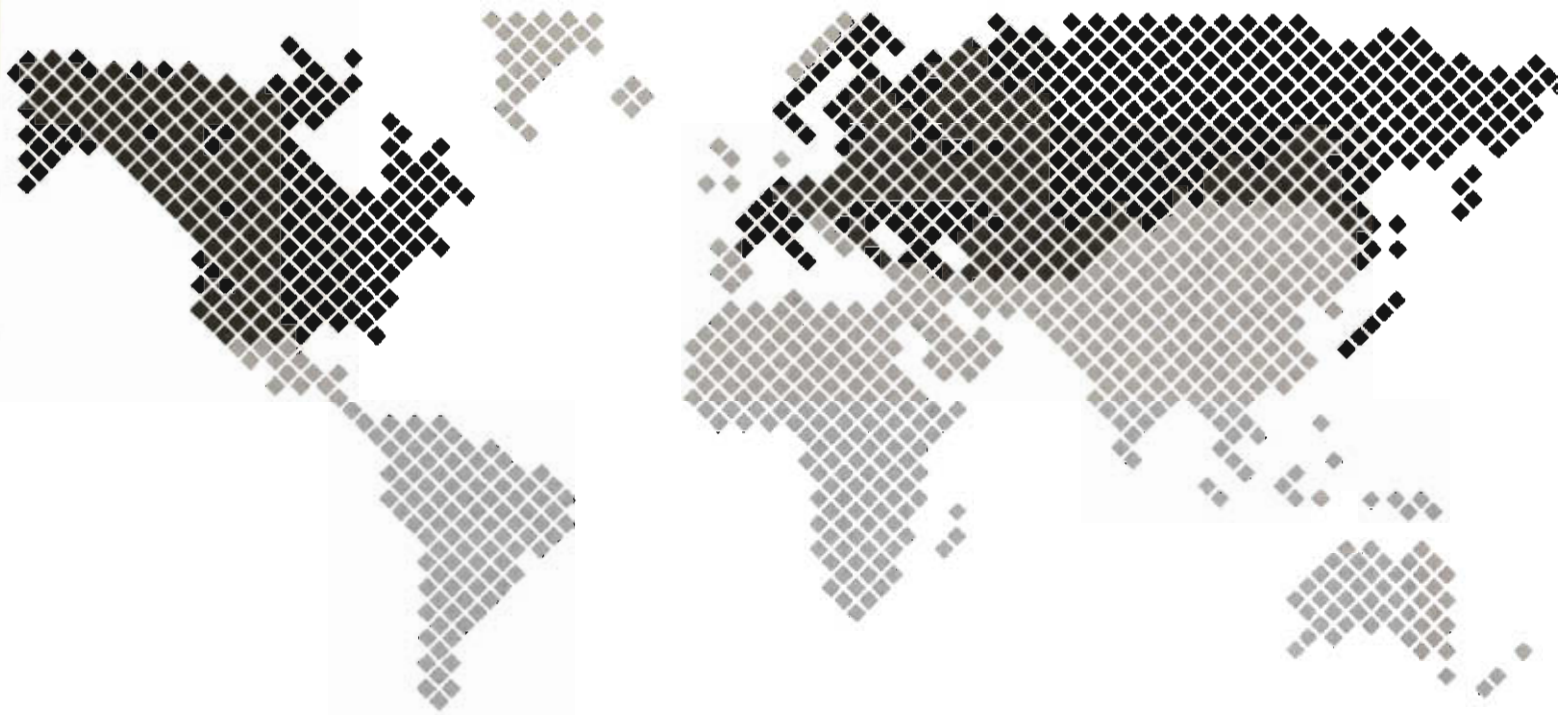
**Mudaham T. Zen** (Indonesia), a member of IIASA's Energy Program in 1976, has been made an officer of the French *Légion d'honneur*.

## PUBLICATIONS

*The following reports are available from Robert McInnes, IIASA Publications Department, for the amounts indicated.*

**The Lack of Consistency for Statistical Decision Procedures.** D.B. Haunsperger, D.B. Saari. Reprinted from *The American Statistician* (1991), 45(43): 252–255. RR-92-1. US \$10.

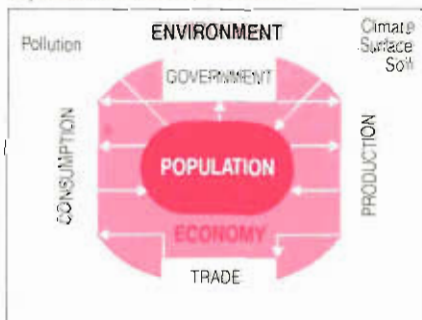
**Trying to Help the Environment — More on the West Ukraine Case.** C. Marchetti. Reprinted from *International Journal of Hydrogen Energy* (1991), 16(8):563–575. RR-92-2. US \$10.



### IIASA's ROLE

The International Institute for Applied Systems Analysis is an international, nongovernmental research institution sponsored by scientific organizations from 15 countries. IIASA's objective is to bring together scientists from various countries and disciplines to conduct research in a setting that is non-political and scientifically rigorous. It aims to provide policy-oriented research results that deal with issues transcending national boundaries. Resident scientists at IIASA coordinate research projects, working in collaboration with worldwide networks of researchers, policymakers, and research organizations.

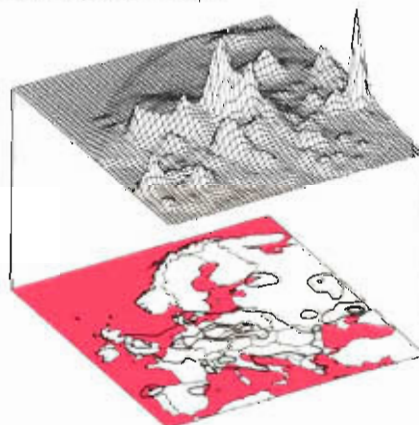
Population / Environment Interactions



### RESEARCH

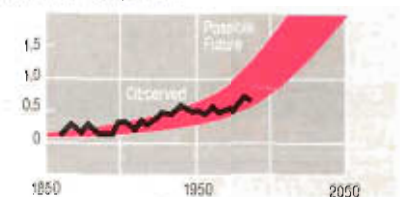
Recent projects include studies on global climate change, computer modelling of global vegetation, heavy metal pollution, acid rain, forest decline, economic transitions from central planning to open markets, the social and economic implications of population change,

Sulfur Deposition in Europe



processes of international negotiations, and the theory and methods of systems analysis. IIASA applies the tools and techniques of systems analysis to these and other issues of global importance.

Global Mean Temperature



### MEMBERSHIP

IIASA was founded in 1972 on the initiative of the USA and the USSR, and now also includes eleven European countries, Canada, and Japan. IIASA has member organizations in the following countries: Austria, Bulgaria, Canada, the Czech and Slovak Federal Republic, Finland, France, Germany, Hungary, Italy, Japan, the Netherlands, Poland, the Russian Federation, Sweden, and the United States of America.

### FURTHER INFORMATION

Further information about IIASA and its work is available from: The Office of Communications, International Institute for Applied Systems Analysis, A-2361 Laxenburg, Austria, Telephone (02236) 71521-0.