IIASA

# options

Fall/Winter '96

International Institute for Applied Systems Analysis

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## Literate Life Expectancy

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## EDITORIAL

A transition in directors always brings about change, and this one is no exception. However, the numerous changes IIASA is currently undergoing are not due primarily to my arrival, but for the most part to the severe financial situation the Institute faces. The failure of several National Member Organizations (NMO) to meet their financial obligations has put the Institute under great stress.

The dimensions of the Institute's problem can be gauged by the decrease in NMO support. According to the agreed scheme of financial contributions, NMOs should be providing 136 million Austrian schillings in 1997. This also is the level that should have been provided in 1996, but actual contributions fell far short. Based on estimates presented at the recent Council meeting, we anticipate that we will receive at most 90 million schillings in 1997. This decrease translates into a reduction of our research staff from about 1,000 person-months in 1995 to 600 person-months in 1997. A 40 percent reduction in research personnel means that we cannot expect to increase external support in the short term, because of reduced capacity to write proposals and reports.

*Laxenburg Castle - home of IIASA*

In order to protect our research program, my highest priority, I have instituted numerous cuts in our administrative and support services. These cuts do have a negative impact on our staff, but, to their great credit, all IIASA personnel affected have responded in a very positive fashion. So far, we have avoided layoffs; we are cutting the number of research workers by not renewing contracts and by not bringing new research personnel to IIASA. We also are undertaking a variety of revenue-enhancing measures, from exploring more profitable strategies for investing IIASA's capital to seeking increased direct funding of our research projects.

***Dr. Gordon J. MacDonald***
***IIASA Director***

Despite adversity, IIASA's staff, both scientific and support, are developing creative approaches to overcome the current problems, which we all hope are temporary. I can report that the Institute as a whole is working together to ensure that IIASA's research program, though diminished in scale, remains world class. My efforts in the coming years will be to maintain and enhance it, while at the same time meeting our financial obligations.

Both the Council meeting and the associated Intergovernmental Meeting in October included a frank and wide-ranging discussion of IIASA's financial difficulties. I believe that the Council, for perhaps the first time, came to grips with the seriousness of the situation. As a result, I am confident that the Council will play an increasing role in helping IIASA overcome the current financial shortfall and build a more secure foundation for future activities. We are working with the present NMOs to ensure that in the future they meet their financial obligations despite the economic difficulties faced by the supporting governments. One very positive signal is that as of January 1, 1997, Norway will join its Nordic neighbors, Sweden and Finland, as a member of IIASA. In the coming months, I hope to promote further increases in IIASA membership, thereby strengthening our research and financial base.

IIASA

In the longer term, IIASA must seek support that does not depend on the year-to-year vagaries of countries' financial well-being. I have begun preliminary contacts with private foundations and industry associations with the goal of raising an endowment

***The Institute as a whole is working together to ensure that IIASA's research program, though diminished in scale, remains world class***

fund that could be used to make up failures of NMOs to pay their agreed-upon contributions. In order to succeed, an endowment drive will require the support of all of IIASA's alumni and friends. I will be calling upon many of you for ideas and assistance, and would welcome any suggestions you might have.

The problems that I have outlined are serious, but I am convinced that they can be solved by the many components of the Institute — staff, Council members, government representatives, and other supporters — working together. In the coming issues of Options, I will present the progress we are making and outline ways in which the many friends of IIASA can help to achieve the Institute's goals.

*Dr. Gordon J. MacDonald*

# Introducing Gordon MacDonald

**In August, Gordon J. MacDonald began his term as the seventh director of IIASA. His experience in research and policy advising complements IIASA's strategy to conduct scientific studies on critical issues of global environmental, economic and social change. Prior to joining IIASA, Gordon MacDonald was Professor of International Relations at the University of California at San Diego. He also worked as Chief Scientist and Vice President of The MITRE Corporation (USA), an independent, non-profit systems engineering and research organization, and as Executive Vice President at the Institute for Defense Analyses in Washington, D.C. He has served on the US President's Council on Environmental Quality and chaired numerous scientific committees for the White House, various federal agencies and the US National Academy of Sciences. In addition, he has led numerous interdisciplinary efforts for the US government, the private sector and academia on issues of the environment, global change and US national security policy.**

**Gordon MacDonald received his A.B. (summa cum laude), A.M. and Ph.D. in geophysics from Harvard University.**

# Research Updates

## Baltic Sea Pollution Controls in Russia and the Baltic States

The Baltic is one of the most severely polluted water bodies of the world. Alexei Roginko of IIASA's Project on Implementation and Effectiveness of International Environmental Commitments (IEC) has researched how Russia and the Baltic states — Estonia, Latvia and Lithuania — have implemented their international commitments to clean up the Baltic Sea. Russia, especially St. Petersburg, is a major source of water pollution that flows into the eastern Baltic. Roginko's research is one of several case studies in which IEC examines the effects of the transition to a market economy on compliance with international environmental commitments.

*St. Petersburg, Russia, on the Neva River, which flows into the Baltic Sea.*

Roginko's study has found that implementation of pollution control in Russia and in the Baltic States has been predominantly coincidental, mostly due to drastic decreases in industrial and agricultural production. However, improved wastewater treatment has markedly contributed to implementation in some cases. For instance, untreated water discharges from St. Petersburg have decreased by nearly half since 1990. And in the Baltic states, municipal plans to reduce pollution loads at all priority hot spots are at an advanced stage or under implementation.

Results from this IEC case study indicate that pollution loads have been declining at a much slower rate compared to industrial production, and if it were not for a tremendous economic collapse, pollution levels would have most likely increased rather than fallen during the first half of the 1990s.

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## Modeling Uncertainty in Multi-agent Systems with INFOGEN

With collaborators Mario Bonatti and Alexei Gaivoronski from ITALTEL in Milano, Italy, researchers in the newly formed Risk, Modeling and Policy (RMP) Project have created a prototype simulation system, INFOGEN, and completed first applications. The information industry was chosen for the first case study as an example of an economic system undergoing rapid technological and structural change that presents challenges not fully addressed by conventional economic modeling.

INFOrmation economy modeling through aGENt programming (INFOGEN) simulates the evolution of the economy. The methodology draws on advances in operations research, simulation, optimization, economic modeling and computer science. The goal was to find approaches for treating fluctuations and uncertainty of the economic environment, bounded rationality of economic agents, and the extensive variety and complexity of dynamic interrelations between different agents (enterprises and businesses, network providers, consumers, regulatory agencies) and the strategies they use.

Depending on the type and set of strategies adopted by producers of new products in the information industry (i.e., mobile telephones, Internet services, etc.), INFOGEN revealed how a system may tend to an equilibrium in which some producers will procure market shares, while other producers will disappear. The results confirmed that INFOGEN can be used for simulating a wide range of complex systems such as financial markets.

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## Russian Policy Makers and IIASA Forestry Researchers Meet in Moscow

Although IIASA's new activity on sustainable boreal forest resources has replaced the previous project on forest resources, environment and socio-economic development of Siberia, the focus remains on the sustainable development of the Russian forest sector.

Due to their size and composition, Russian forests possess extremely high environmental and economic importance for Russia and for the global climate and markets. Based on the unique comprehensive data collected and analytical studies completed in the earlier project, the new IIASA activity is poised to formulate implementable policies for the Russian forest sector. In order to ensure that this IIASA activity proceeds effectively, a meeting with high-level Russian participants was held in mid-November.

At the meeting, Russian officials and collaborators identified the major policy issues from their persepective and IIASA scholars presented results achieved in their study thus far. Based on these two components, a formal working plan for the policy portion of the IIASA study was prepared and presented. The results, in the form of policy options to encourage sustainable socio-economic development, will be available for use by Russian policy makers as agreed at the meeting.

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# The power of exports



**Rising from a subordinate role under central planning, exports of goods and services now battle old and new obstacles to lead economic recovery and expansion in emerging markets throughout Central and Eastern Europe.**

International trade is experiencing a renaissance in the small transition economies of Central and Eastern Europe (STEs). For decades, trade was guided by political considerations. This is no longer the case. Today, it is being revived under completely new conditions and consumer preferences.

During economic restructuring, policy makers soon recognized that good export performance was necessary for general economic progress, especially for small countries. Recent policies to stabilize the economy have limited national demands for goods and services; therefore, STEs had to increase exports progressively to generate perpetual economic growth. That is not as easy as it sounds. Although exports have momentum that gives hope for continued strong economic growth, they still face obstacles that impede the smooth functioning of sending products out of a country.

What these obstacles are and how to overcome them is the topic of a two-year study performed by researchers in IIASA's Economic Transition and Integration Project, together with a network of local colleagues in the STEs. Led by IIASA's János Gács and Richard Cooper, the international team of scholars conducted country, topical and enterprise case studies to explore the impediments to exports that small transition economies face once the initial systemic changes and the switch to Western markets have taken place. Studies were prepared for eight STEs: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Romania, Slovakia, and Slovenia. In some cases, local researchers contributed what are probably the first studies in these countries about the exporting behavior of national enterprises.

The results indicate that adjustments at the enterprise level and in microeconomic policies (activities of government that alter domestic resource allocation) influence export performance more than macroeconomic state intervention of total output, employment, or the like. The study will be described in its entirety in a book scheduled to be off press in early 1997. This article is a preview of some of the key findings.

## The Problem

The more goods produced for export, the greater the contribution to an expansion of domestic output or economic growth. Also, market standards are best transmitted by the conditions the exporters meet in the global marketplace. Thus, export performance of STEs is of compelling importance and any problems inhibiting the export process must be resolved.

The liberalization of trade was a key element of economic reform. Theoretically, it meant that exports and all the activities that enhance them would be free of unnecessary bureaucratic government control.

Practically, things are not so straightforward. The relevant difficulties are the focus of the IIASA study.

### About the Sample

Each country in the study began its political and economic transformation between 1989 and 1991. In Romania, Bulgaria, and Latvia, liberation of exports followed with only some delay. In some cases, export expansion could not keep pace with import growth (see Table 1). In addition, exports have been quite volatile, showing a wide variation of growth rates among individual countries.

The numbers in Table 1 reveal the increasing importance of exports for these STEs, primarily due to the collapse of demand at home and in the former Council for Mutual Economic Assistance (CMEA) markets. In new states (the successor countries of Yugoslavia, Czechoslovakia, and the Soviet Union) former intrastate deliveries became interstate trade. The 30 percent average growth in the sample countries dwarfs the average export expansion in Organization for Economic Cooperation and Development (OECD) countries (19 percent) and in developing countries (23 percent). Table 1 also shows that the ratio of exports to the gross domestic product (GDP — the total value of goods and services produced by an economy) is about 40 percent for most of the countries in 1994, implying a comparatively high level of openness to trade.

Of the three countries that existed before 1990, only Hungary showed an increase in exports from 1989 to 1994. Exports contracted in Romania and Bulgaria, but for different reasons; neither had attained 1989 levels by 1995. However, all STEs experienced trade recovery problems due to the recession in world trade in 1993, the consequences of establishing independence, and the rapid rearrangement of trade with former Soviet Union (FSU) republics.

The distribution of exports by region presented in Table 2 shows that the European Union (EU) has become the dominant export market. This importance increased since key STE trading partners — Austria, Finland and Sweden — joined the EU in 1995. Trade among the original members of the former CMEA has fallen substantially.

Despite the opening of Western markets, the expansion of STE exports has remained greatly constrained. Under the new conditions, enterprises had to take much unprecedented initiative and were forced to reorganize exports in terms of target countries, commodity composition, quality, terms of delivery, and related services.

### Nagging impediments to exports include ...

The principal finding of the IIASA study is that once the first phase of macrostabilization is complete, success of exports from STEs will largely depend on enterprise-level factors.

### ... some macroeconomic issues,

The country studies revealed that several macroeconomic factors, especially the development of exchange rates and the real interest rate, remain among the most important determinants of export performance.

Although exchange rate regimes by the mid-1990s showed considerable variation (from fixed to flexible) across the STEs, one trend was consistent among all of them: successful stabilization policies resulted in a process of continuous real appreciation of currencies. But this meant that STE exporting enterprises started to face higher costs at home.

The country studies point to an erosion of the "exchange rate edge" for exporting enterprises, leading to a deterioration of the cost competitiveness of exports. The enterprises most affected were those in countries where the real wage was already high or was allowed to increase (Hungary and Slovenia), or where no substantial devaluation preceded the period of continuous real appreciation (Hungary).

In most STEs, stabilization is still a high priority, so policies will hardly change. The governments hope that cost competitiveness, labor productivity improvements, or structural changes will diminish the role of exchange rates in export competitiveness.

A unanimous finding of the IIASA research is that STE exporters lack financing comparable to that available for competitors in the world market, primarily because of high domestic interest rates. In the Czech Republic, Hungary, Slovenia, Romania, Bulgaria, and Latvia, the real lending rates exceeded 16 percent. But STE governments have not considered high lend- →



**Table 1. The importance of exports in selected small transition economies**

| | Exports in 1994 (bln. US$) | CMEA share in exports in 1989 (%) | Former CMEA share in exports in 1994 (%) | Export/GDP in 1994 (% at market exchange rate) | Export growth 1994 - 1995 (% of US$ values) | Trade balance in 1994 (% of exports) |
|---|---|---|---|---|---|---|
| Bulgaria | 4.16 | 62 | 16 | 41 | 32.5 | - 4 |
| Czech R. | 14.29 | 47 | 31 | 40 | 30.6 | - 3 |
| Estonia | 1.30 | 96 | 43 | 56 | 133.5 | - 27 |
| Hungary | 10.78 | 41 | 22 | 26 | 46.0 | - 36 |
| Latvia | 0.97 | 95 | 54 | 43 | 14.7 | - 9 |
| Romania | 6.15 | 25 | 14 | 21 | 53.9 | - 16 |
| Slovakia | 6.73 | 47 | 47 | 54 | 48.2 | + 2 |
| Slovenia | 6.81 | 19 | 9 | 48 | 36.2 | - 6 |

ing rates a binding constraint on exports. This adds to the problems of weak commercial financing infrastructure in these economies.

In the Czech Republic, Slovenia, and Hungary, the high rates coupled with increased stability and the relaxation of capital controls led to increased financial inflow, further appreciating the currencies.

### ... demand-side impediments,

IIASA's investigation of all eight countries found external or demand-side impediments to be much weaker than supply-side or internal barriers to exports. Nevertheless, the external barriers are a persistent obstacle.

STE enterprise managers find impediments for their exports, although trade barriers in the EU, European Free Trade Association (EFTA), and Central European Free Trade Agreement (CEFTA) countries have recently decreased substantially. STEs face not only old antidumping regulations, but also new licensing requirements in the EU and new quotas. In addition, the EU's association process requires the introduction of specific technical standards, forcing STE firms to make investments if they want to participate in the new markets.

There are also limitations to the markets of the former CMEA partners. In the former Soviet states, for example, the country studies suggest that lack of financial and trade infrastructure, uncertainties about transport and payments, lack of exchange risk sharing, frequently changing regulations, remnants of centralized state trading, discrimination against certain countries (Estonia and Latvia), and the need to pay bribes and deal with corrupt state representatives all restrict exports.

The high costs of entry into Western markets and the difficulties of establishing a distribution and marketing network and building a reputation are due primarily to problems within STEs, especially the enterprises' lack of experience. Except for Slovenia and Hungary, STE producers did not have any experience in foreign trading, especially trade outside the CMEA. Now individual firms must do that which was solely the business of secretive state agencies.

Some of the deficiencies seem fairly basic: lack of knowledge of foreign languages, foreign regulations and trade practices, and marketing skills. These impediments will disappear with time or by establishing certain business structures, such as joint ventures with foreign partners, by subcontracting where the foreign partner markets the final product; or by choosing a step-by-step product development and marketing and trade strategy.

### ... and supply-side impediments.

On the supply side, impediments to exports include restrictive domestic conditions, enterprise inexperience, lack of government support, increasing production costs, and the high cost of credit and risk.

The country studies give ample evidence of STE institutions that do not function properly and conditions that restrict activities of domestic enterprises. Poor financial conditions, uncertainty in privatization, removal of key linkages in the domestic market, lack of credit, and poorly functioning financial intermediation limit enterprise operations.

A heritage of separating domestic enterprises from foreign markets has made many STE firms unprepared to meet the needs of export markets. There is a lack of information and often ignorance regarding foreign standards, regulations, and customer requirements.

The state is not really helping. To improve their chances of joining the Western trade community, STE governments want to develop non-interfering reputations regarding trade and consequently do little to support exports directly. Authorities do not perform even those roles expected and acceptable in any market economy. Tax and tariff systems also inhibit rather than support exports. And, after quickly dismantling the former centralized systems, governments are indecisive with respect to permanent trade missions abroad.

The country studies also indicate the presence of relatively high and consistently increasing production and export costs (i.e., wages, energy, credit, and risk). Successful exports make long-awaited wage rises possible, so the STEs' comparative advantage is evaporating. In addition, certain input factors, like energy, will no longer be available at lower, subsidized prices. Already today, Slovenia and Hungary have lost much subcontracting busi-

**Table 2. Distribution of exports in 1994 by region (in percent)**

| | European Union | Germany | Former CMEA | Russia | Partners in "new trade"[a] |
|---|---|---|---|---|---|
| Bulgaria | 45.5 | 14.0 | 16.2 | 10.5 | ..... |
| Czech Republic | 50.9 | 34.7 | 30.5[b] | 2.8 | 18.4 |
| Estonia | 20.7 | 7.6 | 43.0[b] | 21.5 | 41.3 |
| Hungary | 48.9 | 28.0 | 21.9 | 6.6 | ..... |
| Latvia | 27.9 | 10.5 | 53.7[b] | 28.1 | 51.5 |
| Romania | 46.0 | 16.0 | 13.5 | 3.4 | ..... |
| Slovakia | 39.9 | 25.0 | 17.1[b] | 3.8 | 42.4 |
| Slovenia | 59.2 | 30.3 | 9.1 | 4.3 | 15.0 |

[a] Trade with countries that belonged to the same former large country; that is, the successor states of the USSR, CSFR, and Yugoslavia

[b] Including "new trade"

*Source:* IMF Direction of Trade Statistics

ness to lower wage STEs like Romania and Slovakia.

Risks of trade — commercial or political — stem from uncertainties concerning the exchange rate, payment by the buyer, and the disappearance of or damage to goods on the way to the customer. These are especially high regarding exports to FSU republics. Institutions offering special credits for exporters and those providing export insurance or guarantee schemes are either still in their infancy or are missing entirely, so STE exporters are especially cautious about making new deals.

## Typical Aspects of Enterprise Adjustment

A major part of the IIASA study documents the diverse forms of adjustments STE enterprises have implemented to deal with impediments to exports and to respond to new incentives for developing export activities.

The main response of enterprises to new trade conditions was to reorganize production processes to improve the efficiency of operations. Many of today's enterprises are downsizing and shedding unnecessary machinery, equipment, inventory, real estate, and labor — hoarded as a sign of success in the past — due to declining demand.

Some STEs are reporting increases in investments by exporters; these investments are focused on quality improvements and technological development, not on capacity expansion. A fast turnaround and vigorous restructuring can only be expected when foreign strategic investors are involved. The foreign connection can assist in marketing, clarifying and setting quality and standardization, and operating and exporting with limited working capital.

In the forthcoming IIASA book, an entire chapter is devoted to the changing relationship of foreign direct investment (FDI) and exports of STEs. Evidence from three countries shows that STEs are approaching or in the phase of the "FDI cycle" in which penetration of FDI into STEs leads to positive trade and spillover effects. Investments are gradually moving to manufacturing sectors that are most promising for exports.

The days of defaulting on liabilities or bribing customs officials are essentially over. The future, already recognized by many STE enterprises, is in inter-enterprise cooperation such as industry associations. Latvia and Slovenia are examples of nations where this new attitude has been converted into action. This indicates that firms no longer expect their governments to provide everything they need.

## Epilogue

In summary, results of IIASA's country studies underline the important role that exports played in the STEs' recent recovery (measured by GDP growth, 1993-1995) as shown in *Figure 1*. Perpetual export growth is crucial for the sustainability of growth in STEs. Like 1995, 1996 shows a decline in the growth rate of world demand for exports; thus it becomes more difficult for the STEs to maintain their export performance. For this reason, eliminating impediments to exports, identified and analyzed in the forthcoming IIASA book "Trade Growth in Transition Economies: Export Impediments for Central and Eastern Europe," is crucial for the future development of STEs. The crux will lie in the ability of STE governments to nurture export development while maintaining a basically intervention-free approach to international trade.

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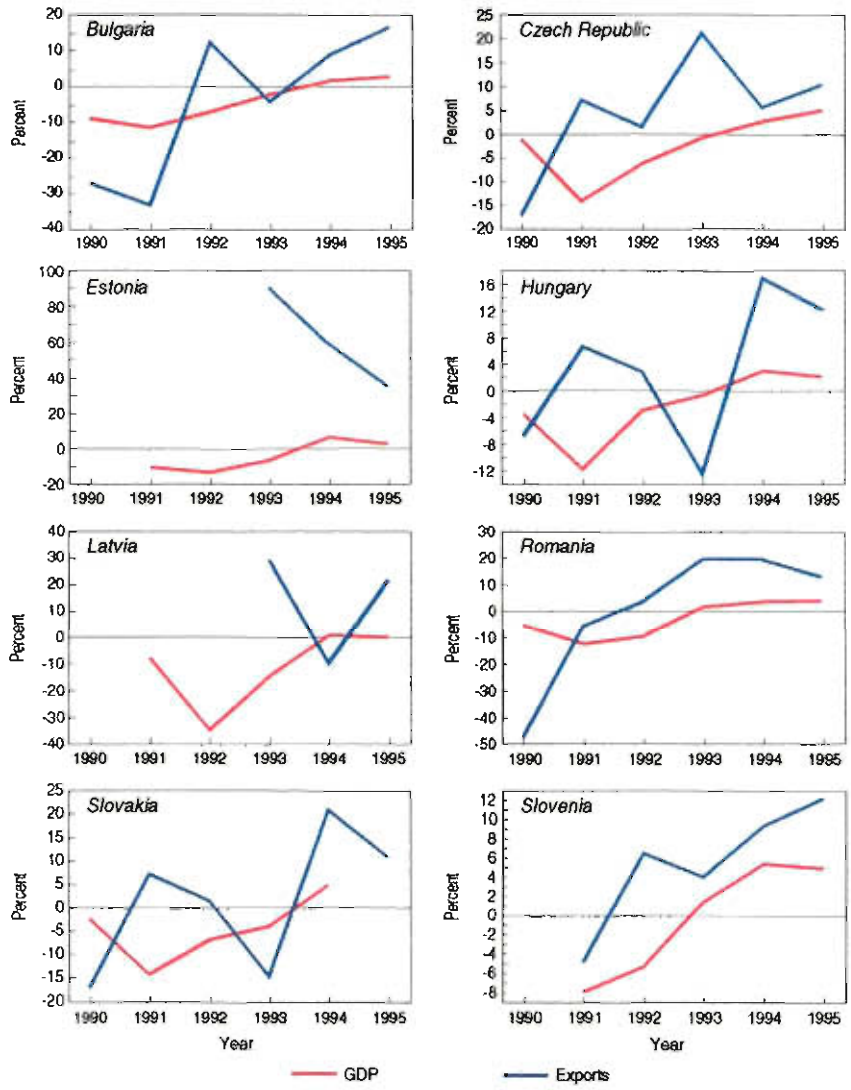
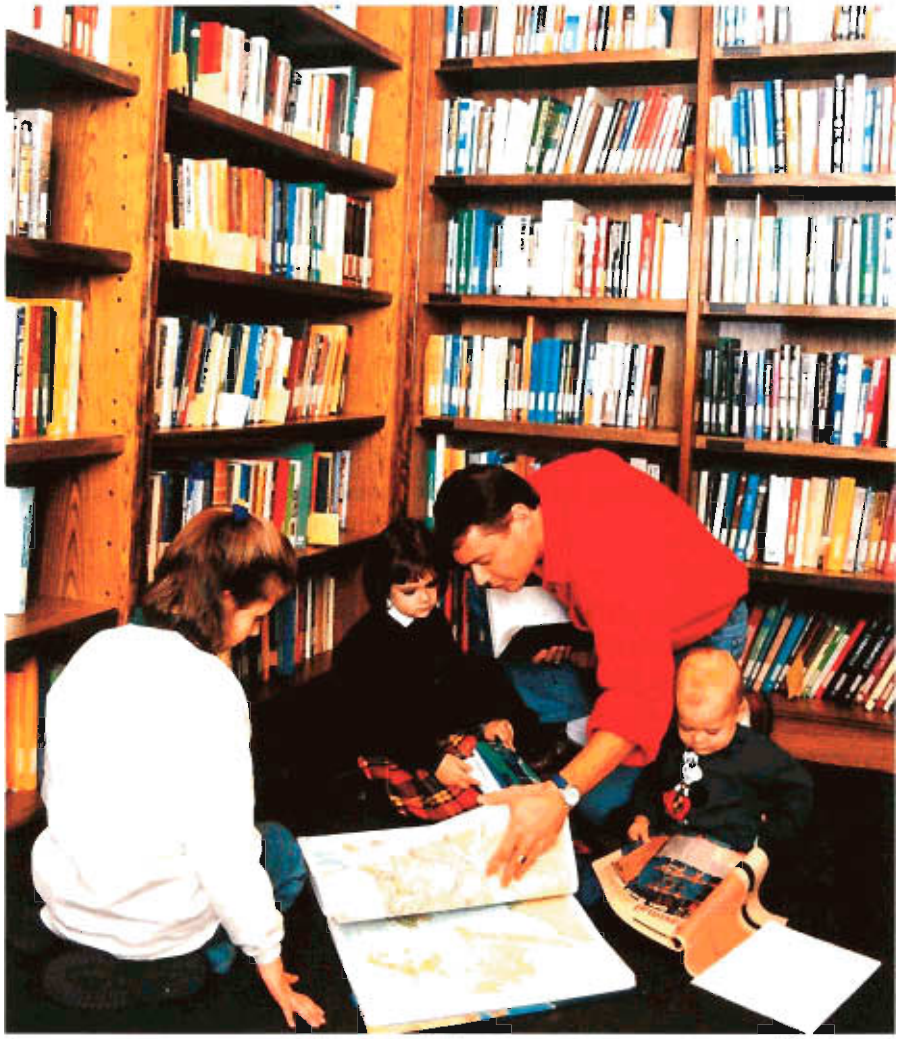



*Figure 1: Real growth of GDP and exports (previous year = 0).*



# Litc
# Exp

***Indicator developed at IIASA and now applied in Mexico shows education and health drive social development.***

The problem of finding ways to improve human quality of life without compromising conditions for future generations has confronted scientists and statesmen since the days of ancient Greece. Overall scientific advancement has been substantial since those early times, but the search for a single number that comprehensively measures a population's quality of life has been unsuccessful to date. With such a number, scientists could make meaningful comparisons upon which decision makers could base well-founded social policies.

In an effort to contribute to and advance the discussions on social development, research scholars at IIASA have developed a new indicator — literate life expectancy (LLE) — and have promising results from first applications.

## What is LLE?

Literate life expectancy is an indicator of social development created by Wolfgang Lutz, Leader of the Population Project (POP) at IIASA. Already the subject of population, development and environment analyses by the Project, Mexico was a natural choice for testing the refined LLE concept. POP Scholar Sergio Medina, IIASA's *Luis Donaldo Colosio Fellow*[4], finds large differences of up to several decades in literate life that suggest significant inequalities in social development. Using the LLE underlines the importance of education and health policy in determining social development.

This new indicator is based on clearly observable individual characteristics and combines in one number the two basic aspects of social development: life expectancy, one of the most comprehensive and undisputed indicators for quality of life, and literacy, an indicator of empowerment. These two factors are directly influenced by government policies and programs on health and education.

"In the Mexican case," says Medina, "the country's twofold agenda to support economic growth and promote sustainable development strategies in rural and urban areas provides an opportunity for a more equitable and fair society." Medina adds, "This might be achieved by emphasizing health and education in the policy-making procedure."

## Mexican LLE: Revealing and Pinpointing Inequalities

Medina used the LLE to assess social development in Mexico at the national, regional, and state levels. Nationwide, the study showed that Mexico's population had an average of 52 years literate life expectancy at birth in 1990. In contrast, however, the analyses reveal a wide difference in LLE of people living in cities compared to those living in the countryside. Women born in urban centers, for example, could expect a literate life almost 20 years longer than that of their rural counterparts, that is, 57 years compared to only 39 years of LLE respectively (*Figure 1*). The differences between urban and rural men were less drastic. Urban men had 56 years of LLE at birth, while rural men had 44 years.

Using the new indicator clearly illuminates differences in social development at the regional level. In the study, analysis at the regional level showed great disparities between the northern and southern regions of Mexico. In the latter, for example, men had 16 and women as much as 26

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fewer years of literate life expectancy than their counterparts in northwest Mexico. The regional differences portray Mexico as a nation with a strong north-south gradient in social development, and are clearly illustrated in *Figures 2* and *3*.

A comparison of *Figures 2* and *3* reveals that women from the north had higher LLE than men from any region of Mexico, but female LLE in the lagging regions of the south was far below male LLE anywhere in the country. Mexico's three southern regions have the lowest LLE at birth for both men and women.

Medina applied the LLE indicator to the state level and identified a positive correlation between urbanization and levels of social development. The indicator reflected both the advantages of highly urbanized centers such as the Federal District (Mexico City and surroundings) and the state of Nuevo Leon and the disadvantages of such states as Chiapas, Oaxaca, and Guerrero (in the south) due to impoverished social conditions. For example, the average LLE at birth of people in Nuevo Leon is already 18 years longer than in Oaxaca. The difference proved to be even larger when comparing the Federal District and Chiapas. In 1990, women and men from the Federal District had 30 and 20 years, respectively, more LLE at birth than those from the state of Chiapas.

The LLE indicator is a simple, comprehensive measure of social development for various geographic areas or subpopulations and has the advantage over other indices in that it is an absolute number that refers directly to years of life. Measured over time, LLE records rates of change in literacy and life expectancy. The results can be used for social policy formulation. If extended to include different mortality and educational scenarios based on alternative policy assumptions, LLE could be used to anticipate future social development. This would provide guidance in determining educational and health conditions required by lagging countries, regions, or states to catch up to the levels of those already more advanced.

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[1] In 1994, IIASA announced the establishment of a fellowship in memory of Luis Donaldo Colosio, the Mexican presidential candidate assassinated on 23 March 1994. The yearly fellowship allows one young Mexican researcher to spend from six to twelve months at IIASA working with scholars from around the world, as Colosio himself did. For information on how to apply for the fellowship, contact Shari Jandl (e-mail: *jandl@iiasa.ac.at*).

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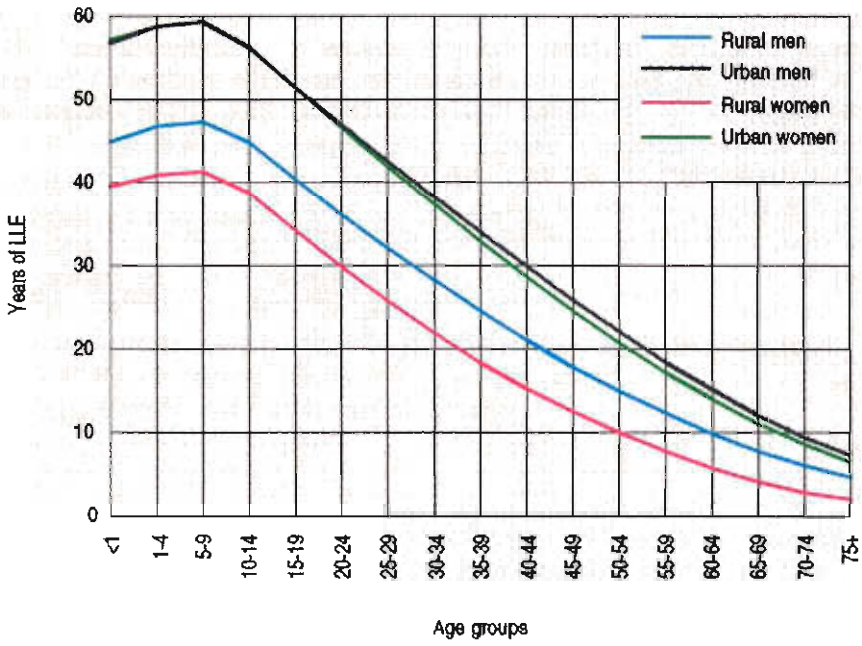



*Figure 1: Literate life expectancy at birth in Mexico by sex and place of residence, 1990.*

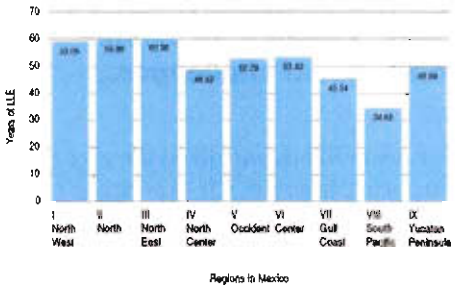



*Figure 2: Literate life expectancy of women at birth by region in Mexico, 1990.*

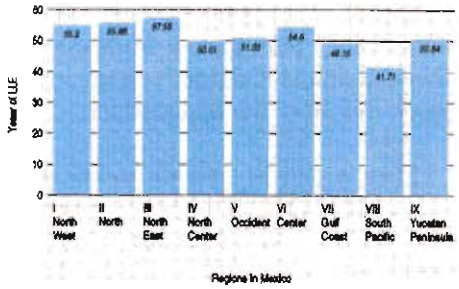



*Figure 3: Literate life expectancy of men at birth by region in Mexico, 1990.*



# Investing in the Future

***Set within the backdrop of an international, interdisciplinary research institute, IIASA's Young Scientists Summer Program prepares young scholars for tomorrow's global challenges.***

Patricia Kandelaars liked the idea of enhancing her research experience by working at an international research institute, so when the opportunity arose to spend a summer at IIASA she enthusiastically pursued it. The doctoral candidate, who is studying environmental economics in the Netherlands, participated in IIASA's Young Scientists Summer Program and says it met all of her expectations.

"I like to discuss research and work with other people, and IIASA is a very good place to do that," says Kandelaars, adding, "I learned a lot about other projects and research fields."

Each summer, young scientists like Kandelaars participate in IIASA's Young Scientists Summer Program (YSSP). Some 60 advanced students whose interests parallel IIASA's commitment to sustainability and the human dimensions of global change are invited to perform research during the summer in an atmosphere conducive to international and interdisciplinary research. Along with the research, participants present seminars on their work and prepare written reports.

"IIASA's Young Scientists Summer Program offers a truly unique experience," says Program Dean Joanne Linnerooth-Bayer, explaining. "No other program in the world offers this type of research opportunity in the setting that IIASA provides. In this environment, YSSP participants broaden their horizons."

Linnerooth-Bayer says the YSSP is organized to maximize participants' exposure to the international, interdisciplinary aspects of IIASA's research. For example, the midsummer workshop where they present their research to fellow participants and IIASA staff gives the young scholars a glimpse of the breadth of research conducted here. "We encourage participants to look beyond the projects they are assigned to," explains Linnerooth-Bayer.

"The most appealing aspects of the program are the international working environment and the variety of research topics," says Kandelaars, adding that she also enjoyed the openness of the people and the working atmosphere. "I have learned a lot from my supervisors at IIASA, as well as from my discussions with other young people in the program," she says.

Kandelaars and 14 other YSSP participants were nominated for IIASA's yearly Peccei and Mikhalevich awards that honor outstanding YSSP work. An overview of the nominees' research

follows. See the box for details on the awards and the winners.

### A Win-Win Situation

IIASA senior researchers consistently give the YSSP high marks for both the quality of researchers it attracts and the work the young scholars produce.

"The YSSP participants I have worked with have made major contributions to our research activities," says Sten Nilsson, leader of IIASA's Forest Resources Project. Nilsson says the key to a successful YSSP experience is to plan the participants' activities well before they arrive. With a clear work plan and expectations defined ahead of time, YSSP participants feel more satisfaction with the work they've completed by the end of the summer, says Nilsson.

One of the Project's tasks is to determine reliable actual and potential fixation rates of greenhouse gases (carbon and methane) in the Siberian forest. Two YSSP participants from Finland contributed to the task by researching the carbon balance of forest ecosystems in Siberia. **Jari Liski** of the University of Helsinki developed a method for calculating the carbon balance of Russian forest soils and found that, for most of the ecoregions in Russia, it is important to include the special features of permafrost soils and peatlands. Such soils are very common in Russia and play a particularly significant role in the carbon balance of forest soils. **Timo Karjalainen** of the University of Joensuu developed a method to assess the carbon balance of tree biomass on the Siberian ecoregion level. This includes estimates of the initial amount of carbon and looks at its dynamics and future developments.

Nilsson says that the work done by Jari and Timo helped the Project to design its Carbon Budget Model for the Siberian forest. "Through their test run on one of the forest's ecoregions, we were able to conclude that the model can be applied to a full-scale analysis of the forests of Siberia and Russia," says Nilsson.

Wolfgang Lutz, leader of IIASA's Population Project, echoes Nilsson's sentiments about the YSSP.

"Overall, the YSSP has contributed positively to both the Population Project and the Institute," he says. "We get new ideas from the YSSP participants," he adds, explaining that in recent years two YSSP scholars associated with the Project have stayed on as full-time researchers.

IIASA's Population Project studies the dynamics of population change as well as the causes and effects of population trends in the context of global change. This year, the Project embarked on a new case study using its Population-Development-Environment (PDE) approach on the Yucatán Peninsula in Mexico. Two YSSP researchers contributed to the study this summer. **Patricia Kandelaars**, of the Vrije Universiteit, the Netherlands, researched the effects of increasing tourism in the Yucatán Peninsula. As part of her research she developed a dynamic simulation model that integrates the interactions among tourism, environment, population and the economy.

***"IIASA's Young Scientists Summer Program offers a truly unique experience."***

***— Program Dean Joanne Linnerooth-Bayer***

**Lauren Hale**, of Harvard University, USA, performed a study to quantitatively describe the issues surrounding the past, present and future of the Yucatán fishing industry, particularly with regard to changing population and environment. Hale developed a simulation model that depicts the dynamics of the fish, shrimp and lobster populations, while also monitoring price, demand and supply trajectories. The most important part of the model is the policy playground that allows policy makers to explore various options — from closed seasons to quotas — in an interactive manner.

IIASA's Project on Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia was able to incorporate results from its YSSP participants into its geographic information system and data bases. These tools will allow for various biophysical assessments of the dynamics of natural vegetation, land productivity, land degradation, and hydrology, and for the analysis of socio-demographic factors. **Stephen Sitch**, of the University of Lund, Sweden, assisted with the implementation and strengthening of the LUC-BIOME model. This model simulates the distribution and functioning of natural vegetation types in relation to a set of environmental conditions and is frequently used within the scientific and policy world. **Shuying Leng**, of the Chinese Academy of Sciences, focused on current land-use structure in China, the magnitude and kind of land-use changes that have occurred during the last decades, and the main driving forces of past land-use changes. **Plamena Gaydarova**, with the Bulgarian Ministry of Environment, researched the response of natural vegetation to acidification for the regions studied within the Project.

Researchers in IIASA's Methodology of Decision Analysis Project included several YSSP participants in the Project's ongoing efforts to explore, develop and implement decision support methods for the applied research problem areas at IIASA. Typical problem classes include land-use and land-cover change, tropospheric ozone, acid rain, and environmental consequences of energy use. An ongoing activity concerns modeling imprecision and uncertainty by fuzzy logic. **Mina Ryoke**, of Osaka University, Japan, collaborated with both the Methodology of Decision Analysis Project and IIASA's Transboundary Air Pollution Project to apply "Fuzzy Rule Generation" to the development of simplified ozone models for selected locations in Europe. Results show that the fuzzy models predict ozone concentrations better than traditional regression models do. **Tobias Canz** continued the energy-modeling work he had been performing at Stuttgart University, Germany, by evaluating the methodology of Fuzzy Linear →

Programming (FLP) with respect to the support that it can offer for the decision-making process in energy system planning under uncertainty. FLP is a methodology for addressing parameter and decision uncertainties in model-based decision support.

IIASA's Project on Systems Analysis of Technological and Economic Dynamics develops models to better understand technological and economic change. To that end, the Project focuses on four issues: evolutionary processes of growth and transitions between growth regimes; evolutionary models of economic change; organizational learning; and industrial evolution. Project researchers supervised YSSP participant **Bauke Visser**, of the European University Institute, Italy, in his efforts to address the diversification of production by multiproduct firms. Visser developed a model of multiproduct markets where firms can decide whether to diversify their production, conditional on information available and their memory of experiences. **Ulla Seppälä**, of the Helsinki University of Technology, Finland, addressed complicated cases of location theory involving multiple facilities. She applied the evolutionary model for location of economic facilities to the analysis of demonopolization of alcohol sales in Finland. **Vladimir Borisov**, of the Moscow Technological Institute, Russia, developed the mathematical foundations to generalize a previous endogenous growth model developed by IIASA's Project on Systems Analysis of Technological and Economic Dynamics, the Dynamic Systems Project and the Austrian Institute of Economic Research. The model analyzes how two countries enhance their productivity in domestic product development by "tapping" each other's knowledge stock. In this case, the ability to assimilate knowledge of external origin ("absorptive capacity") depends on a country's own cumulated investment in R&D.

YSSP participants in IIASA's Dynamic Systems Project saw firsthand how researchers use mathematical models to study the nature of changes in large-scale economic and environmental systems. In the field of environmental modeling, the Project has been identifying model procedures to develop a methodology that addresses problems of forecasting and regulating environmental systems. YSSP participant **Oscar De Feo**, of the Fondazione ENI Enrico Mattei, Italy, analyzed the relationship between nutrient supply and food yield of ecosystems. He discovered that mean yields are maximized when ecosystems are chaotic. "This general result is consistent with other studies supporting the idea that living systems evolve toward the edge of chaos through optimization, adaptation and learning," says Sergio Rinaldi, Oscar's YSSP supervisor.

***"The most appealing aspects of the program are the international working environment and the variety of research topics."***

***— YSSP participant Patricia Kandelaars***

Researchers with IIASA's Project on Optimization Under Uncertainty offered YSSP participants a look at how to develop practical modeling techniques that help scholars explicitly incorporate uncertainty into research. **Kristoffer Hägglöff** of Linköping University, Sweden, applied the Project's new techniques of solving decision problems under uncertainty (the stochastic branch and bound method) to a real-world problem involving the Willamette River in Oregon, USA, and analyzed the performance of the method. **Mikhail Davidson** of Moscow State University, Russia, worked on numerical methods for solving very large optimization problems. He continued the research initiated jointly by three IIASA Projects — Optimization Under Uncertainty, Dynamic Systems, and Risk Uncertainty and Complexity — aimed at aggregating constraints into a small number of conditions. Mikhail introduced new techniques to boost the efficiency and reliability of this joint research.

## *A Key to the Future*

Since its inception nearly 20 years ago, the YSSP has trained more than 800 young researchers. YSSP alumni have gone on to become successful researchers and policy makers. Some return to IIASA to continue their research.

But even more important than the training IIASA provides is the lasting impressions left on these young scholars by their international, interdisciplinary experience. "The main comment we hear from YSSP alumni is how the interdisciplinary aspect of IIASA's research really broadens their perspectives," says Linnerooth-Bayer, adding that their YSSP experience often prompts many young scholars to modify their research directions.

In addition, their stay at IIASA helps the YSSP scholars establish an international network which, in today's global society, is of utmost importance, according to Linnerooth-Bayer. IIASA nurtures interactions not only between YSSP participants and researchers, but also among the young scholars themselves. Program Coordinator Margaret Traber plans social activities that range from a welcome party to weekend excursions.

In exchange for the enriching research and social atmosphere it provides, IIASA ends up with a corps of young diplomats eager to spread the word about the YSSP and the Institute itself. "I meet with most YSSP participants before they leave and ask them if they would recommend the program to a friend; I've never received a 'no' for an answer!" says Linnerooth-Bayer. Kandelaars reflects this sentiment: "I must say that I and the other YSSP participants worked very hard, but it certainly was worth the effort. I am very glad I came to IIASA and I highly recommend the YSSP."

Contact:
*Margaret Traber,*
*YSSP Coordinator*
E-mail: *traber@iiasa.ac.at*
URL: *http://www.iiasa.ac.at/docs/Admin/YSP/IIASA_YSSP.html*

# Peccei and Mikhalevich Scholarship Winners

Each year, two or three outstanding YSSP participants are selected to receive awards that allow them to return to IIASA for an additional three months and continue their research. One of the awards, the Peccei Scholarship, is named after Aurelio Peccei, a founder of IIASA and former president of the Club of Rome, to recognize Peccei's contributions toward understanding global problems. The Mikhalevich Scholarship was established in memory of Academician Vladimir Mikhalevich, a former Soviet Union and subsequently Ukrainian representative to IIASA. Mikhalevich was Academician of the Ukrainian and Russian Academies of Sciences and Professor at the Kiev University.

This year the Peccei Award has been given to **Patricia Kandelaars** of the Netherlands and **Lauren Hale** of the United States; both worked with IIASA's Population Project. Patricia is a doctoral student at the Vrije Universiteit in Amsterdam, majoring in environmental economics. Lauren is working on a bachelor of arts degree in environmental science and public policy at Harvard University.

This year's Mikhalevich Award winner is **Oscar De Feo**, who performed research with IIASA's Dynamic Systems Project. Oscar is working at Fondazione ENI Enrico Mattei, Milan, Italy, on natural resources management.

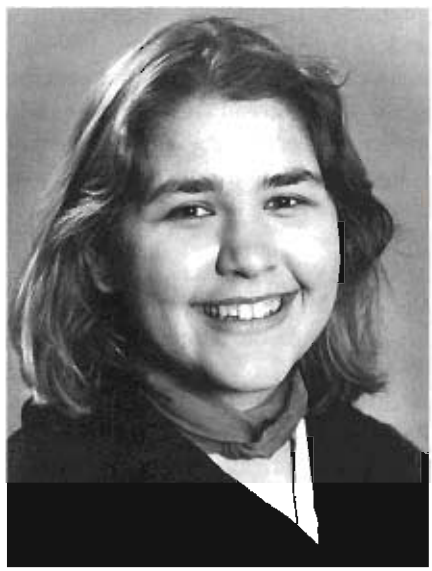
In view of the large number of exceptionally good candidates this year, the selection committee also awarded two Honorable Mentions:

Plamena Gaydarova, Bulgarian Ministry of Environment, for her work in the Modeling Land-Use and Land-Cover Changes in Europe and Northern Asia Project;

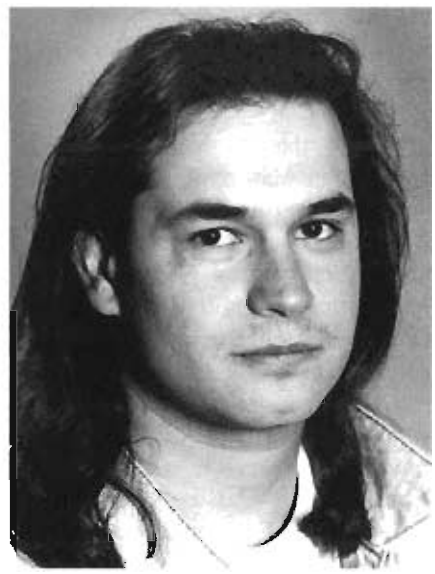
Vladimir Borisov, Moscow Technological Institute, Russia, for his work in the Dynamic Systems Project and the Systems Analysis of Technological and Economic Dynamics Project.



*Patricia Kandelaars*



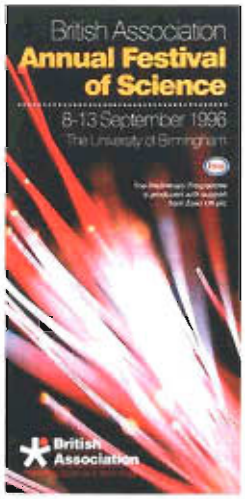
*Lauren Hale*



*Oscar De Feo*

**IIASA is now accepting applications for its 1997 Young Scientists Summer Program (YSSP); the deadline is February 7, 1997. Applicants should be pre-doctoral candidates whose interests correspond to ongoing research at IIASA. For more information, visit the YSSP web site at**
**http://www.iiasa.ac.at/docs/Admin/YSP/IIASA_YSSP.html**
**or contact: Margaret Traber, YSSP Coordinator, IIASA, A-2361 Laxenburg, Austria**

**Tel: +43 2236 807 448**
**Fax: +43 2236 71313**
**E-Mail: traber@iiasa.ac.at**




***John Lanchbery, Jill Jäger and Owen Greene represented IIASA at the British Association's Annual Festival of Science.***

# External Relations

## *IIASA Conference Focuses on International Environmental Agreements*

IIASA scientists shared their wealth of knowledge about international environmental agreement processes with members of the British scientific community and the general public at the British Association's 1996 Annual Festival of Science in Birmingham, UK.

During the day-long, IIASA-sponsored John Mason Conference, titled "Making International Environmental Agreements Effective: The Role of Science and Review Processes," IIASA representatives Jill Jäger, Owen Greene and John Lanchbery presented research results on agreements to protect the environment and the conservation of flora and fauna. Jäger also presented research from IIASA's Transboundary Air Pollution Project on the use of integrated assessment models in the international negotiations for reducing sulfur emissions in Europe.

"In the 1990s, IIASA's research has played an increasingly important role in developing policy responses to global and regional issues," explained Jäger, IIASA's Deputy Director and Conference Chairperson. "Scientific research at IIASA demonstrates the ways in which interdisciplinary, multinational research projects can be used to support policy development," she said.

A prime example of such research was the development of the 'Regional Air Pollution Information and Simulation' (RAINS) model by IIASA's Transboundary Air Pollution Project. Results from the integrated assessment model were used as a basis for the negotiations of the Second Sulfur Protocol. Jäger talked about how the interaction between IIASA researchers and negotiators helped the development of a model targeted to a specific problem. "Without results from this model, agreement on ambitious emissions reduction targets could not have been achieved," said Jäger.

The IIASA John Mason Conference also highlighted IIASA research that has focused on compliance issues affecting environmental agreements. According to Owen Greene, a Research Scholar with IIASA's Project on Implementation and Effectiveness of International Environmental Commitments (IEC), and a faculty member of the University of Bradford, UK, it is most important to examine how science and expert knowledge can contribute to improving the effectiveness of environmental agreements. Greene presented research on "Knowledge, Implementation and Compliance: Lessons from Agreements to Prevent Ozone Depletion, Sea Pollution and Climate Change." Summing up the main points of his research, Greene said, "In practice, international environmental commitments are often not implemented properly," explaining that there are clearly a number of reasons for this. "Non-compliance can occur because of a combined lack of political will, knowledge and capacity," he said, adding that the results of research at IIASA on a wide range of international environmental agreements could be used to improve the design of future agreements to make them more effective.

Compliance and effectiveness may be further enhanced when implementation review systems are built into agreements, said John Lanchbery, a Research Scholar also with IIASA's IEC Project and with the Verification Technology Information Centre (VERTIC), London. In a talk titled "The Role of Science and Review Processes in International Agreements Concerning the Preservation of Flora and Fauna," Lanchbery explained, "The increased knowledge about the operation of agreements that review systems provide may help to build confidence in treaties which may, in turn, lead to increased compliance and effectiveness."

"The John Mason Conference gave IIASA a unique opportunity to demonstrate its breadth of scientific research," said Jäger, adding that such events are important both for providing information to those not directly involved in IIASA networks as well as eliciting feedback on IIASA's work. ■

# Meetings

***Informal Meeting of Governmental Representatives***
***30 October, Laxenburg, Austria***

Governmental representatives from IIASA's member countries — including Norway, who will officially join the Institute as of January 1997 — were invited by the Austrian Ministry of Science, Transport and the Arts to an informal follow-up meeting on the Intergovernmental Meeting of November 1994 (see *Options* Winter '94). At the 1994 meeting, participants had formulated recommendations and guidelines for IIASA's future development. Also present at the 1996 meeting were observers from non-member countries including China, Denmark, and Mexico, as well as the European Union.

IIASA Director Gordon MacDonald presented the Institute's current research strengths and outlined future research initiatives. The subsequent discussion and supportive statements focused on developments since the November 1994 meeting, future membership in IIASA and schemes of financial contributions. Participants agreed that IIASA has made substantial progress on the November 1994 recommendations. As a result, the work of IIASA has received increasing international recognition and plays an expanding role in policy development on global issues

***Climate Change: Cataclysmic Risk and Fairness***
***20-22 July, Laxenburg, Austria***

Participants at this interdisciplinary workshop, co-sponsored by IIASA's Risk, Uncertainty and Complexity Project, Resources for the Future (USA), the Norwegian Research Centre in Organization and Management, and the International Academy of the Environment (Switzerland), examined the possibilities of cataclysmic changes related to anthropogenic climate change and the related equity issues. The meeting's goal was to explore novel and interdisciplinary analytical approaches to the climate-change issue by combining the knowledge of climate-change experts with the insights of the risk community and the social science community.
Contact: *Joanne Linnerooth-Bayer*
E-mail: *bayer@iiasa.ac.at*

***Methodology and Tools for Model Based Decision Support: A Review of Collaboration Between Poland and IIASA***
***5-6 September, Laxenburg, Austria***

Researchers from IIASA's Methodology of Decision Analysis Project met with more than 30 researchers from eight countries to review and summarize long-term, collaborative, decision support activities between Polish researchers and several IIASA projects. There were 18 scientific presentations summarizing various state-of-the-art tools for model-based decision support. Abstracts of the presentations, as well as lists and software, are available upon request.
Contact: *Marek Makowski*
E-mail: *marek@iiasa.ac.at*

***Advances in Methodology and Software in DSS***
***8-10 September, Laxenburg, Austria***

Fifty-two participants from 13 countries participated in this yearly workshop sponsored by IIASA's Methodology of Decision Analysis Project, in cooperation with the Japan Institute for Systems Research. The workshop focuses on decision support systems and allows for the exchange of recent developments in methods, tools and applications. This year's workshop included 31 scientific presentations and several software demonstrations.
Contact: *Marek Makowski*
E-mail: *marek@iiasa.ac.at*

***Neuro-Computing and Remote Sensing***
***11-12 September, Laxenburg, Austria***

In conjunction with the Institute of Economic and Social Geography at the Economic University of Vienna, IIASA's Methodology of Decision Analysis Project has been researching the potentials of neural nets for interpreting data obtained by remote sensing techniques. Workshop participants reviewed and evaluated the project and designed plans for future research.
Contact: *Marek Makowski*
E-mail: *marek@iiasa.ac.at*

# Appointments

**Andreas Beyer** (Germany), a graduate student at the University of Osnabrück, Institute for Environmental Systems Research, has joined IIASA's Transboundary Air Pollution Project as a research assistant to work on the RAINS-Europe Manual.

**Willemijn Tuinstra** (Netherlands), a recent graduate of Wageningen Agricultural University, the Netherlands, has joined IIASA's Transboundary Air Pollution Project to study the use of integrated assessment models in international environmental policy development.

# Awards

Peter de Jánosi, former Director of IIASA, was awarded the Austrian Cross of Honor for Science and the Arts, First Class (Österreichisches Ehrenkreuz für Wissenschaft und Kunst, Erster Klasse), from the Austrian Federal Ministry of Science, Transport and the Arts. The award, which is Austria's highest medal for scientists and science administrators, recognized Dr. de Jánosi's achievements as IIASA Director. In particular, he was honored for his efforts to integrate Austria's research institutions and researchers into IIASA's research program. He also fostered close collaboration with Austrian government agencies, recognizing the importance of Austria as IIASA's host country.

***Peter de Jànosi accepts his award from Raoul Kneucker, Secretary General of the Austrian Federal Ministry of Science, Transport and the Arts.***

→ **Yoichi Kaya**, Vice Chairman of the IIASA Council, was named the first guest professor of the new Research Department of Energy Systems at Nagoya University, Japan. Professor Kaya teaches Electrical Engineering at the University of Tokyo, Japan.

*Yoichi Kaya*



# Project News

IIASA's **Water Resources Project** ended this summer with the completion of a three-year study to develop innovative and affordable strategies for water quality management for river basins in Central and Eastern Europe. The results are being summarized in a policy-oriented book due for publication next year.

In August, the *Optimization Under Uncertainty* and the *Risk, Policy and Complexity* projects were merged into one activity called **Risk, Modeling and Policy**. Joanne Linnerooth-Bayer and Iouri Ermoliev will serve as its co-leaders. In 1997, this project also will include some of the activities previously performed by the Methodology of Decision Analysis Project, which was discontinued at the end of 1996.

Although IIASA's new activity on **Sustainable Boreal Forest Resources** has replaced the previous project on *Forest Resources, Environment and Socioeconomic Development of Siberia*, the focus remains on the sustainable development of the Russian forest sector. Sten Nilsson now leads a reorganized research team to formulate implementable policies for the Russian forest sector (see *Research Updates*, page 5).

# Hot Off the Press

For ordering information contact: Eryl Maedel (E-mail: *maedel@iiasa.ac.at*) IIASA Publications Department


### *Acid Rain and Environmental Degradation: The Economics of Emission Trading*

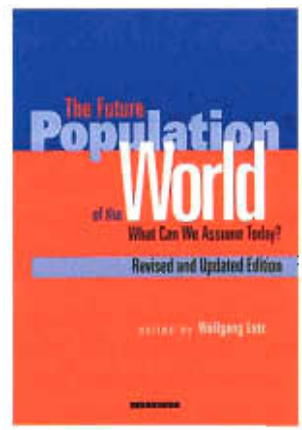
While a member of IIASA's Transboundary Air Pollution Project, Ger Klaassen produced this unique volume that sets the tone for future discussions in Europe on transboundary pollution control. The book was published by Edward Elgar Publishing Limited (ISBN 1 85898 489 0) in association with IIASA.

"Acid Rain and Environmental Degradation" is a thorough state-of-the-art survey of theory and applications of trading emission permits. Part of the book examines the European acid rain issue and discusses how it can be addressed by means of tradable permits, with particular reference to sulfur emissions. This volume offers items of interest for the academic economist, the environmentalist and, perhaps most importantly, the policy maker.

### *The Future Population of the World: What Can We Assume Today?*

A new, revised edition of "The Future Population of the World: What Can We Assume Today?", containing new population projections by IIASA's Population Project (see *Options* Summer '96), has been published by Earthscan (ISBN 1 85383 349 5), in association with IIASA.

The new edition, edited by Project Leader Wolfgang Lutz, contains a thorough assessment of what we can reasonably assume today about population development over the next 50 to 100 years. Its seventeen chapters, written by some of the best-known experts in the international demographic community, systematically address the main components of future population growth, focusing on future fertility and mortality in developing countries and on intercontinental migration. In addition, the book presents the first fully probabilistic world population projections for the 21st century ever published.




*To order the book, contact:* Earthscan Publications Ltd., 120 Pentonville Road, London N1 9JN UK. Attention: Andrew Young. Telephone: 0044 171 278 0433 Fax: 0044 171 278 1142 E-mail: *earthinfo@earthscan.co.uk*

# Selected Grants and Contracts

### *Acidification and Ozone*

IIASA's *Transboundary Air Pollution (TAP) Project* has received a major grant from **Directorate-General XI (Environment, Nuclear Safety, and Civil Protection)** and **General and International Affairs**

**DGXI/A2** of the Commission of the European Communities. The funds will be used over two years for the research on cost-effective control of acidification and ground-level ozone in Europe. Based on collaboration with research institutes in Norway, France, Netherlands and Sweden, the results will be delivered directly to the Commission for policy development.

### *Air Quality Management in China*

Within the scope of its RAINS-Asia work, IIASA's *Transboundary Air Pollution Project* has received funding from the **World Bank** (Washington, USA) for in-depth investigation of air quality management in China.

### *Population and Education*

The **Directorate-General IB/A5**, also known as the 'Technical Unit Mediterranean', of the Commission of the European Communities, has contributed financial support for studies on population and education prospects in the Western Mediterranean Region by IIASA's *Population Project*.

### *Integrated Assessment*

Under its Programme for Environment and Climate — 1994-1998 — Topic 4, the **Directorate-General XII/D5 (Science, Research and Development)** of the Commission of the European Communities has committed funds to IIASA's *Environmentally Compatible Energy Strategies Project* for work on integrated assessment modeling of global environment policies and decision patterns. The grant is for three years (1996-1998).

### *Global Environmental Assessment*

The **National Science Foundation** (NSF) in Washington, D.C., USA, is awarding considerable funds to six research centers and teams of scientists to study the human dimensions of global change. The charge is to investigate what the results are — both good and bad — when humans and their environment interact. IIASA participates in two of these six teams.

One group, led by the Harvard University Committee on the Environment, has received funds for five years to support studies of societal responses to large, long-term global environmental change. Pre-doctoral and post-doctoral fellows will spend time at IIASA as well as at Harvard University to examine how assessments of global change interact with policy making, politics and negotiations, and how to improve the process.

The NSF also awarded financial support for five years to the National Bureau of Economic Research, to work with the Yale Center for Global Change and IIASA. This group will organize conferences and workshops designed to encourage domestic and international cooperative research on human dimensions of global change.

### *Impacts of Global Warming on Agriculture*

The **Japan Institute of System Research** in Tokyo, Japan, is funding the development of a model for the impacts of global warming on agriculture in the Asian-Pacific Region (Phase II) by IIASA's *Methodology of Decision Analysis Project*.

# What's New on the IIASA Web

IIASA's **Web Team** has introduced a new style and layout for the Institute's home page (*http://www.iiasa.ac.at*). The items in the column on the left (This Week, What's New, Coming Events and General Information) keep you up-to-date with what is happening on a daily basis at the Institute (see back cover of this *Options* issue).

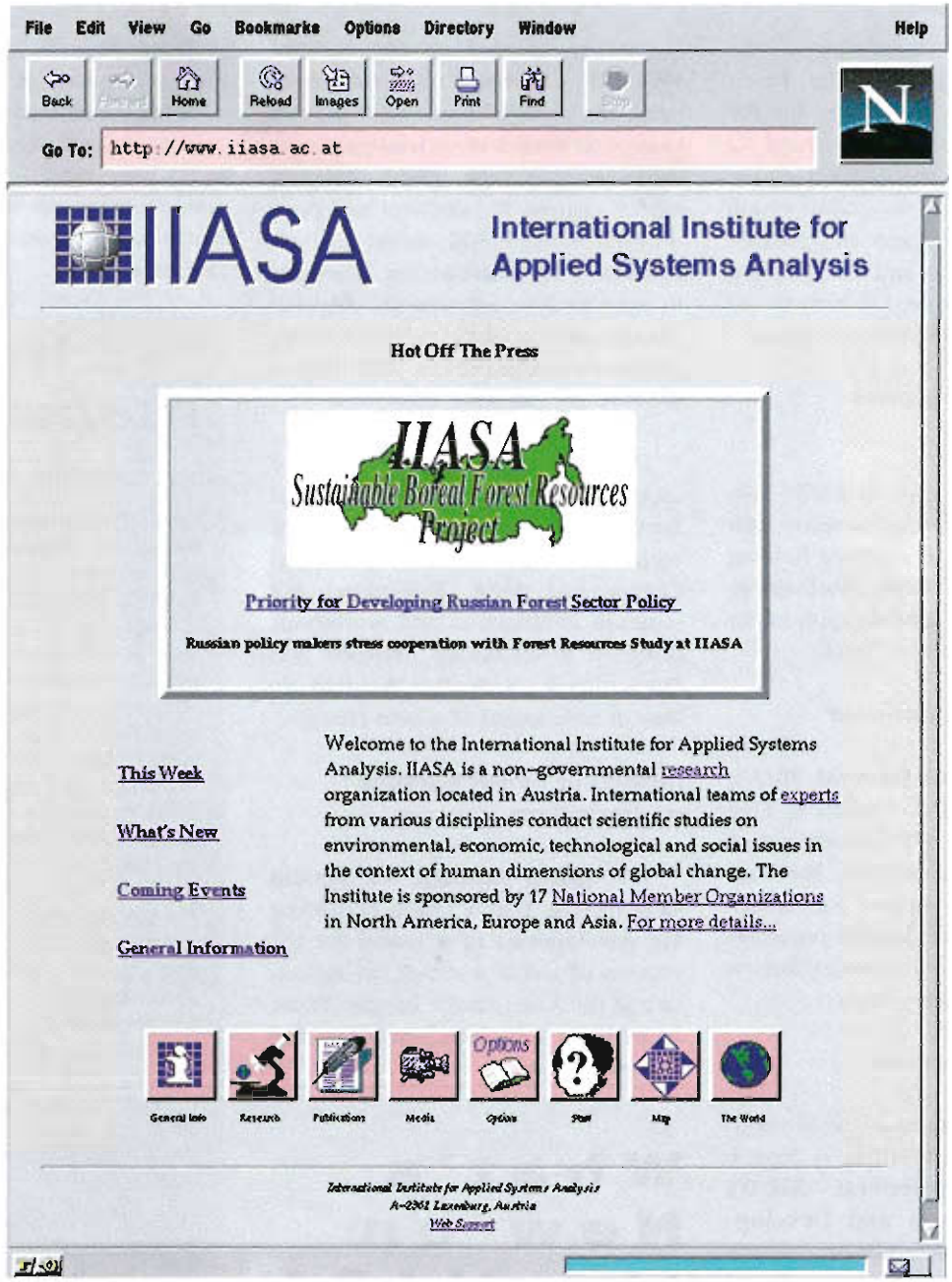
The icons at the bottom of the page guide you to interesting information about the Institute including: descriptions of research projects; a staff search facility; a catalogue of IIASA publications and on-line interim reports of ongoing research (formerly known as working papers); the *Options* magazine; a summary of IIASA's media-oriented materials and events; and a map to take you efficiently to the information you need. The Web Team (*web@iiasa.ac.at*) welcomes all comments and questions from our visitors and users. ■

# In Memoriam

On September 16, 1996, McGeorge Bundy, one of the central creators of IIASA, died in Boston, Massachusetts, following a heart attack. He was 77. Bundy was special assistant for international security affairs to Presidents Kennedy and Johnson. He was president of the Ford Foundation when he was appointed by President Johnson in December 1966 to explore the possibility of establishing an international center for studies of the common problems of advanced societies. For the next three years he worked closely with Jermen Gvishiani of the Soviet Union and Solly Zuckerman of the United Kingdom to create IIASA. In 1970, Bundy passed the baton to National Academy of Sciences President Philip Handler, who served as the principal U.S. negotiator until IIASA's formal founding in October 1972.

***McGeorge Bundy — Instrumental in IIASA's Founding***

## IIASA Web Update




## IIASA National Member Organizations

**Austria**
The Austrian Academy of Sciences
**Bulgaria**
The National Committee for Applied Systems Analysis and Management
**Canada**
The Canadian Committee for IIASA
**Czech Republic**
The Czech Committee for IIASA
**Finland**
The Finnish Committee for IIASA
**Germany**
The Association for the Advancement of IIASA
**Hungary**
The Hungarian Committee for Applied Systems Analysis
**Japan**
The Japan Committee for IIASA
**Kazakstan**
The National Academy of Sciences
**Netherlands**
The Netherlands Organization for Scientific Research (NWO)
**Norway**
(as of January 1, 1997)
Research Council of Norway
**Poland**
The Polish Academy of Sciences
**Russia**
The Russian Academy of Sciences
**Slovak Republic**
The Slovak Committee for IIASA
**Sweden**
The Swedish Council for Planning and Coordination of Research (FRN)
**Ukraine**
The Ukrainian Academy of Sciences
**United States of America**
The American Academy of Arts and Sciences

IIASA International Institute for Applied Systems Analysis