

 IIASA

options

International Institute for Applied Systems Analysis

Spring' 94

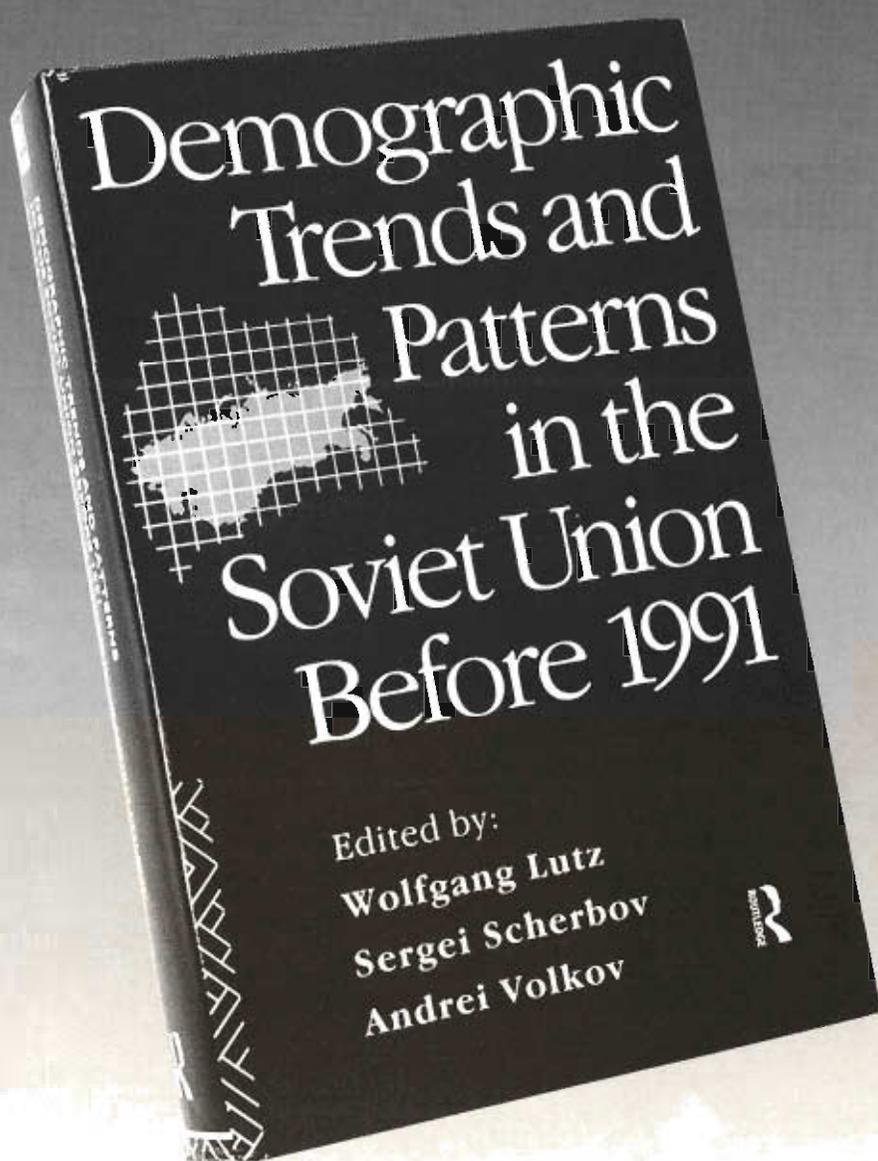
*Special Issue
Includes:*

ANNUAL
REPORT
1 9 9 3

Demographic Trends and Patterns in the Soviet Union Before 1991
Wolfgang Lutz, Sergei Scherbov, and Andrei Volkov, editors

The first international compendium of research on demographic trends and patterns in the republics of the Soviet Union, using newly available data in detailed analyses of fertility, marriage and family, mortality, and age structure through the twentieth century.

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

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EDITORIAL



It has become a tradition to mail out IIASA's Annual Report with the spring issue of *Options*. The 1993 Annual Report again provides a brief overview of our accomplishments in the past year. We welcome any inquiries from readers who want more detail.

On the following pages are descriptions of three very important research projects started late in 1993. All three build on previous IIASA work, and all three take us into novel territory.

The project on Regional Material Balance Approaches to Long-Term Environmental Policy Planning will examine material flows in selected regions of Europe. The work will stress the critical physical science aspects of the problem, but will also include an examination of policy dimensions.

A new project on Implementation and Effectiveness of International Environmental Commitments brings to IIASA a far-flung network of social scientists and lawyers concerned with environmental commitments — increasingly important factors in our management of environmental problems. The project reflects IIASA's interest in the human dimensions of global change.

These projects are the first to come to IIASA in response to international Calls for Proposals. We issued the calls as an experiment to determine whether solid proposals for new projects would be forthcoming from international, interdisciplinary teams. Our experience shows that the scientific community is indeed ready and able to respond, and that careful international peer review of submissions can lead to sound projects.

The third new project, Systems Analysis of Technological and Economic Dynamics, is not the result of a Call for Proposals but of an unsolicited proposal by scholars familiar with IIASA's long-standing interest in technological dynamics. Technology is one of the key factors in global change, whether we speak of environmental or economic change; it is both the cause of and the cure for many of our problems. A better understanding of the evolution of technology is of critical importance to our future.

I am pleased to be able to report that IIASA is supporting these new projects, and I wish every success to the scholars taking part in them.

Peter E. de János
Director

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FEATURE

Regional Material Balance Approaches to Long-Term Environmental Policy Planning

Over the last 20 years many countries have made great efforts to improve the quality of their air and water; but during this time the quality of the soil in most parts of the world has become progressively worse. The Rhine River Basin is a good example: a recent IIASA study of materials flows in the basin found that since 1950 levels of air and water pollution have declined dramatically while accumulations of cadmium and other pollutants in farm soils have risen steadily, in some cases to potentially toxic levels.

The goal of this three-year project is to trace the complex flows of materials through the industrial economy to the land and its soils, and to explore how policies aimed at improving the environmental quality of the land should be integrated with management of material flows.

It is based in part on the concept of industrial metabolism and an integrated, economic—environmental perspective on materials use. Industrial metabolism entails cradle-to-grave analysis of material flows, tracing the movement of chemicals through the industrial economy, identifying the points of transfer from economy to environment, and assessing their impact in the environment. This sort of holistic understanding of the links between environmental pollutants and their sources is essential: only by considering all potential sources of emissions can we develop policies that will lead to a real decrease in pollution, rather than shifting the burden from one medium to another.

Policies affecting major economic sectors (energy, industry, trade, agriculture, and management of land and natural resources) profoundly affect the flow of materials through the economy and thus into the environment, yet they are usually formulated without thought of their potential impact on the land and soils. A major goal of the research will be to clarify the links between current policies and their effects on soil and landscape quality, and to propose new ideas for policies that will improve the environmental quality of the land.

Researchers will study three geographical areas: the countries of the European Union; the Rhine Basin; and the contiguous basins of the upper Elbe/Oder rivers. The

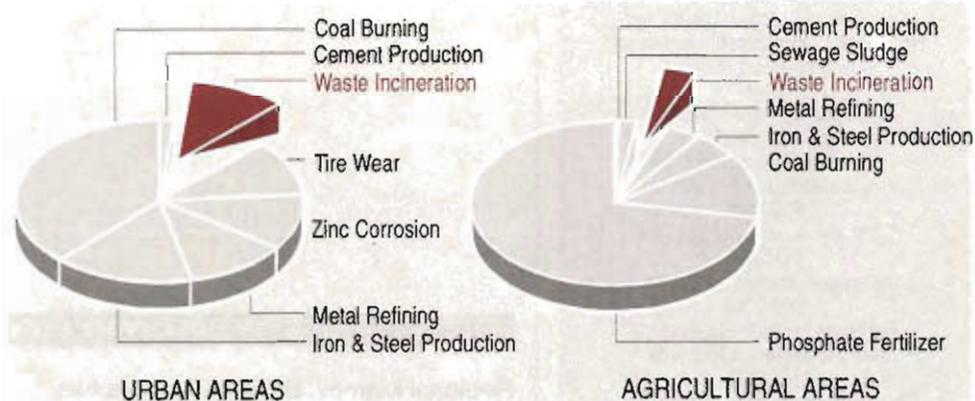
EU study will be conducted in collaboration with four universities in the Netherlands, with Leiden University taking the lead role. The Rhine Basin component will build directly on IIASA's study from 1989 to 1993 of *Sources of Chemical Pollution in the Rhine Basin*, one of the most extensive industrial metabolism analyses yet completed. The study of the upper Elbe/Oder basins, spanning large parts of Poland, eastern Germany, and the Czech Republic, including the notoriously polluted Black Triangle, will include collaboration with economists, hydrologists, soil modelers, and soil chemists from these and other countries.

The project is particularly timely: the Council of Europe has designated 1995 as European Conservation Year, with a focus on soil protection. But it should be stressed that although the study is on a regional European scale, the problem of materials use and land degradation is of serious concern around the globe. The intention is to develop concepts that will be of general interest and broadly applicable, particularly in areas of the world undergoing rapid industrial development, such as southeastern China.

In the first year work will focus on the development of inventories of material flows and soil quality analyses in the Black Triangle. An extensive soils sampling and analysis program will be conducted to supplement and validate available databases. About 150 samples will be analyzed for content and mobility of heavy metals. In the second and third years the study will emphasize scientific and policy analysis of this and other information.

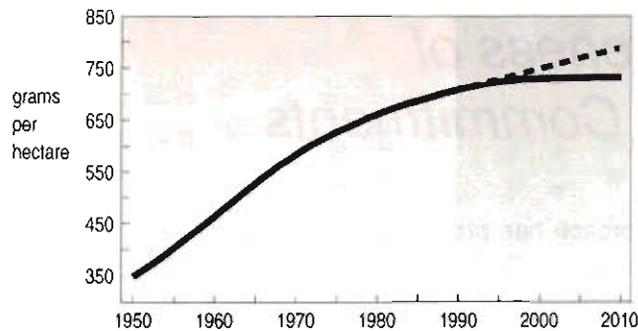
The project will comprise four major topics of study:

Diffuse Sources of Cadmium Deposition in the Rhine Basin



Cadmium, a toxic heavy metal, is used in the manufacture of only a few products, notably rechargeable batteries, but traces of it occur in many substances. A ban on cadmium-containing products would affect only the small wedges (waste incineration); depositions from other sources would continue. The charts are from the 1989—1993 IIASA study of *Industrial Metabolism in the Rhine Basin*; this project will build directly on that earlier work.

Cadmium Concentrations in Agricultural Soils



Cadmium accumulating steadily in agricultural soils of the Rhine Basin could be released by acidification. The solid line assumes cadmium is eliminated from phosphate fertilizer by the year 2000, the dashed line assumes no change in cadmium content. Data are from IIASA's Rhine Basin study.

Integrated Waste Management

The first task in this area is a study of the sources and fates of demolition wastes on the scale of the European Union. Recommendations will be provided for the effective management of these wastes in relation to selected chemicals.

The second task is a comparison of waste management practices (with a focus on heavy metals) between the Rhine Basin and the upper Elbe/Oder basins. The goal is to determine whether lessons learned in the cleanup of the Rhine Basin could provide insights into the cleanup of the upper Elbe/Oder region, or indeed of any highly degraded basin.

Integrated Land Management

Four tasks are envisioned in this topic. One is the management of agricultural lands in the EU. Emphasis will be given to the potential impacts on soil and water quality of large-scale abandonment of agricultural lands, a consequence of efforts to reduce Europe's surplus agricultural production; the lands most likely to be abandoned are in general highly contaminated.

A second task is the assessment of food contamination in the basins of the Rhine and upper Elbe/Oder rivers. Soil and crop sampling will be conducted to ascertain the current public health risks associated with crop ingestion; the potential risk in the future will be estimated through scenario analysis.

The third task is an assessment of the potential for landscape restoration in degraded lands of the upper Elbe/Oder basins. This will include an evaluation of various strategies for integrated landscape restoration and analysis of the environmental impacts of various economic development scenarios.

The fourth task is the formulation of a white paper on integrated land management. This report is expected to be the tangible output of a workshop IIASA will cosponsor with the International Society of Soil Science in the autumn of 1994. The conference will focus on the sustainable management of abandoned lands in Western Europe and derelict, contaminated lands in Eastern

Europe from the perspective of maximizing multiple uses of the soils. It is intended that the white paper will be submitted to the Ministers of the Council of Europe, who will convene a meeting on soil protection policies in Liechtenstein in early 1995.

Spatially Integrated Material Flows

This important aspect of the research is intended to account for the globalization of markets, and thus of materials flows. Evaluations will be made of possible effects of various regional policies and developments at the international/global level, and conversely, how international developments influence choices and opportunities in regions.

The focus will be on the EU, which is both a powerful regulating body and a region exercising considerable influence on international markets and material flows. Alternative international/global background scenarios will be developed as frameworks for the regional studies. A team of researchers will spend the summer of 1994 at IIASA designing a mass flow model linking emissions from economic activities to deposition and accumulations in soils. The model will be a key tool for scenario analysis and policy evaluation. A major question for analysis is, What are the implications of a more deliberate management of material flows for the development of institutions and policy tools at the international, regional, national, and local levels?

Methodological Aspects

Efforts will be made to develop methodologies and models that could be used in regional studies of material flows and land degradation in other parts of the world. This might include the development of large-scale pollutant-specific environmental risk assessments and methods for economic evaluation of pollutant risks, especially in regard to long-term accumulations of pollutants; a generalized framework for land management and restoration on the regional scale; and a generalized scheme to determine which data, and what quality of data, are required for studies in industrial metabolism at different scales.

William Stigliani

Personnel

William Stigliani is the scientific leader of the project working together with **Björn Anderberg** and **Mojdeh Keykhah**. A parallel position, leader of the policy component of the project, will be created. The following researchers are expected to play important parts in the project: **Jürgen Blazejczak**, Deutsches Institut für Wirtschaftsforschung, Berlin; **Peter Jaffe**, Princeton University, USA; **Jerald Schnoor**, University of Iowa, USA; **Josef Seják**, Institute of Economics, Prague; **Jan Suschka**, Technical University of Lodz, Bielsko-Biala, Poland; and **Helias Udo de Haes**, Leiden University. Other scholars from various countries and disciplines will contribute.

FEATURE

Implementation and Effectiveness of International Environmental Commitments

Until recently environmental issues were at the margin of international affairs; today they are the focus of important treaties and agreements and a key factor in relations between states. The aim of this three-year project is to link scholars from many disciplines and countries who are studying environmental agreements, to coordinate systematic and complementary research on these topics, and ultimately to provide fresh insights that help policy makers create and implement agreements that lead to a better environment. Research will emphasize the relationship between domestic implementation and the international evolution of environmental commitments, with four concurrent lines of inquiry:

Implementation of International Agreements at the Domestic Level, and Domestic–International Linkages

This work entails detailed and comparative studies of the ways that countries implement international agreements. We are especially interested in two aspects of domestic implementation: the effectiveness of different styles of implementation in different countries and cultural settings, and the relationship between the process of implementation domestically and the evolution and effectiveness of the international agreement over time. We are looking not only at models of implementation where the state plays the central role, but also at non-state influences; for example, the roles of industry and environmental nongovernmental organizations.

Researchers will study and compare implementation of international agreements in many economic settings. The initial work will involve Western Europe and the former Soviet Union, then other countries of Central and Eastern Europe. In addition to understanding which modes of implementation are most effective, one goal is to determine the part played, if any, by international agreements during rapid economic transitions. A parallel study of implementation in developing countries will be launched within a year.

The first results of the work — an extensive review of relevant literature, methods, concepts adopted, and cases selected for this study — will be available later this year. The work is led by Steinar Andresen and Elena Nikitina and conducted by Vladimir Kotov, Alexei Roginko, Jon Birger Skjærseth, Olav Schram Stokke, and Jørgen Wettestad.

Construction of a Database on Effectiveness of International Environmental Agreements

Research on the effectiveness of international environmental agreements has typically been detailed studies that trace cause and effect in a small sample. This

approach has produced useful case studies of many environmental regimes, but makes it difficult to draw *systematic* conclusions. Each case is complex and unique; each case study focuses on different variables with different concepts.

What is needed is a well-defined databank that can be used to test and develop general theories. Prior efforts to develop such a database have left crucial variables, especially those needed to explain the effectiveness of an agreement, uncontrolled and unexplored. Key variables are indeed difficult to code, requiring carefully designed and tested data protocols and assistance from field researchers in coding cases.

Building such a database is not just a matter of compiling data but a research task in itself. The three-year duration of the IIASA project allows enough time to develop an extensive database, test it in a larger research program, and disseminate it.

This effort is led by Marc Levy, Oran Young, and Michael Zürn, in collaboration with a network of a dozen other scholars. A review of the literature, with special attention to the main theories of international institutions and the variables they imply for coding, will be available later this year, as well as draft papers on the data collection protocols, including discussions of key variables and classes of information. Testing of the data protocol and database concepts begins late this summer.

Implementation at the International Level

This work focuses on international processes of monitoring, verification, and enforcement. The goal is to subject environmental agreements to the sort of systematic scholarly appraisal that arms control agreements have had in the past. In some respects the procedures and concepts are generic; an open question is how environmental agreements differ from others, and what that implies for effective implementation. Research is being conducted in four areas:

A detailed review of studies of the role of verifiability in international environmental commitments. To what degree, and under what conditions, does verification of compliance matter? How much weight should negotiators of international agreements put on issues of verifiability, especially when they reduce political acceptability and flexibility? For different types of agreements, what are the links between gathering and exchange of data and verifiability? How do underlying domestic statistical systems — which are the basis of national reporting on compliance — affect verifiability for different types of agreements?

An overview of the use and performance of mechanisms that have been (and might be) used to review international agreements. These organizations and procedures are designed to record the performance of signatories to an agreement and to help the parties work through and adjust to implementation problems. Our goal is to determine which mechanisms are most effective and why.

An empirical study of all experiences under international environmental agreements with Formal Implementation and Review Mechanisms. What types of FIRMS exist? When have they been used? How do they relate to other procedures and obligations associated with the agreement? The first step will be a broad survey of existing cases; then we will select key cases and comparisons for detailed research.

An empirical study of the funding of secretariats to international environmental commitments. Secretariats typically collect and disseminate reports, prepare key background papers, organize meetings, etc.; no systematic effort has been made to see if they are adequately funded to do the work. Usually they rely on self-reporting of data by the signatories; but a recent study by the US General Accounting Office has pointed out that self-reports vary widely in quality, and that many countries have not bothered to submit them. For selected international agreements and secretariats, we will examine systematically the funding arrangements, participation and timeliness of different countries' voluntary and mandatory contributions, and funding links with international organizations.

The two overviews and initial results of the FIRMS study will be ready late this year, as will the study on secretariat financing. This work is being conducted principally by Owen Greene, John Lanchbery, Juan Carlos di Primio, and David Victor.

Game Simulation of Implementation

Project members will design and run a role-playing game simulation of the negotiation and implementation of an international environmental agreement. The first game participants would be invited officials from a representative collection of states who are concerned with the negotiation of international agreements and with implementation and compliance in their own countries.

The game would simulate linked negotiations and policy-making at domestic and international levels, in several stages: early, unstructured negotiation of international institutions; subsequent negotiation of specific obligations, allocations, emission limits, contributions, etc.; and domestic implementation and compliance decisions through which national authorities try to live with the commitments and institutions they have negotiated internationally. Each step will be repeated to give a more realistic approximation of ongoing bargaining, regime management, and learning.

There is much to be learned by developing and

observing the playing of a well-designed game. This exercise also reflects the policy orientation of the project: by playing the game, policy makers can learn about and experiment with implementation problems and issues.

Elements of the game will be tested this summer, and the full game will be played at IIASA in the summer of 1995 in a workshop for policy makers. This effort is led by Edward Parson, who has built games to study the process of negotiating new agreements. He has written an essay on the concepts relevant to the difficult task of building a game for simulating the implementation of policies.

In addition to this research we intend to make IIASA a base for scholars working on questions of implementation and effectiveness. Project members have already put considerable effort into organizing conferences, disseminating information, and creating new opportunities for communication. We will assemble a library of relevant literature, including documents that are difficult to locate elsewhere; we hope to put relevant references and notes into an organized (computerized) format and make this information available to scholars visiting IIASA. Eventually papers and data files will be accessible instantly via the electronic Internet. Periodic updates to database files may be provided to those active in the area, either by diskette or via the Internet.

David Victor

Personnel

An average of four to six people will be in residence at IIASA although the project will make use of many shorter stays coordinated to bring together scholars working on similar topics. **David Victor** is the co-leader in residence at IIASA, and **Eugene B. Skolnikoff**, Massachusetts Institute of Technology, USA, is the nonresident coleader. Among the investigators, most of whom will spend extended periods of time at IIASA, are: **Steinar Andresen**, **Jon Birger Skjærseth**, **Olav Schram Stokke**, and **Jørgen Wettestad**, Fridtjof Nansen Institute, Norway; **Owen Greene** and **Julian Sait**, Department of Peace Studies, University of Bradford, UK; **Anna Korula**, IIASA; **John Lanchbery**, Verification Technology Information Centre, London; **Marc Levy**, Princeton University, USA; **Vladimir Kotov**, School of Business Management, Russian Academy of Transport; **Elena Nikitina** and **Alexei Roginko**, Institute of World Economy and International Relations, Russian Academy of Sciences; **Edward Parson**, Harvard University, USA; **Juan Carlos di Primio**, Forschungszentrum Jülich, Germany; **Oran Young**, Dartmouth College, USA; and **Michael Zürn**, University of Bremen, Germany.

We are assembling an advisory committee which currently comprises **Abram Chayes** (Harvard Law School, USA), **José Goldemberg** (University of São Paulo, Brazil, and Princeton University, USA, former Brazilian Minister of Science and Technology), **Peter Sand** (Legal Adviser for Environmental Affairs, The World Bank), and **Arild Underdal** (University of Oslo, Norway).

FEATURE

Technological and Economic Dynamics

Meaningful analysis of many long-term processes of global change will be possible only with a better understanding of the links between technology and development. This project will be concerned with modeling technological change and the broader economic developments associated with it, as both cause and effect. The goal is to take advantage of new developments in theoretical and empirical research in order to develop stronger theory and better modeling techniques.

In the last decade considerable progress has been made on various techniques of dynamic economic modeling. Some of this work has employed ordinary differential and difference equations, and some of it stochastic equations. Several models have been developed in which an economic analogue of natural selection winnows out members of a population with different degrees of fitness. A number of efforts have taken advantage of improved simulation techniques. Others have employed more traditional mathematics. As a result of this theoretical work, the toolkit for modeling technological and economic dynamics is significantly richer than it was a decade ago.

In the same period there have been major advances in the empirical understanding of technological and economic change. There are many more detailed technological histories available. Much more is known about the similarities and differences of technical advance in different fields and industries and there is some understanding of the key variables behind those differences. A number of studies have provided rich information about how industrial structure coevolves with technology.

In addition to this work at the technology or sector level, the last decade has also seen a great deal of empirical research on productivity growth and measured technical advance at the level of whole economies. A considerable body of research now exists on the different rates of productivity growth among nations.

As a result of this work, the questions that theorists and modelers ought to address are now much more clearly defined. The work described above often has been undertaken in appreciation of certain observations that needed to be explained, like the apparent phenomenon of dynamic increasing returns, or the approximately log-normal distribution of firm sizes in many industries. But the connection between theoretical and empirical research has not been close. The philosophy of this project is that the chances of developing better theory and useful analytical techniques can be greatly enhanced by allowing scholars who understand the empirical phenomena to provide questions and challenges for the theorists.

This project will have strong links with theoretical scholars at the Santa Fe Institute, the Central Economic Mathematical Institute in Moscow, the Solvay International Institute of Physics and Chemistry at the Free University in Brussels, and the V.M. Glushkov Institute of Cybernetics in Kiev. It will also involve scholars active in the various Sloan Foundation projects on the comparative evolution of different industries; researchers at Statistics Canada and elsewhere who are working with new data sets that enable us to follow over time the establishments within a given industry; and scholars concerned with broad macroeconomic questions such as convergence. The following three areas of research are envisaged.

Technological and Industrial Dynamics

Over the past decade analyses of the process of innovation have significantly enriched the knowledge of the mechanisms, opportunities, and incentives that drive technical change in industry. These studies have shown the importance of various forms of increasing returns in the accumulation of technical knowledge and common patterns of change, including the existence of apparent trajectories. The evidence suggests that technological dynamics are specific to particular sectors, and most likely, to particular countries. How does one model and interpret these variegated patterns of technological change?

A related question concerns the coevolution of technologies and industrial structures. For some sectors the innovating firms are relatively big incumbents, while in others they are mainly small new entrants; sometimes innovative activities appear to feed on themselves, giving early producers a competitive advantage, while at other times past successes can actually hinder efforts to explore new technologies. The research issue here concerns the links between technology development and the changes in the size distribution of firms and the changes in market shares — the “demography” of entry and exit.

Innovation, Competition, and Macrodynamics

The idea that innovation and diffusion are the core of economic development is not new. But economists have never adequately modeled the processes by which technical change fuels growth, possibly because of the equilibrium framework prevailing in their discipline. Our approach will be to formalize growth as an evolutionary process, with competition among heterogeneous technologies and firms, implying various structural changes. The challenge will be to provide a consistent account of several macroeconomic phenomena, including parallel movement in aggregate

time series and the persistence of wide differences in productivity, per capita incomes, and growth rates. The theory must also account for the revolutionary transitions toward market economies now underway in Eastern Europe.

Learning Processes and Organizational Competence

All processes of innovation, diffusion, and imperfect adaptation have a crucial microeconomic dimension. At the most general level a better understanding is needed of how and what economic agents learn within systems that are likely to display highly nonlinear features and phase transitions, sudden discontinuities, and unexpected events. More specifically, the microeconomics of innovation often rest in organizational entities — firms — which have a repertoire of problem-solving procedures and decision rules that shape the avenues of change and the competitive dynamics. But why are some firms more successful than others? And how can one meaningfully formalize the knowledge which organizations embody and the evolution of that knowledge?

Methodology and Output

Project members intend to proceed with two complementary styles of modeling. The first is richer from the viewpoint of phenomenological and behavioral details and relies mainly on the development of simulation models. The task will be to show that, under economically meaningful system parameters and behavioral rules, the major regularities in macroeconomics and industrial dynamics emerge from underlying nonlinear interactions among heterogeneous microeconomic entities. The second style of modeling focuses on reduced form dynamic models in which the dynamics of endogenously changing technologies, as well as expectations, organizational forms, and behavioral traits, involve various types of feedback.

To capture the underlying competitive processes a wide variety of mathematical approaches has been suggested within and outside economic analysis: ordinary differential and difference equations, in particular with trajectories on the unit simplex (so-called adaptive processes of growth), and stochastic differential equations. Project members will develop and apply several methods, especially generalized urn schemes.

Throughout the goal will be to contribute to the theory of evolving complex systems and to make links with parallel developments in other fields of research — the “rugged landscapes” explored in population dynamics, for example, the evolution of complex structures in biology, and theories of adaptive learning and emergent computation. The principal output of the project will be a series of monographs.

Personnel

The project is to run for three years and involve an international, interdisciplinary network under the leadership of **Giovanni Dosi**, Department of Economics, University “La Sapienza”, Rome. IIASA will be the base for a small resident team of researchers, including **Yuri Kaniovski**. Members of the research network will spend varying amounts of time at IIASA, from a few weeks to a few months per year. The following researchers are expected to play important roles: **Serguei Glaziev** and **Valery L. Makarov**, CEMI, Moscow; **Richard Nelson**, Columbia University, New York; **Luc Soete** and **Gerald Silverberg**, MERIT, University of Limburg, the Netherlands; and **Sidney G. Winter**, University of Pennsylvania.

Other collaborators have been identified in Stanford University, University of California/Berkeley, University of Manchester, University of Minnesota, University of Maryland, University of Rome, University Luigi Bocconi in Milan, University of Trento, the Wharton School at the University of Pennsylvania, Statistics Canada, the V.M. Glushkov Institute of Cybernetics in Kiev, the Solvay Institute in Brussels, the Santa Fe Institute, the Technical Research Center of Finland, Espoo, CEPREMAP, Paris, and the University of Paris XIII.

INSIDE IIASA

NEW PROJECTS

Siberian Forests

The Government of Canada has given IIASA two separate contracts to support various aspects of the institute's study of the sustainable development of the Siberia's forest resources and forest industries. Contact: *Sten Nilsson*

Kenyan Agriculture

With support from the UN Food and Agriculture Organization, IIASA will collaborate with the Kenya Agricultural Research Institute to assess the national agricultural potential of Kenya in light of possible changes in climate. More detailed assessments will be made of the districts of Kisii, Kwale, and Marsabit. Contact: *Günther Fischer*

Evolutionary Economics

The International Association for the Promotion of Cooperation with Scientists from the Independent States of the Former Soviet Union has awarded IIASA a contract to support East European collaborators in the new project on Technological and Economic Dynamics (page 8). Contact: *Yuri Kaniovski*

Environmental Information System

The Dutch National Institute of Public Health and Environmental Protection (RIVM) has given IIASA a contract to extend the XENVIS environmental information system. Contact: *Kurt Fedra*

CONFERENCES

Energy and Emission Scenarios for Southeast Asia, 31 January—2 February, Laxenburg, Austria.

Energy and emission scenarios for the next few decades were the subject of a workshop organized by the Transboundary Air Pollution project. Eighteen experts involved in the development of the RAINS-Asia model (*Options* Winter '93) discussed national energy projections and compared them with analyses of global energy trends by IIASA's project on Environmentally Compatible Energy Strategies. Contact: *Markus Amann*

Basic Research in the Russian Federation, 6—7 March, Laxenburg, Austria.

This workshop, one in a series regarding economic transition in Russia, brought together a distinguished group of Russian and Western scholars and officials, including Andrei Fonotov, Russian deputy minister of Science and Technology Policy, and Vladimir Fortov, chairman of the Russian Foundation for Basic Research, to discuss science policy and basic research. Participants discussed the "brain drain" and ways of supporting basic research, including: downsizing the sector; improving its efficiency; the merits of preserving elite scientific centers and teams; special assistance to young scholars; and lobbying for the interests of scientific sector in representative bodies. A more extensive summary will appear in the next issue of *Options*. Contact: *Il'dar Karimov*

Regional CORINAIR Expert Meeting, 15—16 March, Laxenburg, Austria.

This meeting brought together national experts from Central and Eastern Europe who are involved in development of the Europe-wide CORINAIR emission inventory for 1990. CORINAIR, endorsed by the European Environmental Agency and the UN Economic Commission for Europe, provides a harmonized database for reporting national emissions of sulfur dioxide, nitrogen oxides, carbon dioxide, volatile organic compounds, and ammonia. Participants discussed the state of work in each country and the next steps before finalization and verification of the national databases. The CORINAIR inventory will be incorporated in the next version of IIASA's RAINS model. Contact: *Markus Amann*

Forthcoming Meetings

IIASA will sponsor or cosponsor the following meetings at the institute.

May 5—7: International Trade Issues of the Russian Federation. Contact: *Janos Gács*

May 22—24: Fairness and Siting. Contact: *Joanne Linnerooth-Bayer*

June 9—11: Restructuring and Recovery of Output in Russia. Contact: *Janos Gács*

June 13—23: Decomposition and Parallel Computing Techniques for Large-scale Systems. Contact: *C. Rosa*

June 16—18: The Nature and Dynamics of Organizational Capability. Contact: *Yuri Kaniovski*

June 23—25: Employment and Unemployment in Russia from a Microeconomic Perspective. Contact: *Janos Gács*

July 11—13: Technological Regimes, Industrial Demography, and the Evolution of Industrial Structures. Contact: *Giovanni Dosi*

August 22—24: Advances in Methodology and Software in Decision Support. Contact: *Jaap Wessels* or *Marek Makowski*

August 25—26: Decision Analysis for Water Resources Management — Future Needs and Challenges. Contact: *László Somlyódy*

NEWS

Appointments

(Full- and part-time)

Peyton Young (USA), an IIASA alumnus from the University of Maryland at College Park, has joined the institute as a research scholar.

Rainer Kurz (Austria), from the Technical University in Graz, Austria, and **Zhihong Wei** (China), Tsinghua University, have joined the Environmentally Compatible Energy Strategies project.

Iouri Pykh (Russia), from the Center for International Environmental Cooperation, St. Petersburg, has joined IIASA to explore networking activities.

Henry Rempel (Canada), from the University of Manitoba, has joined the Food and Agriculture project.

Maarit Ronnila (Finland), from the Helsinki School of Economics, has joined the Forest Resources project.

Steinar Andresen (Norway), **Jan B. Skjærseth** (Norway), and **Jørgen Wettestad** (Norway) from the Fridtjof Nansen Institute, Lysaker, Norway; **Juan Carlos Di Primio** (Argentina) from the Karlsruhe Projektgruppe Energie und Umwelt, Eckenstein-Leopoldshafen, Germany; **Anna Korula** (Austria) from the IIASA project on Processes of International Negotiation; **Vladimir Kotov** (Russia) of the School of Business Management, Academy of Transport, Moscow; **Elena Nikitina** (Russia) and **Alexei Roguinko** (Russia) from the Institute of World Economy and International Relations, Russian Academy of Sciences, Moscow; and **Eugene Skoinikoff** (USA) from the Center of International Studies, Massachusetts Institute of Technology, have joined the new project on Implementation and Effectiveness of International Environmental Commitments (page 6).

Masahiro Inuiguchi (Japan), of Hiroshima University, has joined the Methodology of Decision Analysis project.

Anne Goujon (France), of the European Center for Development Policy Management in Maastricht, the Netherlands, has joined the Population project.

Juzer Dhondia (India), from the Center for Environmental Science and Engineering at the Indian Institute of Technology in Bombay, India, has joined the Transboundary Air Pollution project.

Olli Varis (Finland), an IIASA alumnus from the Academy of Finland, and **Vladimir Novotny** (USA), from Marquette University, Milwaukee, USA, have joined the Water Resources project.



In collaboration with Battelle Pacific Northwest Laboratories, Washington, D.C., and the International Academy of the Environment, Geneva, IIASA hosted a March meeting of some 30 experts assessing Global Climate Change and the Social Sciences.

NEW PUBLICATIONS

The following books are now available from booksellers or from the publisher.

Demographic Trends and Patterns in the Soviet Union Before 1991. W. Lutz, S. Scherbov, A. Volkov, editors. Routledge. ISBN 0-415-10194-8.

Research and Development Management: From the Soviet Union to Russia. C. Schneider. Physica-Verlag. ISBN 3-7908-0757-5.

The following reports are now available from IIASA's Publications Department for the amounts indicated. For payment by Visa or Mastercard, please send the number of your credit card, the expiry date, and a copy of your signature. A complete publications list is on the Internet Gopher at gopher.iiasa.ac.at.

GIS and Environmental Modeling. K. Fedra. RR-94-2. US \$10.

Alternative Demographic Scenarios for 20 Large Member States of the Council of Europe, 1990—2050. C. Prinz, W. Lutz. RR-94-3. US \$10.

Proceedings of the Second International Colloquium on Regional Development. T. Kawashima, T. Vaško, editors. CP-94-1. US \$15.

Seasons and Chaos in Ecosystems. S. Rinaldi, S. Muratori, Y. Kuznetsov, M. Scheffer, and F. Doveri. RR-94-4. US \$10.

In Memoriam Luis Donaldo Colosio

Mexican presidential candidate, IIASA alumnus, killed 23 March 1994. From March 1978 to July 1979 he was a research scholar in IIASA's project on Population Resources and Growth, when he carried out a case study of migration, urbanization, and economic settlement in Mexico. His death is a great loss to Mexico, and a personal loss to many of us.



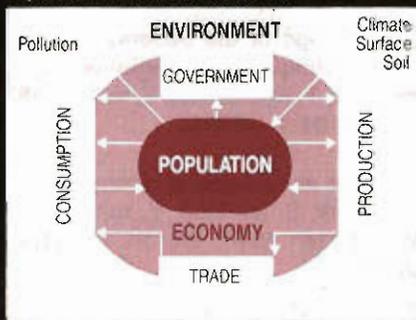
IIASA

International Institute
for Applied Systems Analysis

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.

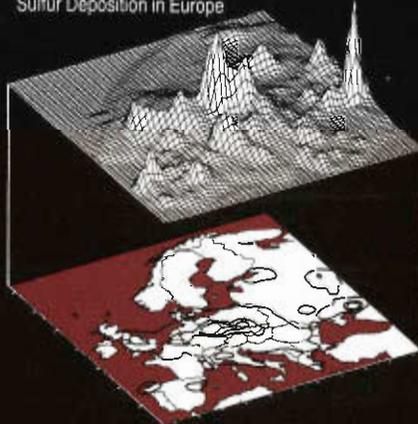
Population /Environment Interactions



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,

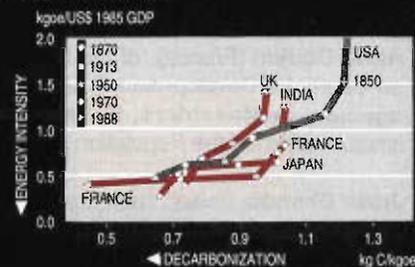
Sulfur Deposition in Europe



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.

◆ Capital Cities of NMO Countries

Energy and the Environment



MEMBERSHIP

IIASA was founded in 1972 on the initiative of the USA and the USSR, and now also includes 11 European countries, Canada, and Japan. IIASA has member organizations in: Austria, Bulgaria, Canada, the Czech and Slovak Republics, Finland, Germany, Italy, Japan, the Netherlands, Poland, the Russian Federation, Sweden, Ukraine, and the United States of America.

FURTHER INFORMATION

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