



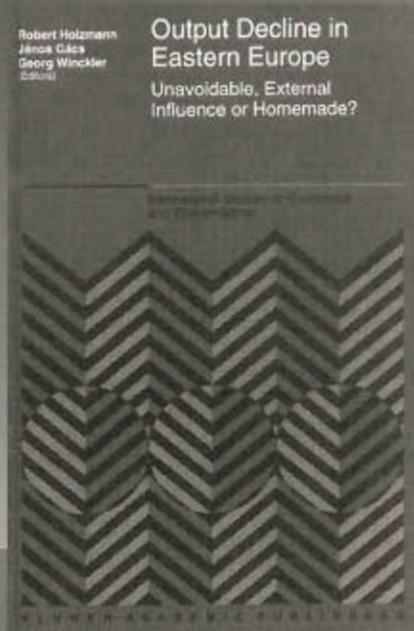
options

International Institute for Applied Systems Analysis

Spring '95

*Special Issue
Includes:*

ANNUAL REPORT 1 9 9 4



IIASA BOOKS

Output Decline in Eastern Europe Unavoidable, External Influence or Homemade?

Edited by Robert Holzmann, János Gács, and Georg Winckler

During the first phase of transition to the market in Central and Eastern Europe real GDP fell by more than 20 percent, while real industrial production decreased by 40 percent. *Output Decline in Eastern Europe* provides comprehensive, multi-factor analyses of this unique, painful experience. Various elements are assessed: the impact of tight credit and fiscal policies; the collapse of the CMEA and the USSR; the inexperience and inability of domestic producers to adjust output to new patterns of demand. In *Output Decline in Eastern Europe* authors from East and West analyze new data in country-by-country studies.

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EDITORIAL



The Climate Conference in Berlin has recently ended without an agreement on targets for greenhouse gas reductions. Enormous publicity surrounded the conference and expectations were extremely high, so it is not surprising that some observers say nothing was accomplished. The more cynical observers swiftly conclude that the conference was simply an exercise in environmental hypocrisy. Narrow and short-sighted national economic self-interest, so it is argued, will never be overcome and will prevent the signing of an effective convention.

The loud voices of coalitions – those of rich countries, poor countries, oil-producing countries, and small island states, to mention but a few – all seemingly taking positions most advantageous for themselves, are certainly some cause for despair. Far-sighted and persuasive leadership has clearly not yet emerged on the climate issue.

Yet despite the clamor, some good things came out of Berlin. The signatory countries restated and reinforced their commitment to developing measures to reduce long-term greenhouse gas concentrations. They also agreed to begin experimenting with joint implementation, a mechanism which, in principle, promises to encourage collaboration between rich and poor countries and maximize benefits for both. The Berlin Conference clearly chalked up some successes.

The question of how best to formulate workable policies for greenhouse gases reduction is complex and uncertain. In the following pages three of my colleagues with sharply diverging views, David Victor, Julian Salt, and John Lanchbery, argue their respective positions cogently and persuasively.

Healthy science depends on free and open debate. It is easier to publicly express differences of opinion at a nongovernmental institution, especially when the debate involves high-profile policy matters, as in the case of greenhouse gas reduction. The rich diversity of views at IIASA, and the ability to express this diversity openly, is something we see as one of the institute's special strengths.

Peter E. de Jánosi
Director

CONTENTS

Hard Targets <i>The Case Against</i>	5
Hard Targets <i>The Case For</i>	7
In Memoriam: V. S. Mikhalevich	9
Inside IIASA	10

Greenhouse Gas Reduction Targets

What Sort, and How Soon?

THE FRAMEWORK CONVENTION ON CLIMATE CHANGE INITIALED AT THE 1992 EARTH SUMMIT WAS ONLY A FIRST step in coordinating the international response to the threat of climate change: negotiators left it to their successors to work out detailed goals, mechanisms, and procedures. Debate since then has been intense, especially on the question of whether to adopt hard, legally binding national targets for reductions in emissions of greenhouse gases, especially carbon dioxide. IIASA has figured prominently in this debate.

In January 1995, just two months before negotiators gathered in Berlin for the first Conference of the Parties to the climate convention, *Nature* published a controversial article written jointly by David Victor, resident co-leader of IIASA's project on the Implementation and Effectiveness of International Environmental Commitments, and Julian Salt, a part-time research scholar in the project who is based at the University of Bradford, England. Victor and Salt argued strongly against negotiating new and hard reduction targets (*Keeping the Climate Relevant*, vol. 373, no. 6512, pp. 280-282). Within weeks a rebuttal was being passed around to climate negotiators and other interested parties. It was written and signed by, among others, John Lanchbery, another member of the IEC project at IIASA. The articles that follow are based on the *Nature* paper, the subsequent rebuttal, and a reply to the rebuttal that was circulated at Berlin.

Readers should note that there is much common ground. Victor, Salt, Lanchbery, and their colleagues in the IEC project agree that the key to making the climate convention effective – indeed, the key to making most international environmental agreements effective – is sound mechanisms for reporting and review of the actions of signatories. The debate is about, first, whether hard or soft targets are more effective, and second, the impact of the negotiation of hard targets on the evolution of reporting and review mechanisms to support the climate convention.

FEATURE

Hard Targets *The Case Against*

CONVENTIONAL WISDOM holds that the next step for an effective climate treaty is to negotiate binding targets and timetables for controlling greenhouse gases. In fact we already have some targets and timetables, and they are not being fully implemented. If new and stricter commitments are negotiated prematurely, the treaty risks drifting away from the reality of what policies can realistically be implemented and what will make it effective.

The treaty will be more effective at controlling greenhouse effects in the long term if the next few years are devoted to building a base of national reports and a system for reviewing those reports. Most of the key conditions for an effective reporting and review system exist in nascent form, but complacency is not justified: most other environmental agreements have failed on this score and thus failed to give adequate attention to what states actually implement. Negotiating even more targets should wait, because extensive debates on future commitments will give countries incentives to misreport and obscure current data on emissions, policies, and measures.

Symbolic Targets

The need for tough and legally binding targets is the central policy goal of the greenhouse activist. Every protocol proposal that was formally circulated among delegates prior to the Berlin meeting had a legally binding, numerical, across-the-board target as its central element.

The Framework Convention on Climate Change currently includes a "soft" target, a loosely worded pledge by developed countries to return emissions of greenhouse gases to 1990 levels by the year 2000. That target mainly reflects what governments were already prepared to commit. Of the OECD's 25 members, 23 are also covered by national or regional targets.

In many countries it may appear that targets are having an effect when actually other stronger factors are at work. Market and labor reforms in the United Kingdom, for example, are drastically reducing the coal industry and, coincidentally, reducing carbon emissions. Germany's carbon emissions dropped 14.5 percent after unification and the collapse of the eastern Germany economy. Not surprisingly, the UK and Germany are the only

OECD countries that will easily meet the convention's target. The worldwide trend to more efficient natural gas lessens emissions of carbon dioxide, but it is unrelated to fears of global warming.

This is not cause for pessimism. Nearly all these countries are implementing some new policies at least partially on the desire to control emissions of greenhouse gases and meet their targets. A few have been active implementers, but most have done little beyond simple and inexpensive (usually free) measures. Developing real policies requires complex and detailed national and sectoral studies and forecasts. The current targets have been useful planning tools by focusing on the needed actions; making them harder and stricter will not help.

Communication, Review, and Assessment

More attention should be given to national reports on emissions and policies. Experiences in the OECD, the International Monetary Fund, the General Agreement on Tariffs and Trade, and the International Labour Organisation, suggest that reporting, review, and assessment could lead to effective international environmental agreements.

A nascent review system is under way in the climate treaty. Our critics suggest that the encouraging early signs are evidence that the review system can flourish alongside debates on targets and timetables. In fact, the climate information system has only passed the easiest hurdles. Transparency of assumptions and modeling methods remains a serious problem. Without transparency it is seldom possible to discover whether governments are genuinely implementing (especially costly) measures or have merely adopted convenient assumptions. A future role for NGOs, among others, in performing independent checks depends crucially on much more progress in transparency.

A targets debate now, especially with governments not willing to implement much, will give extra incentives to obscure, massage, and leave "flexible" the underlying data. Already there are hints of this. Demand-side management programs, a highly popular greenhouse policy, are virtually impossible to compare across countries – to see which are claiming genuine policies and which are unrealistic – because national reports don't report the

Hard targets are senseless when no government can predict exactly what it will implement, even if it makes a genuine effort.

data in a comparable format. The extent of the problem is unclear precisely because transparency remains low. The foundation for a useful information system is promising, but still weak.

Roads Less Traveled

Avoiding targets at this stage could offer valuable time to consider other options. (We consider several in the original *Nature* paper.) Many who seek additional targets and timetables want a new treaty by 1997, but sorting out a sophisticated and realistic agreement will take longer. It is unfair and untenable for heavily nuclearized France to face the same percentage cuts as Germany, whose economy is built on carbon-intensive coal. Yet there are few agreed ideas about how to address the different starting points of countries. Now is the time to explore options, rather than rushing into across-the-board simple targets and timetables with little understanding of whether they can be implemented. Experience in many areas, such as controlling North Sea pollution and acid rain in Europe, shows that simple across-the-board management measures are economically and ecologically inefficient.

If targets are pursued – notably for the period beyond 2000, when the convention's current target probably does not apply – greater attention should be given to soft targets, not the hard (legally binding) targets that environmental groups and activist countries want to adopt. Negotiating hard targets will lead to tortuous legal drafting, and ultimately to hard law with soft language, as in the current convention: a valuable symbol, perhaps, but no more effective. Better to have a precise but nonbinding target that would set a common pace for controlling greenhouse gas emissions. Such a target would be easier to reach and thus more likely to be in force by 2000.

Our Critics

Supporters of hard (and simple) targets often refer to the control of acid rain in Europe, especially the 30 percent emissions reduction target of the 1985 sulfur protocol. But the states that led the sulfur negotiations were sure that they could meet, and in most cases greatly exceed, the target when they signed. For example, Norway had already met the target in 1985, and went on to achieve about 70 percent emissions reductions. Lead states' commitment to action gave them moral authority in dragging other states to reduce emissions. These lessons don't apply to the climate regime in 1995 – the lead states are not on track to comply with, let alone exceed, the tough international targets they advocate (except Britain and Germany, where reductions in emissions are unrelated to environmental policies).

Advocates of legally binding targets also point to the Montreal Protocol on Substances that Deplete the Ozone Layer and its phase-out target for CFCs and Halons. For industrialized countries nearly all emissions control has

been relatively easy to forecast and implement – conditions under which targets are effective. CFCs, Halons, and sulfur are not intrinsic to the modern economy; carbon dioxide is. Hard targets are senseless when no government can predict exactly what it will implement, even if it makes a genuine effort.

Some of our critics have argued against the *Nature* paper because it gives "dangerous" arguments to the coal lobby, OPEC, and others who oppose carbon controls. Our sin is to suggest that the climate negotiators abandon some of the conventional wisdom, notably hard targets, because it will lead to ineffective measures (as it has in the past). The regime is on the right track but could be derailed by a new debate on targets.

Finally, some people suggest that a debate on targets could help by distracting unwanted political attention from the review process. If the convention is to be effective, debates about commitments have to be real. That requires putting the debate about what states do – the implementation review process – at the center. It is hardly irrelevant or misleading to connect it to the debate on new commitments. An effective review process is the best way to connect international law to the reality of what states can implement.

Conclusions

The arguments here lead to five practical lessons for the next few years of building an effective climate convention:

- Don't focus now on tough new targets and timetables. The industrialized countries who must first control their emissions have enough targets. After 2000 a soft (precise but nonbinding) target will be sufficient, if based on what is achievable.
- Give the process of gathering and reviewing information the political space needed to operate.
- Work hard to increase the utility of national reports, which are the backbone of the system. Governments must report fully and in a manner that allows comparisons. In most environmental agreements this is a weak link.
- Support the secretariat that must manage the reporting and review process. We estimate that initially the needs are modest, perhaps a dozen professionals, funded by stable commitments rather than the now popular system of voluntary trust funds.
- Design a multilateral consultative process so that questions about implementation can be effectively raised and reviewed.

We estimate that two full cycles of reporting and review – three to six years, perhaps longer if it isn't taken seriously now – will be needed to ensure the foundation is properly in place.

David Victor and Julian Sall

FEATURE

Hard Targets *The Case For*

IN THEIR PAPER, *Keeping the Climate Treaty Relevant*, in *Nature*, and in their similar paper printed in this edition of *Options*, David Victor and Julian Salt argue against the inclusion of hard (legally binding) targets and timetables for greenhouse gas emission limitation in the climate convention. They do so on the grounds that contentious debates on this topic might cause the convention to "drift away from the reality of what policies can realistically be implemented and what will make it effective." In particular, they postulate that debates on targets and timetables will detract from the development of effective reporting and review processes which, they contend, are the key to effective implementation. They thus conclude that over the next few years the parties to the convention should concentrate on building up the nascent reporting and review processes in the convention rather than on negotiating legally binding commitments limitations on emissions.

While agreeing with David and Julian on the importance of reporting and review processes, I disagree with their theory that contentious debates on targets and timescales will adversely affect the development of the information gathering and assessment process. In common with many others who have routinely attended meetings of the Intergovernmental Negotiating Committee, I conclude that the opposite is probably true. In addition, most relevant evidence from other similar agreements is that the existence of, or negotiations on, hard targets has little effect, either way, on the development of effective reporting and review processes. To couple the two processes as David and Julian have done thus seems irrelevant and misleading.

Climate Politics

I make this point strongly because at the last negotiating committee meeting in February, and at the Conference of the Parties in Berlin in April, David and Julian's paper, which they circulated, had the effect of linking those in favor of the development of effective review processes (such as myself, David, Julian, and other IEC colleagues) with the minority at the meeting which wished to take no action to revise and strengthen the convention. (The minority was, essentially, the OPEC countries which think that cutting carbon dioxide emissions would adversely affect their oil revenues, which it probably would.) This

unfortunate linkage was not what the authors intended and did not accurately reflect the views expressed in their paper, although they do advocate a three- to six-year delay in negotiations on targets, which they also propose should be nonbinding. Nevertheless, in the highly polarized and politically charged debate at the INC and in Berlin we were perceived to be opposed to the position of the majority of states (including nearly all OECD and G-77 countries) that the commitments in the convention are inadequate and ought therefore to be revised.

Tenuous Links

On close reading of their paper, I do not find that David and Julian give any hard evidence which supports a link between hard targets and review mechanisms. They merely

conclude that there is one. Nor, for that matter, do I find them convincing on another of their conclusions, which is that the convention should adopt soft (not legally binding) rather than hard targets. The evidence which they do cite is almost invariably open to several different interpretation. For example, they say near the beginning of their paper that the convention's current soft commitments do not represent much more than what states are doing anyway and that such emission stabilization as has been achieved

so far is largely as a result of factors unconnected with implementing the convention, all of which is true. But surely this is, if anything, an argument against soft targets?

In my opinion the only potentially substantial evidence that the authors cite, at some length, in their *Nature* paper concerns lessons learned from experience of the development of reporting and review processes in other agreements. They select as examples the OECD, IMF, ILO, and GATT. However, while interesting, this is perhaps not the most relevant experience to consider in relation to the climate agreement. All four regimes are strong compared to the climate convention and, in any case, have little direct bearing on environmental issues, although indirectly they do have significant environmental effects. Better examples, would be those agreements concerning atmospheric pollution, notably the ozone agreements (the Vienna Convention on Substances that Deplete the Ozone Layer and its protocols and amendments) and the Convention on Long-Range Transboundary Air Pollution (LRTAP, the acid rain agreement). It is worth discussing

Noisy debates on the adequacy of commitments have constructively diverted attention from discussion of reviews of implementation.

them here at some length.

Both of the agreements have developed quite thorough reporting and review processes while having also developed hard targets and timetables. Moreover, some of the targets in both agreements were hotly debated and perceived as being difficult and expensive to implement,

in much the same way as possible commitments to emission reductions in the climate convention. Regarding LRTAP, David and Julian make the point that the sulfur dioxide protocol to the agreement was implemented well, because it was fairly easy to do so, and that the nitrogen oxide protocol was implemented relatively poorly because

Implementation and Effectiveness of International Environmental Commitments

The debate on these pages over greenhouse gas targets reflects only a small part of IIASA's work on international environmental commitments. The IEC project began early in 1994 under co-leaders David Victor, resident at IIASA, and Eugene Skolnikoff, of the Massachusetts Institute of Technology. Project members pursue three complementary lines of research.

Historical Case Studies and Comparative Research

Two teams of scholars, one working principally at the domestic level and the other at the international level, are studying implementation of international agreements through historical analysis and case study comparisons. Each team asks two common questions.

First, how does the process of implementation at the domestic level affect the performance of international agreements? The focus is on participation in and access to the process. A better understanding of domestic implementation is needed to devise strategies that turn words and agreements into changes in the behavior of the people and institutions that matter most.

Second, under what conditions does an international agreement evolve to stay close to what is implementable? Agreements guide behavior to some extent, but they cannot drift far from the realities of what signatory countries want and can do.

One team of researchers is conducting detailed comparisons of domestic implementation of four international agreements across Europe. A parallel application of similar methods to developing countries is planned. The team pays particular attention to issues of implementation in Russia.

A second team studies international processes that influence implementation. Their focus is on processes of monitoring, performance review, verification, and enforcement. The primary line of research is detailed empirical studies of the roles of international review mechanisms.

The two teams of researchers work together to explore domestic-international linkages, a topic now at the forefront of research on politics and institutions. By design, some of the cases studies overlap.

Building a Database on International Regimes

Past research on the effectiveness of international environmental agreements has produced many detailed and useful case studies, but samples have been small and systematic comparison is difficult. Four members of the project are constructing a database intended to allow systematic use of historical evidence from a large number of cases. Similar efforts in the past have often left crucial variables uncontrolled and unexplored. This team will try to include all major variables related to effectiveness.

Revisions to a draft data protocol should be finished by the end of 1995. The goal is to code 50 to 60 environmental agreements. The protocol will also be flexible enough to include non-environmental cases, such as security or trade regimes.

Game Simulation and Other Activities

A game simulation is being developed to explore issues of institutional design, implementation, and compliance in international agreements. The exercise, tentatively scheduled for the summer of 1996, will be a dynamic/sequential simulation of three decades of linked negotiations and policy-making regarding climate change issues at domestic and international levels. Experts from many countries will represent national authorities, with key countries represented by teams of five to seven people.

Project members involved in historical research also follow developments in new environmental agreements and, when appropriate, enter debates about their progress. In addition to the Framework Convention on Climate Change, they track the Convention on Biological Diversity, the Convention to Combat Desertification, and the Montreal Protocol on Substances that Deplete the Ozone Layer.

its targets were more difficult to attain. They make a similar point regarding the ozone agreements where, as the targets have become increasingly stringent, it has become more and more difficult to attain them. These points are factually correct but it does not follow that soft targets and timetables would have worked better than hard ones. Nor, more importantly in the context of this paper, does it follow that the negotiations on the tough targets and timetables adversely affected the development of the reporting and review processes in the agreements. Indeed, it highlights the fact that they developed rather well. Certainly well enough to clearly show up the deficiencies in implementation which David and Julian mention.

Crucially, when trying to find evidence relevant to the future development of the climate convention it would seem wise to try to draw conclusions from experience of its development so far. David and Julian outline some of the stages the development of the agreement but, again, cite no direct evidence of any causal relationship between debates about targets and timetables and the development of effective reporting and review processes.

I would contend that the climate negotiations since Rio have shown that the noisy and contentious debates on the adequacy of the commitments in the convention (and on joint implementation) have constructively diverted political attention away from discussion of reviews of implementation and measures. Debates on how to perform these reviews have been conducted in a nonconfrontational and informed manner in large part because the noisy and contentious political debates have been centered elsewhere. As a result, and as David and Julian mention in their paper, the convention has embarked on a very promising first review of implementation and measures in which the parties are participating with enthusiasm. Thus the direct evidence so far is that if the climate convention is to develop really effective reporting and review processes, a contentious, noisy, and diversionary debate on hard targets for substantial emission reductions may well prove helpful.

What Really Happened

Delegates to the climate conference in Berlin concluded that the current commitments – to stabilize greenhouse gas emissions at 1990 levels by the year 2000 – are not adequate, and set up an *ad hoc* group to begin negotiations on a protocol, or other legal instrument, to the convention. The group should complete its work by 1997, in time for the protocol to be adopted by the third Conference of the Parties and to come into force in 2000. The aim will be “to set quantified limitation and reduction objectives within specified time frames . . . for anthropogenic emissions by sources and removals by sinks of greenhouse gases” and to elaborate policies and measures to accomplish this goal.

John Lanchbery

I N M E M O R I A M



Vladimir
Sergeyevich
Mikhalevich

ACADEMICIAN VLADIMIR S. MIKHALEVICH was one of the leading Ukrainian scientists of his generation. Trained in Kiev and Moscow as a physicist and mathematician, he won a reputation as a first-rate researcher before going on to serve as director of the V.M. Glushkov Institute of Cybernetics of the Ukrainian Academy of Sciences. He had a long and fruitful association with IIASA, first as Soviet representative and chairman of IIASA's Governing Council, then as the first representative to IIASA of the newly independent Ukraine. Indeed, he, more than anyone else, was responsible for Ukraine's admission to IIASA.

Vladimir Mikhalevich was born in 1930 in Chernigov in the Ukrainian SSR. He attended Kiev State University and went on to earn a doctorate in physics and mathematics in 1967 from Moscow State University. In 1969 he was made a full professor. Later he was named a full member of the Ukrainian Academy of Sciences. In 1984 he was elected to the USSR Academy of Sciences. As a member of the Supreme Soviet he served in the Commission of Energy.

As a researcher he investigated many aspects of applied mathematics, including optimization techniques, decision science theory, and modeling of complex systems. At a time when it was not popular, he explored the use of computers in mathematical analysis. He supported young scientists who followed this direction; moreover, he encouraged other young scholars to pursue new lines of enquiry that diverged from his own.

His formal association with IIASA began in 1987, when he became Soviet representative on and chair of IIASA's Governing Council. He served in that post until 1992. It was a period of tumultuous change in Central and Eastern Europe, and he provided a steadying influence. Following the collapse of the Soviet Union, he led efforts to arrange Ukrainian representation at IIASA. In 1994 he rejoined the council as the first representative of Ukraine. On December 16 he died unexpectedly.

In June, at the next meeting of the IIASA Council, his former colleagues will consider a proposal to establish a **Vladimir S. Mikhalevich Scholarship**. The scholarship would be awarded for high achievement by a participant in the institute's annual Young Scientists Summer Program, a program he was exceptionally proud of.

INSIDE IIASA

RESEARCH GRANTS

Climate Change and Nigerian Agriculture

The Food and Agriculture Organization of the UN has given IIASA a grant to support a case study of the possible impact of climate change on agricultural production in Nigeria. A multi-layered national GIS-based land resource and agricultural production information system will be created using available data sets. Agro-ecological zones methodology developed at IIASA will be expanded and used in conjunction with the land resource information to assess the effects of climatic shifts on agro-ecological potential, agro-economic production capacity, land degradation, biodiversity, and other considerations. Similar methodology will also be used in a case study of Bangladesh. An earlier version was used in a recently completed study of Kenya.

Contact: *Günther Fischer*

Siberian Forest Resources

Industry Canada has awarded IIASA a grant to support an ongoing study of the sustainable development of Siberia's forest resources (see *Options* Winter '94).

Contact: *Sten Nilsson*

CONFERENCES

VOC Expert Panel Meeting

16–17 January, Laxenburg, Austria.

Eleven researchers and government scientists from Europe and Canada attended this workshop to discuss emissions of air pollutants, especially volatile organic compounds, from the petrochemical industry, organic chemical industry, and solvent use. The VOC panel is one of several expert panels established by the UN/ECE Task Force on Emission Inventories. The task force is a broad effort by the countries of the UN/ECE (the USA, Canada, and most countries of Europe) to develop a consistent, unified methodology for inventories of emissions of air pollutants. This workshop was cospon-

sored by AEA Technology, National Environmental Technology Centre, Culham, UK.

Contact: *Zbigniew Klimont*

Models of Evolutionary Change

20–22 January, Laxenburg, Austria.

Some 30 economists, mathematicians, and other researchers at this workshop discussed a range of issues related to the modeling of technological and economic change. Subjects included the common features of current models, the ways in which they "explain" certain empirical phenomena, and the fundamental building blocks at the core of evolutionary models.

Contact: *Giovanni Dosi*

Impediments to Exports in Small Transition Economies

27–28 January, Laxenburg, Austria.

Twelve economists from 10 countries discussed the setup of a new IIASA research effort involving national case studies of impediments to export growth in eight countries of Central and Eastern Europe.

Contact: *János Gács*

Global Water in the 21st Century

20–22 February, Laxenburg, Austria.

Seven experts discussed a wide range of issues with the objective of identifying alternative areas for future research at IIASA regarding freshwater resources. Three topics were identified. A followup meeting in June intends to produce a draft call for proposals to be reviewed by the institute's steering committee on global environmental change research.

Contact: *László Szomlyódy*

Rhine/Black Triangle Policy Comparisons

2–3 March, Laxenburg, Austria.

The purpose of this workshop was to discuss possible approaches for a comparison of environmental manage-

ment in the Ruhr of Germany and the district of Katowice, Poland. Some 15 researchers from both natural and social sciences discussed various aspects of the historical record and current state of pollution, remediation, and policies in both areas.

Contact: *Barnes Bierck*

International Financial Instruments for Environmental Investments in Central and Eastern Europe

23–24 March, Laxenburg, Austria.

This workshop brought together 50 representatives of environmental ministries and academics from Central and Eastern Europe, staff of international financial institutions and other organizations (World Bank, EBRD, EIB, EU, OECD), and bilateral aid donors. The purpose was to discuss the efficiency of international support for environmental investments in Central and Eastern Europe and ways to enhance international aid. The workshop recommendations will be incorporated in a report to the next European environment ministers meeting, to be held in Sofia in October. The workshop was cosponsored by the Austrian and British ministries of the environment.

Contact: *Ger Klaassen*

Economic Growth

26–28 March, Ottawa, Canada.

Thirty economists including 12 members of the network of IIASA's project on Technological and Economic Dynamics, met to discuss issues of long-term economic growth. The conference was cosponsored by the Canadian Institute for Advanced Research.

Contact: *Giovanni Dosi*

Modeling Land Use and Land Cover Change in Europe and Northern Asia

3–5 April, Laxenburg, Austria.

Some 30 scientists from northern Asia, Europe, and the USA met to discuss the direction of a new IIASA project on land use and land cover change. Areas of discussion included historical changes in land use in the study region, sectoral lessons from agriculture and forestry, socioeconomic drivers and interactions between human and natural systems, problems of modeling ecosystem and agricultural patterns, as well as issues of project integration.

Contact: *Günther Fischer*

Gopher Out, Web In

As of June 1, the IIASA gopher will be no more. Internet users can find all information that was on the gopher, and more, on IIASA's World Wide Web server:

<http://www.iiasa.ac.at/welcome.html>

Forthcoming Meetings

Sponsored or cosponsored by IIASA

May 11–16: Ecology and Evolution of Mutualism. Contact: *Karl Sigmund*

June 10–14: Expert Meeting on Population Estimates and Projections. In Cairo. Contact: *Hassan Musa Yousef*

June 12–17: Nonsmooth and Discontinuous Optimization and Applications. Contact: *Andrei Ruszczyński*

June 20–22: International Energy Workshop. Contact: *Leo Schrattenholzer*

June 27–29: Evolutionary Processes of Growth and Development—Histories and Theories. Contact: *Giovanni Dosi*

June 29–July 1: Impediments to Exports in Small Transition Economies. Contact: *János Gács*

July 3–5: Evaluation of Ukraine's GATT Membership and Alternatives. Contact: *Joe Peck*

July 13–15: Restructuring of Applied R&D in Russia. Contact: *János Gács*

July 16–20: Dynamics and Control Systems. In Sopron, Hungary. Contact: *Arkadii Kryazhimskii*

July 27–29: Test Run for Simulation-Gaming Exercise. Contact: *Edward Parson*

September 4–8: Advances in Methodology and Software in DSS. Contact: *Marek Makowski*

APPOINTMENTS

Full- and part-time

The following scientists have joined the new project on Land Use and Land Cover Change: **Akio Bito** (Japan), from the Department of Education at the Yamanashi University, Kofu. **Nikita Pismanchevski** (Russia), from the Foundation for Agrarian Development Research, Moscow. **Vladimir Stolbovoi** (Russia), from the Dokuchaev Soil Institute, Moscow. **Jelle van Minnen** (The Netherlands), from the Environmental Forecasting Bureau at the National Institute of Public Health

and Environmental Protection, Bilthoven, and **Mingcha Zhao** (People's Republic of China), from the Institute of Geography of the Chinese Academy of Sciences, Beijing.

Michael Apps (Canada), from the Northern Forestry Centre, of the Canadian Forestry Service, Edmonton, has joined the Forest Resources project.

Barnes Bierck (USA), from CDM International, Cambridge, Massachusetts, has joined the Long-Term Environmental Policy Planning project.

Walter Fontana (Italy), from the University of Vienna, and **Aija Leiponen** (Finland), from the Research Institute of the Finnish Economy, Espoo, have joined the Technological and Economic Dynamics project.

Daniel Perlmutter (USA), from the University of Pennsylvania, has joined IIASA as an Institute Scholar.

Warren Sanderson (USA), an IIASA alumnus from the State University of New York at Stony Brook, has rejoined the Population project.

Peter Zapfel (Austria), from the University of Economics and Business, Vienna, has joined the Transboundary Air Pollution project.

AWARDS

In March two IIASA scientists were honored by the International N.D. Kondratieff Foundation at a conference in St. Petersburg. **Cesare Marchetti** was awarded a silver medal for his work related to Kondratieff's ideas on economic cycles, and **Tibor Vaško** was given a Kondratieff memorial medal for his activities in the 1980s to support research on long waves.

In Memoriam T. Keith Glennan

First Head of the U.S. National Aeronautics and Space Administration and a valued supporter of IIASA during its formative years.

NEW PUBLICATIONS

The following book is now available from booksellers or from the publisher.

Output Decline in Eastern Europe: Unavoidable, External Influence or Homemade?

R. Holzmann, J. Gács, G. Winckler, editors. Kluwer, Dordrecht, The Netherlands. ISBN 0-7923-3285-7.

Reports

The following reports are now available for US \$10 each. For payment by Visa or Mastercard, please send the number of your credit card, its expiry date, and a copy of your signature to IIASA Publications. A complete publications list and ordering form is on the WWW at <http://www.iiasa.ac.at/>.

On Badly Behaved Dynamics: Some Applications of Generalized Urn Schemes to Technological and Economic Change.

G. Dosi, Y.M. Kaniovski. Reprinted from the *Journal of Evolutionary Economics*, Vol. 4, No.2, 1994.

Knowledge Distribution and Coordination in Organizations: On Some Social Aspects of the Exploitation vs Exploration Trade-off.

L. Marengo. Reprinted from the *Revue Internationale de Systemique* Vol.7, No.5, pp. 553-571, 1993

The Greenhouse Gas CH₄: Sources and Sinks, the Impact of Population Growth, Possible Interventions.

G. Heilig. Reprinted from *Population and Environment: A Journal of Interdisciplinary Studies* Vol.16, No.2, November 1994.

An Emission Inventory for the Central European Initiative 1988.

Z. Klimont, M. Amann, G. Klaassen, J. Cofala, F. Gyarfás, W. Schöpp. Reprinted from *Atmospheric Environment* Vol.28, No.2, pp. 235-246, 1994.

Options and Costs of Controlling Ammonia Emissions in Europe.

G. Klaassen. Reprinted from *European Review of Agricultural Economics* 21(1994):219-240.



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FURTHER INFORMATION

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