IIASA Mission

IIASA’s mission is to provide insight and guidance to policymakers worldwide by finding solutions to global and universal problems through applied systems analysis in order to improve human and social wellbeing and to protect the environment.

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From IIASA’s Chairman and Director

The transition to IIASA’s strategy for 2011–2020, research advances, and capacity building were the main accomplishments of 2010. As part of IIASA’s move to a more focused and policy relevant research agenda, IIASA developed the framework for the Institute’s new research plan and consulted widely with our National Member Organizations (NMOs) via a series of external workshops. Following this, we drafted the 2011–2015 research plan, which was approved in principle by IIASA’s Governing Council in November 2010. The accession to IIASA in early 2011 of the leading scientific institutions of the dynamic developing countries of Brazil and Malaysia, which brings the number of our NMOs to 19, was in many respects due to the attractiveness of the research topics on our new agenda (page 26).

RESEARCH

IIASA’s work is underpinned by high-quality science and 2010 saw the Institute’s researchers have their most successful year to date in terms of scientific publishing with 137 articles published in peer-reviewed journals and citations of IIASA’s work reaching a new high of 3,717 (page 10). The quality research combined with IIASA’s focus on global problem areas makes our work of increasing relevance to policymakers. For example, IIASA’s research feeds into the work of numerous international organizations from the World Bank to the Intergovernmental Panel on Climate Change (IPCC). In addition to briefing UN Secretary-General Ban Ki-moon personally on scientific topics, IIASA has contributed to the Secretary-General’s Advisory Group on Energy and Climate Change and was pleased to welcome him to the Institute in September—the first-ever visit to IIASA by a UN Secretary-General (page 14).

There were far too many achievements in 2010 to list them all in this short statement or even in the entire Annual Report, therefore we highlight a few in each of the research areas of IIASA’s new strategy:

ENERGY AND CLIMATE CHANGE Nature, in its 11 February issue, published information about the new scenario framework for climate change research and assessment. IIASA headed the international team developing the “Representative Concentration Pathways,” expected to optimize the research process for the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Research (IPCC) to be published in 2013–2014. Nine IIASA scientists are among the current list of Lead Authors (LA) and Review Editors (RE) selected to contribute to AR5 and the Synthesis Report. The IIASA Council Chair, several Council Members, and 42 GEA authors have also been selected as LAs or REs. In 2010 IIASA extended its GAINS (Greenhouse gas—Air pollution INteractions and Synergies) model to include short-term climate forcers such as black carbon, methane, and tropospheric ozone (page 19). Findings from the model have underpinned ongoing international studies including the UNEP Black Carbon Assessment and the Arctic Council’s Assessment of Emissions and Mitigation Options for Black Carbon. Related work by IIASA and an international team of researchers and published in Nature Geoscience revealed that reducing airborne carbon particles and curbing emissions of other short-lived climate forcers would “buy time” to reduce longer-lived greenhouse gas emissions. Large parts of IIASA’s energy and climate change research contribute to the Global Energy Assessment (GEA) which is hosted at IIASA and will publish its results in 2011. GEA aims to identify strategies and options for addressing the major global energy-related challenges (page 22).

FOOD AND WATER IIASA demographers and forestry experts contributed to a special issue of the journal Philosophical Transactions of the Royal Society B, examining long-term food supply trends. Another study
on assessing global nitrogen flows in cropland led by IIASA and the Beijing Forestry University showed that about 80 percent of African countries are confronted with nitrogen stress or scarcity, while two-fifths of nitrogen used in agriculture is lost to ecosystems. IIASA and the Food and Agriculture Organization of the United Nations completed their third global assessment of land resources using the agro-ecological zones (AEZ) methodology in 2010. The new comprehensive global AEZ (GAEZ) information enables rational land-use planning on the basis of an inventory of land resources and evaluation of biophysical limitations and production potentials of land (page 18). In 2010 IIASA improved and developed new methods to examine the future ecology and evolution of exploited fish stocks (page 19).

POVERTY AND EQUITY IIASA’s ongoing work into how countries can better prepare for natural disasters continued in 2010. Dramatic research by IIASA and partners, published in PNAS, showed that without urgent international financial assistance to help least developed countries adapt to climate-related extreme events before 2030, large-scale impacts on human development and the environment in these countries will occur (page 21). IIASA further developed research linking demography, education, health, and economic growth. One notable study revealed that education trumps income in reducing mortality in developing countries (page 21).

CROSSCUTTING RESEARCH Population change is one of the key drivers of global change and cuts across the research areas studied at the Institute. IIASA began a new partnership with the Vienna Institute of Demography (VID), and the Vienna University of Economics and Business to form the Wittgenstein Centre for Demography and Global Human Capital. This aims to become the world’s leading center on demographic analysis of the development of human resources and their impact on society and the economy. IIASA’s expertise in demography continued to develop in 2010 with several notable studies including research published in PNAS. The article argued changes in population, including aging and urbanization, could significantly affect global emissions of carbon dioxide and global change in general over the next 40 years.

CAPACITY BUILDING In 2010, 51 young scientists from 21 countries participated in IIASA’s annual Young Scientists Summer Program (YSSP); Elisabeth Wetterlund and Carl Salk won the 2010 Peccei and Mikhalevich Awards for their outstanding participation (page 16). It was also announced that the Russian economist Petr Aven, president of Russia’s Alfa-Bank, had created the Petr Aven Fellowship to fund a YSSP scholar for each of the next 10 years. Petr Aven will support one student each year from Russia or a developing country that is not an IIASA member. This was part of IIASA’s new annual fundraising campaign to support young scientists from developing countries, where funding would otherwise not be available (page 32). Nuno Bento from Portugal and Xiaojie Chen from China were awarded IIASA’s 2010 postdoctoral scholarships (page 29). We continue to work with our NMOs to find new ways to enhance IIASA’s capacity building activities, including short courses, regional seminars and workshops. The January 2011 research planning meeting in Cape Town, South Africa, generated many additional ideas for capacity building, including a regional young scientist program supported by IIASA researchers.

EVENTS Events both at IIASA and abroad continue to be central to presenting the Institute’s work. For example, at a side event at the XXIII World Congress of the International Union of Forest Research Organizations in Seoul, Korea, IIASA forestry scientists discussed the crucial role of forests in maintaining Earth’s ecosystems, as well as the tools needed for advanced integrated forest management. And in December IIASA ecologists held Speciation 2010: First European Conference on Speciation Research.

AWARDS Prestigious international awards were conferred on: Norman Neureiter, Chairman of IIASA’s Endowment Fund; Co-president of the Global Energy Assessment José Goldemberg; Vice-Chair and former Chair of the IIASA Council, Simon Levin; IIASA Council Chairman Peter Lemke; and IIASA researcher Professor Laixiang Sun. And particularly noteworthy was the award to Wolfgang Lutz leader of IIASA’s World Population Program who won the 2010 Wittgenstein Award—known as the “Austro-Nobel Prize.”

CONCLUDING REMARKS The financial health of the Institute is sound due to the re-confirmation of Japan’s membership and the addition of two new members. While the external research funding has leveled off, the growth in membership will establish a sound balance between external and internal funds. We would like to thank all staff at IIASA for maintaining the high standards of research, collaboration, and hard work that characterize the Institute, especially in a year when such important transitions needed to be made.
Following a year of preparation in 2010, IIASA embarked on a new direction in 2011 with the launch of its new strategic plan. The strategy will see the Institute focus its expertise and experience on three major problems: (1) Energy and Climate Change; (2) Food and Water; and (3) Poverty and Equity (see pages 26–27).

Our world is changing, with fundamental shifts occurring in economic and political power, growing global environmental problems, and potentially explosive social conflicts. The new strategy places IIASA in a position to apply advanced systems analysis to achieve a better understanding of the complex, interdependent challenges that countries now face.

It is not the first time that IIASA’s direction has been shaped by a changing world. In 1972 IIASA was established to use science to build bridges across the Cold War divide. It was part of the detente, or thawing of relations, between the USA and the Soviet Union and benefited from the support of both US President Lyndon Johnson and USSR Premier Alexey Kosygin. IIASA’s research agenda was to focus on the growing global problems then facing advanced industrial societies.

When the Cold War ended, the Institute broadened its mandate, from being a tool for East–West cooperation to assuming a truly global focus. Today IIASA’s member countries account for over half the world’s population and include the world’s four largest economies.

The annual report focuses on the Institute’s work and accomplishments in 2010 but begins by putting these activities in context with a summary of IIASA’s highlights from 1972 to 2009. Uniting all these achievements are IIASA’s core characteristics: scientific excellence, an interdisciplinary approach, independence from both governments and countries, and the relevance of its research for policymakers. This combination makes IIASA a unique and truly international research institute.

More detailed information is available on IIASA’s Web site: www.iiasa.ac.at
1972
At the height of the Cold War, 12 nations from the East and West meet in London to sign the charter establishing IIASA in the neutral setting of Austria.

1974
George Dantzig, winner of the US National Medal of Science, is joined at IIASA by Nobel Prize laureates Tjalling Koopmans (USA) and Leonid Kantorovich (USSR) to expand IIASA’s study of advanced systems science and methodology.

1975
A new research field, Adaptive Ecosystem Policy and Management, is founded at IIASA based on results of a study relating forest conditions to pest propagation that has implications for forest management policy throughout North America and Scandinavia.

1976
IIASA scientists warn the world about the dangers of climate change and suggest pioneering solutions such as capturing and storing carbon. IIASA was one of only two institutions worldwide that, by the mid-1970s, already had an established research program on climate change and policy.

1977
The first Young Scientists Summer Program is a huge success, and since 1977 IIASA has attracted over 1,500 talented young scientists to spend a summer working with scholars from other nations and disciplines. Many go on to take senior posts in academia, business, and government.

1980
A chance conversation between IIASA colleagues brings unexpected results. James Vaupel, a US demographer, mentions a scientific problem to Soviet mathematician, Anatoli Yashin. “I think I can help,” Yashin replies. The two go on to develop more reliable projections of population aging in developed countries.

1981
IIASA publishes the first comprehensive, truly global assessments of energy issues, resulting in the internationally acclaimed report, *Energy in a Finite World*.

1982
An IIASA research team of chemists, biologists, mathematicians, engineers, hydrologists, economists, computer specialists, and managers completes a study on eutrophication and management of Lake Balaton, central Europe’s largest lake. Its findings influence water policy in Italy, Japan, the USA, and the USSR.

1983
Groundbreaking research by an IIASA scholar provides the intellectual underpinnings for the later US Department of Justice’s antitrust case against Microsoft. The findings pioneered the modern approach to increasing returns which shows how powerful firms can exploit the particular nature of high-tech markets to the disadvantage of opponents who offer better products.
1986
IIASA scholars publish *Sustainable Development of the Biosphere*, which is quickly accepted by the science community as the core scientific text on sustainable development.

1988
In response to mounting tensions regarding global food issues, IIASA creates an unprecedented computer model that links national agricultural models. Named the Basic Linked System, it becomes a practical tool for determining the effectiveness of policies to eliminate hunger and the impacts of agricultural trade liberalization.

1989
IIASA’s scientific model of Europe’s acid rain problem is officially adopted by the 28 countries of the Geneva Convention on Transboundary Air Pollution as the main technical support for renegotiation of the treaty. This is the first time that all parties to a major international treaty agree to accept a single scientific model.

1991
IIASA researchers complete the first consistent continent-wide assessment of forest resources in Europe and the European regions of the former Soviet Union, revealing the alarming consequences of air pollution for European forests.

1994
IIASA’s Regional Acidification Information and Simulation (RAINS) model underpins the agreement of 33 European governments to reduce damaging emissions of sulfur dioxide.

1995
Five IIASA scientists are chosen to be Lead Authors of the Second Assessment Report of the Intergovernmental Panel on Climate Change. Since then, eleven IIASA scholars have played leading roles in the IPCC’s third and fourth assessment reports, which provide the world with the most scientifically advanced, comprehensive, and rigorous analysis of the state of climate change.

1995
Funded by the World Bank and the Asian Development Bank, the RAINS model is extended to facilitate the analysis of sulfur dioxide pollution in Asia and is presented to energy planners and government officials in 18 Southeast Asian nations.
1996
A second edition of the IIASA book *The Future Population of the World: What Can We Assume Today?* is published. It includes the first-ever probabilistic population scenarios (predicting world population will probably never double again) and new findings on population aging.

1998

2000
IIASA scientists and models play a leading role in preparing the most comprehensive and sophisticated scenarios yet of greenhouse gas emissions for the twenty-first century. The work is published as the *Special Report on Emissions Scenarios* by the Intergovernmental Panel on Climate Change and Cambridge University Press in 2000.

2001
IIASA demographers are first to forecast, in a *Nature* article, that the world population will peak in the twenty-first century and then begin to decline.

2002
IIASA scientists complete the most comprehensive study of Russian forests and land resources ever undertaken. Results are presented to President Putin of Russia.

2004
IIASA scientists reveal that undesirable genetic changes are taking place in fish stocks as a result of commercial exploitation. Documentation of these evolutionary changes could have provided a valuable early warning signal of the collapse of a fish stock such as the northern cod in the early 1990s.

2005
Disaster aid is often too little and too late. It also discourages governments and individuals from taking advantage of the high returns to preventive action. In a *Science* article, scholars from IIASA’s Risk, Modeling and Society Program identified several innovative approaches to free vulnerable countries from dependence on unpredictable post-disaster assistance.

2007
IIASA scientists share the Nobel Peace Prize with authors of the IPCC reports and Al Gore for “their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.” They follow in the footsteps of four Nobel Prize laureates who have worked at IIASA: Tjalling Koopmans and Leonid Kantorovich (Economics, 1975); Paul Crutzen (Chemistry, 1995); and Thomas Schelling (Economics, 2005).

2010
The Institute has its most successful year to date in terms of citations of IIASA’s work. Research by IIASA scientists was cited in over 3700 journal articles in 2010 according to the independent database of peer-reviewed literature, SCOPUS.
Scientific Excellence

IIASA’s work is underpinned by high-quality science. In 2010 IIASA scientists published 137 articles in peer-reviewed journals, made over 220 presentations, and held editorships in over 55 academic journals.

HIGHLY PUBLISHED AND CITED In 2010 IIASA had its most successful year to date in terms of scientific publishing. The Institute’s researchers published 137 journal articles recognized by the independent database of peer-reviewed literature, SCOPUS. Citations of IIASA articles have also continued to increase significantly (see chart).

EDITORSHIPS Numerous IIASA scientists have been appointed to editorships for peer-reviewed academic journals. In 2010 IIASA researchers held editorships in over 55 journals ranging from Energy Economics to Climate Policy to Global Environmental Change to Ecological Modelling Journal.

REMEASURING AGING Due to increasing life-spans and improving health many populations are “aging” more slowly than conventional measures indicate. As published in Science, IIASA scientists have developed new measures of aging that take disability and longevity into account. Their results give policymakers new tools to better determine the economic cost of an aging population and set more appropriate retirement ages.

THE ROLE OF PUNISHMENT IN THE EVOLUTION OF COOPERATION IIASA’s Karl Sigmund was the lead author of a study, published in Nature, that demonstrates how self-governing institutions that promote increased cooperation through a system of sanctions can emerge spontaneously, without the need for intervention from a higher authority.

POPULATION CHANGE: ANOTHER INFLUENCE ON CLIMATE CHANGE Changes in population, including aging and urbanization, could significantly affect global CO₂ emissions over the next 40 years, according to a study published in PNAS. The research, involving IIASA, NCAR, and NOAA, identifies urbanization as particularly important in many developing countries, especially China and India, and aging as important in industrialized countries.

HIGHLY CITED AUTHOR 2007–2010 IIASA’s Janusz Cofala was recognized by Elsevier, the academic publisher, as a highly cited author for the period 2007 to 2010 for the paper entitled “Scenarios of global anthropogenic emissions of air pollutants and methane until 2030,” published in Atmospheric Environment. 


IIASA journal articles

Citations of IIASA articles


IIASA SCIENCE INCREASINGLY PUBLISHED AND CITED

Year

3 000

2 000

1 000

50

200

100

1000

4 000
**Presentations** Unlike many universities, IIASA does not divide the world into academic disciplines, which is one reason why audiences are eager to hear lectures by IIASA researchers. In 2010 IIASA scientists gave over 220 lectures. Audiences were diverse, ranging from scientists at the Royal Society in London, United Kingdom, to negotiators at the United Nations climate change conference in Cancun, Mexico, to experts on disaster management in Bhutan.

**Advisory Boards** Over 60 advisory boards and steering committees have selected IIASA scientists to contribute high-quality scientific evidence to a range of global, regional, and local challenges. These range from Nebojsa Nakicenovic’s membership of the UN Secretary-General’s Advisory Group on Energy and Climate Change to Joanne Bayer’s membership of the Science Committee of the Chinese Academy of Disaster Reduction.

**UN Report Urges Universal Access to Modern Energy by 2030** In May 2010, the UN Secretary-General’s Advisory Group on Energy and Climate Change (AGECC) launched their landmark report, *Energy for a Sustainable Future*, in Vienna. Austrian Minister for European and International Affairs, Michael Spindelegger, Chair of UN-Energy and the AGECC, UNIDO Director-General, Kandeh Yumkella, and member of AGECC and IIASA’s Deputy Director, Nebojsa Nakicenovic took part and called for universal energy access and a 40 percent reduction in global energy intensity by 2030, to meet climate change targets and other UN development goals.
International, Interdisciplinary Research

International, interdisciplinary research teams and the use of advanced scientific tools underpin IIASA’s integrated approach to global challenges.

DISTRIBUTION OF IIASA RESEARCHERS

During 2010 scientists from 38 countries conducted research at IIASA:

- Austria • Belgium • Brazil • Bulgaria • Canada • China •
- Czech Republic • Estonia • Finland • France • Germany • Hungary
- India • Indonesia • Iran • Ireland • Israel • Italy • Japan •
- Republic of Korea • Malawi • Nepal • Netherlands • Norway • Pakistan
- Poland • Russia • Senegal • Singapore • Slovakia • South Africa • Spain •
- Sweden • Switzerland • Ukraine • United Kingdom • United States • Vietnam

Of the scientists who worked at IIASA in 2010, 33 percent were social scientists, 32 percent were natural scientists and engineers, and 35 percent were mathematicians, computer scientists, and researchers from other disciplines.
Corollary 1.

Proof. Indeed, since $y = 1$ this implies the transversality condition, as $0 \leq \eta$.
Policy-Relevant Research

Resolving complex global problems, ranging from climate change to global poverty, requires an international approach. IIASA works closely with a wide range of international organizations to provide decision makers with the evidence and tools to make better-informed, more cost-effective decisions that take into account the complexity of the scientific issues and the increasingly multipolar nature of our world.

UNITED NATIONS SECRETARY-GENERAL United Nations Secretary-General Ban Ki-moon and Mrs. Ban visited IIASA at Schloss Laxenburg on 2 September—the first-ever visit by a UN Secretary-General to the Institute. The Secretary-General was accompanied by the Foreign Minister of Austria, Michael Spindelegger, the Governor of Lower Austria, Erwin Pröll, and the Director-General of the United Nations Office in Vienna and Executive Director of the United Nations Office on Drugs and Crime, Yury Fedotov.

Discussions focused on the main global problem areas that form the basis of IIASA’s new strategic research priorities—food and water, energy and climate change, and poverty and equity—as well as how these support the Secretary-General’s seven “Priorities for Action” for the United Nations. IIASA has significant and ongoing interactions with the UN, having provided scientific briefings to the Secretary-General at UN Headquarters in New York.

ENERGY IIASA’s Deputy Director Nebojsa Nakicenovic is a member of the UN Secretary-General’s Advisory Group on Energy and Climate Change (AGECC). In 2010 the AGECC issued a report arguing for universal access to clean, affordable energy by 2030 and a significant (40 percent) lowering of energy intensity levels during the same period.

IIASA through its establishment of the Global Energy Assessment (GEA) works closely with the Global Environment & Technology Foundation, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), United Nations Foundation (UNF), and the Energy Sector Management Assistance Program of the World Bank. The GEA is a major initiative that seeks to provide the elements to redefine the global energy policy agenda. In 2010 its work was presented at, among others, the United Nations Commission on Sustainable Development (CSD), the World Energy Congress, and the High-Level Conference on Energy at the World Energy Forum held at the United Nations in New York.

The International Atomic Energy Agency (IAEA) continues to use an IIASA-developed systems analysis tool, known as MESSAGE (Model for Energy Supply System Alternatives and their General Environment impacts). The tool helps energy planning bodies to formulate and evaluate alternative energy supply options for a nation or region, taking into account local constraints.
NATURAL DISASTERS AND POVERTY  IIASA contributed three background papers to the *World Bank* report, *Natural Hazards, UniNatural Disasters: The Economics of Effective Prevention*. The highly praised report examines how loss of life and damage from natural disasters can be prevented or minimized in a cost-effective manner.

IIASA’s collaboration with the Munich Climate Insurance Initiative hosted by the United Nations University (UNU) in Bonn continued in 2010. The research shows that donor-supported insurance can play a pivotal role in addressing poverty in the context of worsening climate extremes. Building on this work, IIASA researchers co-authored a report for United Nations Development Programme (UNDP) that advised on creating a Climate Risk Finance Facility for Development.

IIASA also worked with the United Nations Population Fund (UNFPA) to develop understanding of how population dynamics and related issues influence poverty in the world’s least developed countries.

CLIMATE CHANGE  Seven IIASA researchers are Lead Authors and two are Review Editors on the forthcoming Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC). IIASA has also played a central role in developing a new generation of future climate scenarios, known as Representative Concentration Pathways, that will form the analytical backbone of the new climate projections of the AR5. In addition, IIASA scientists have played key roles in two forthcoming IPCC special reports: *Renewable Energy Sources and Climate Change Mitigation*, and *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*.

IIASA’s Greenhouse Gas and Air Pollution INteractions and Synergies (GAINS) model underpinned IIASA’s contribution to a comprehensive scientific assessment of limiting near-term climate change organized by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). GAINS analyses also provided quantitative information to the European Commission to prepare for the United Nations Climate Change Conference (COP16) in Cancun.


In 2010 IIASA researchers worked with *UNEP* on *The Emissions Gap Report* which investigated how far countries’ responses to climate change had progressed over the previous year. Two IIASA researchers participated in the expert panel advising UNEP’s Multi-Criteria Analysis for Climate Change, which aims to develop a methodology to address the multi-faceted dimensions of climate policy planning.

FOOD AND FORESTS  In collaboration with the Food and Agriculture Organization (FAO) of the United Nations, IIASA continued to develop and maintain the Global Agro-ecological Zone tool to analyze current and potential crop production across the world. IIASA researchers also contributed to a *World Bank* report into growing interest by big investors in acquiring farmland, often in developing countries.

IIASA’s forestry experts provided analytical support to the negotiations at the United Nations Climate Change Conference (COP16) in Cancun based on their research into avoided deforestation and REDD (Reducing Emissions from Deforestation and Degradation). Part of the work was based on an IIASA study, funded by the *World Bank*, into a large-scale REDD project in the Congo Basin.

IIASA worked closely with the International Union of Forest Research Organizations (IUFRO), jointly funding a student to take part in IIASA’s Young Scientists Summer Program and presenting at the XXIII World Congress of IUFRO.

Forest certification is seen as one of the most effective tools for promoting sustainable forest management and as a control mechanism for avoiding deforestation and implementing REDD. IIASA scientists co-authored a *FAO-UNECE* report on the present state of forest certification and provided an outlook for the near future. IIASA also partnered with the International Livestock Research Institute (ILRI) to investigate ways of making livestock systems more sustainable.
Capacity Building

Capacity building at IIASA involves giving the next generation of scientists access to IIASA’s knowledge, research skills, and international networks as a basis for building their future career. IIASA offers two educational programs—graduate (YSSP) and postdoctoral—as well as workshops to convey its research and expertise to others.

YOUNG SCIENTISTS SUMMER PROGRAM

In 2010 the Young Scientists Summer Program welcomed 51 advanced graduate students from 21 countries to work on their research projects within IIASA’s programs. The 2010 scientific program was designed to emphasize and expose the critical role and relevance of interdisciplinary science and policy analysis in tackling “real world” problems. Three seminars addressing IIASA’s new global problem areas were organized, at which selected research programs presented their core research.

At the first seminar on Food and Water, research staff from the Evolution and Ecology, Forestry, and Land Use Change Programs presented research on the environment and natural resources. At the second, on Energy and Climate Change, panel members from the Atmospheric Pollution Program (APD), Energy (ENE), and the Risk and Vulnerability (RAV) Program presented research on emissions and development, extreme events, and critical infrastructure. The third on Poverty and Equity featured presentations on development and urbanization, globalization, population growth, and migration by panel members from the World Population (POP), Health and Global Change (HGC), and RAV Programs. All seminars were followed by group discussions with YSSPers and IIASA staff.

A number of external speakers, with IIASA connections, were invited to address the YSSPers. The YSSPers also benefited from specially organized extracurricular scientific, cultural, training, and leisure activities, including for the first time a communications and media training workshop designed to provide an understanding of the importance of effective communication for scientists and its role in influencing audiences.

For the complete list of IIASA YSSP participants 2010, see page 28.

www.iiasa.ac.at/YSSP

PECCEI AND MIKHALEVICH AWARD WINNERS

The Peccei and Mikhalevich Awards are conferred annually on two or three outstanding participants in IIASA’s Young Scientists Summer Program.

The winner of the Peccei award for 2010 was Elisabeth Wetterlund of Sweden’s Linköping University while Carl Salk, of Duke University, USA, won the Mikhalevich Award. The awards provide financial support enabling the YSSPers to return to IIASA for three additional months of research.

Rennie Lee of the Sociology Department at the University of California received an honorable mention for her excellent research during her YSSP affiliation with IIASA’s Health and Global Change Project.
POSTDOCTORAL PROGRAM

Five postdoctoral scholars worked at IIASA in 2010 on topics closely related to IIASA’s research agenda.

Postdoctoral contracts are one or two years in length, with successful applicants being based within IIASA programs. This facilitates access to IIASA’s data, models, tools, and other knowledge, helps build their work experience, and allows them to research as part of an interdisciplinary team. There are usually a number of opportunities to publish work individually or with other scientists.

As well as experience within the Program, postgraduate researchers are also introduced to—and become part of—IISA’s worldwide network of partners, which is a very useful basis for building their own career capacity for the future.

IIASA welcomes these talented and highly trained scientists with their up-to-the-minute knowledge and youthful enthusiasm.

IIASA’s postdoctoral fellowships are financed by IIASA, the Kempe Foundation in Sweden, the Vienna Science and Technology Fund, and also as part of projects funded by the EU.

For a complete list of IIASA postdoctoral research fellows 2010, see page 29.

www.iiasa.ac.at/pdocs

WORKSHOPS

IIASA organizes and co-organizes many workshops to build capacity among scientists and policymakers, either on a national or regional basis or at IIASA itself.

Among many examples, senior policy advisors and research leaders from 12 countries met at IIASA in September to advance the Black Carbon (BC) Assessment which uses the IIASA GAINS model to identify options to reduce emissions of BC and ozone precursors. Bhopal, India, was the venue for a capacity-building workshop on ecological modeling for forest researchers in January, at which IIASA scientists gave lectures on climate change mitigation, carbon accounting, vegetation modeling, and strategies for reducing greenhouse gas emissions in the forest sector. And in Tallinn, Estonia, IIASA worked with the Estonian Suicidological Society to organize an international conference on suicide.

Many IIASA workshops are designed to provide ongoing support and knowledge building. These include the series of international Workshops co-organized by IIASA on Uncertainty in Greenhouse Gas Inventories, which continued in 2010 with a multidisciplinary forum in Ukraine on state-of-the-art research and developments in accounting, verifying, and trading GHG emissions, and their inherent uncertainties.
Environment & Natural Resources

The conservation of biodiversity makes a critical contribution to moderating the scale of climate change and reducing its negative impacts by making ecosystems—and therefore human societies—more resilient. It is therefore essential that the challenges related to biodiversity and climate change are tackled in a coordinated manner and given equal priority.

UN Secretary-General Ban Ki-moon, Global Biodiversity Outlook (GBO-3, 2010).

LAND USE CHANGE AND AGRICULTURE (LUC)

The main scientific goal of LUC in 2010 was to develop more effective tools and databases to address the complex interlinkages between the volatile world food system, the rapid expansion of biofuel production, and climate change. The third global IIASA–FAO Agro-ecological Zones (GAEZ v3.0) assessment was concluded in 2010. This ambitious and comprehensive assessment of crop production was enabled by rapid developments in information technology which have produced increasingly detailed global databases of vital geographical layers. LUC developed a new GAEZ Portal to share the rich database and results as a public global good via an interactive Web site. The 2010 World Bank report on “Rising Global Interest in Farmland—Can it Yield Sustainable and Equitable Benefits” based on GAEZ v3.0, assessed crop production potentials and yield gaps for major agricultural commodities, and produced estimates of “fair” land values. LUC participated in a number of large projects in 2010. In “Water Scenarios for Europe and for Neighboring States” (SCENES) it helped develop and analyze a set of comprehensive scenarios of Europe’s freshwater futures up to 2050. In “Water and Global Change” (WATCH) its research provided global spatial data on key components of the water cycle. In “Assessing the Market for Commercial use of Biomass for Heat and Power Generation in Bulgaria, Romania, Ukraine, Belarus and Turkey,” LUC contributed to an assessment of the current market for biomass fuels in these countries, in the legal, social, environmental, and business contexts. In “Effective and Low-disturbing Biofuel policies” (ELOBIO), LUC used its ecological–economic modeling framework to analyze impacts of biofuel expansion scenarios on food and feed markets and the environment. LUC continued work on “Integration of Mainstream Economic Indicators with Sustainable Development Objectives” (IN-STREAM), which aims to better integrate mainstream economic indicators with sustainable development objectives. In the project “China Agricultural Transition: Social and Environmental Impacts” (CATSEI), LUC addressed the main environmental stresses deriving from and affecting Chinese agriculture. The main results were presented at a Policy Forum in Beijing in November 2010.

FORESTRY (FOR)

In 2010 FOR research transcended the forest sector and moved toward consideration of entire landscapes—agriculture, forests, wetlands, and populated areas—and also of complex socio-economic interactions and conflicts, including competition for land. FOR worked on 40 short- and long-term projects, all having a good fit with its existing research themes. FOR continued to develop and enhance the Integrated Modeling Cluster, with particular reference to its biophysical core models. Remote sensing experts participated in developing new space-borne technologies for comprehensive and high-resolution imaging of changes in forests down to the subnational level, where previously unrecorded forestry areas can now be continuously monitored. Enhanced FOR modeling techniques with respect to land-use change, including food security, water and (bio)-energy, enabled better insights into future food demand and the impact of supply-side strategies related to climate change. Other related studies included the mapping of nitrogen scarcity which, along with poverty, causes food insecurity and malnutrition, and research into how irrigation systems can help improve future food security. FOR continued work on the development of integrated methodology for a Full Verified Greenhouse Gas Account on the basis that partial accounting under the Kyoto Protocol, fails to meet the UNFCCC’s ultimate goals. The integrated methodology, based on a fusion of all available sources of information and methodology, was further enhanced to address the global impacts of the forest sectors of the emerging economies of Brazil, China, Congo Basin countries, India, and Russia. FOR contributed to the improvement of international forest governance through numerous direct and collaborative initiatives. Particular emphasis was on forest certification, one of the most effective tools for promoting sustainable forest management, avoiding deforestation, and thereby mitigating climate change.
In 2010 EEP extended its research into the future ecology and evolution of exploited fish stocks. Methods to quantify fisheries-induced selection pressures were refined, a novel approach to inferring life-history parameters from individual growth trajectories was developed, and trends in the maturation schedules of exploited fish stocks were examined—for wild Atlantic salmon in the Baltic, captive Atlantic salmon in Norway, northern pike in Europe, Atlantic cod in Iceland, Atlantic cod in the Barents Sea, European plaice in the North Sea, and chum salmon in Korea. EEP is also developing a framework for evaluating joint stakeholder satisfaction based on multi-criteria utility functions.

EEP initiated the now-permanent ICES Working Group on Fisheries-induced Evolution of the International Council for the Exploration of the Sea. Operating at the interface of policy advice and fundamental science, this international expert group is developing protocols and tools for evolutionary impact assessments, anticipating the effects of fisheries-induced evolution on major reference points of modern fisheries management, and estimating fisheries-induced selection differentials across a large number of marine stocks.

EEP research on the evolution of cooperation is contributing to governing the commons, ecosystems management, theoretical and experimental economics, and evolutionary biology. The Calculus of Selfishness by EEP’s Karl Sigmund (2010) was favorably reviewed in American Scientist, Nature, and Science. An article published in Nature analyzed “pool punishment” as a rudimentary form of governance for protecting public goods.

A new book on the Mathematics of Darwin’s Legacy featured four (of twelve) chapters on adaptive dynamics theory, two by EEP’s staff and two inspired by EEP’s work. Here EEP’s contributions forge bridges between adaptive dynamics theory and other frameworks for describing micro-, meso-, and macro-evolution, including the burgeoning evolution and development field. EEP researchers also demonstrated, for the first time, the existence of chaotic evolutionary attractors, which may help explain apparently random differences in biodiversity patterns among spatially segregated communities.

Strengthening its collaboration with researchers from DYN and FOR, EEP is helping to develop a next generation of vegetation models informed by evolutionary ecology to promote sustainable forest management and to gain better insights into the impacts of climate change on vegetation cover.

EEP convened Speciation 2010: First European Conference on Speciation Research. With more than 170 participants congregating at IIASA, this event was part of the Research Networking Programme Frontiers of Speciation Research, supported by the European Science Foundation and coordinated by EEP.

Short-term climate forcers such as black carbon, methane, and tropospheric ozone were a main focus of APD research in 2010, with APD completing implementation into its GAINS model of all the components necessary for a comprehensive global assessment of their sources, mitigation potentials, and effects. This has enabled improved assessment not only of the potentials and costs of mitigation, but also of the benefits for humans and ecosystems.

A new tool was developed to quantify the impacts of mitigation measures for short-lived climate forcers on instantaneous radiative forcing and to search for cost-effective mitigation strategies. The new tool and data updates are invaluable resources and have attracted great interest from global and regional policy initiatives.

APD’s Markus Amann and Zbigniew Klimont were invited to act as lead authors for a comprehensive scientific assessment organized by UN Environment Program and the World Meteorological Organization. “Measures to Limit Near-Term Climate Change and Improve Air Quality,” for release in spring 2011, will provide quantitative information on the mitigation potentials of short-lived climate forcers in different world regions.

Using GAINS, APD identified 15 practical measures that, together, could reduce the global warming potential of short-lived pollutants by up to 60 percent. All the measures, which are technically feasible, would be beneficial for air quality and result in more efficient energy use, thereby reducing emissions of long-lived greenhouse gases.

At the request of the Arctic Council of Ministers, APD’s GAINS model underpinned an investigation into the effects of short-lived climate forcers on Arctic climate change. APD also contributed quantitative information on current and future emissions of black carbon to the Ad Hoc Expert Group on Black Carbon under the Convention on Long-range Transboundary Air Pollution (CLRTAP). Integrated modeling for the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, which is currently being renegotiated, is headquartered at IIASA. The Protocol will be revised to include more pollutants within a more integrated approach, with multiple targets aimed at addressing multiple effects.


www.iiasa.ac.at/Research/EEP

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To support preparations for the 2010 climate negotiations in Cancun, GAINS analyses provided quantitative information to the European Commission on the potential and costs for mitigation of non-CO2 emissions in all member states and on the co-benefits of CO2 mitigation strategies for reduced health effects from air pollution. GAINS was also used to assess the achievement of EU air quality targets and determine if further specific actions are needed.

www.iiasa.ac.at/Research/APD
**Population & Society**

Population aging will certainly be the source of many challenges in coming decades. But there is no reason to exaggerate those challenges through mismeasurement. We will be able to address those problems better with a larger array of measures of aging...


**Processes of International Negotiation (PIN)**

At the end of 2010 PIN and IIASA parted company, with PIN moving to the Netherlands Institute of Foreign Relations at Clingendael in The Hague after more than two decades at IIASA.


The Climate Change Project produced *Strategic Facilitation of Climate Talks—How to Cope with Stumbling Blocks*, edited by Sjöstedt and Macaspace Penetrante. The forthcoming book takes into account the results of the Copenhagen Conference of Parties within a wider context.

The Identity Conflict Project submitted its findings in 2010. *The Slippery Slope to Genocide: Reducing Identity Conflicts and Preventing Mass Murder*, edited by Anstey and Zartman, focuses on the role of external efforts to promote negotiation in internal identity conflicts that may lead to mass killings and genocide, assuming that parties cannot break the stalemate by themselves.

The results of the Negotiation Failures Project, the forthcoming book *Unfinished Business: Negotiations that did not end in Agreement*, edited by Faure and Cede, presents both analyzed cases and analytical approaches to explain incomplete results, and is awaiting review.

The book project, *Evaluating Negotiation of the Comprehensive Test Ban Treaty*, the result of a June 2009 workshop at IIASA has been edited for publication. A follow-up workshop in 2010 focusing on on-site inspection negotiations prepared a full-length manuscript covering the CTBTO negotiations in 1992–1994 and continued “elaboration” of on-site inspection procedures.

The CTBT Project presented a panel in February 2010 at the annual meeting of the International Studies Association (ISA) in New Orleans. With the Climate Change Project, PIN presented the third climate change negotiation simulation within the framework of the 2010 YSSP.

PIN published issues 34 and 35 of its expanded newsletter *PIN Points* in 2010 and will continue to publish it online.

[www.iiasa.ac.at/Research/PIN](http://www.iiasa.ac.at/Research/PIN)
WORLD POPULATION (POP)

The award to POP’s Wolfgang Lutz of the €1.5 million Wittgenstein Prize by the Austrian Science Fund, was the hallmark of a successful year for POP. As part of the European Research Council (ERC) Advanced Grant awarded to Wolfgang Lutz in 2009, scientific preparations continued for a study on “Forecasting Societies’ Adaptive Capacities to Climate Change” which will produce new population projections by age, sex, educational attainment level, labor force participation, and health status. The assumptions of the projections, to be conducted in collaboration with the James Martin School for 21st Century Studies of Oxford University, will be assessed by several thousand experts globally via an electronic questionnaire, finalized and tested in 2011–2012, in contrast to usual projections, based on assumptions of a small group of experts.

A comprehensive POP review revealed that education trumps income in reducing mortality in developing countries. Another POP study on returns to education using new IIASA reconstructions of human capital by age and sex in 120 countries since 1970, showed education leading to fertility declines and population age structure changes, with consequent improvements in the democracy indicator. This global relationship shows Iran, which over the past two decades has experienced the world’s most rapid fertility decline, to have a high chance of becoming more democratic in coming years.

Another POP analysis of net migration rates in the 55–74 age group in Sweden showed net migration losses from Stockholm to non-metropolitan regions. This suggests the impacts of later life migration will be felt most in non-metropolitan regions offering climate, cost-of-living, and environmental benefits.

In a study published in Science, Warren Sanderson and Sergei Scherbov developed new measures of aging that take changes in disability status and longevity into account. These supplement the UN “old age dependency ratio,” which considers the number of people dependent on others at age 65. The authors show that the British population is getting older and likely to get healthier, and that these two effects will offset one another.

www.iiasa.ac.at/Research/POP

RISK AND VULNERABILITY (RAV)

With weather-related disasters posing significant and escalating threats to Europe, research conducted by RAV for the EU project “Adaptation and Mitigation” (ADAM) yielded the first comprehensive probabilistic maps of flood and drought risks across the EU. These findings are expected to have great influence on national and local policymakers preparing to adapt to climate change. RAV also made an acclaimed contribution to a UN/World Bank report Natural Hazards, UnNatural Disasters: The Economics of Effective Prevention, examining the benefits and costs of improving or retrofitting buildings against disaster risk in a range of low-, middle-, and high-income countries in Asia and the Caribbean.

RAV’s message that donor-supported insurance can play a pivotal role in addressing poverty in the face of worsening climate extremes was articulated at the Cancun climate conference (COP16) and through publications. The importance of tackling disaster-related poverty by using novel risk-financing instruments was underlined in a RAV paper on weather-induced poverty traps and microinsurance as a policy instrument.

RAV also addressed topics of risk management and policy in two different policy arenas: adaptation to climate change and renewable energy development. A major achievement was publication of results in PNAS on vulnerability in least-developed countries, showing that improvements in human development can counteract the impacts of climate change.

In the area of renewable energy development RAV, together with major research institutions, is examining the risks associated with large-scale solar, wind, and transmission infrastructure projects to achieve climate mitigation targets, focusing on the European and North African regions. A roadmap has been published examining policy approaches for reaching 100 percent renewable penetration in the power sector by 2050.

www.iiasa.ac.at/Research/RAV

EUROPEAN POPULATION REACHES 500 MILLION

The European Demographic Data Sheet 2010, published by IIASA’s World Population Program and the Vienna Institute of Demography of the Austrian Academy of Sciences, shows the European population reaching 500 million during the first half of 2010 through a combination of accessions, migration, and natural growth. The map shows the projected change in total population size from 2010 to 2030 (in percent).

www.populationeurope.org
Energy & Technology

New energy technologies are needed to provide the essential services to the two billion without access to modern energy forms as well as to improve the efficiency and reduce the adverse impacts of energy in the more affluent parts of the world.

Nebojsa Nakicenovic, The Changing World: Energy, Climate and Social Futures (presentation at IIASA Conference ’07)

DYNAMIC SYSTEMS (DYN)

In 2010 DYN research covered three areas: Assessment of Dynamical Systems (ADS); Economic Dynamics (ED); and Ecological Dynamics and Environmental Management (EDEM). New application-oriented methods developed within ADS aimed at creating a specific “IIASA niche” in applied mathematics, focusing on the theories of control, dynamical systems, and dynamic games. DYN methodology found applications in-house, while methodological questions from programs also initiated DYN research.

Three projects in ADS sought to understand the complexities of dynamical systems, for instance, how the exhaustibility of a natural resource impacts the long-term co-development of a country’s production and research sectors; what the optimal investment and consumption policies are with respect to abatement costs for an economy maintaining an old (“dirty”) technology sector or developing an innovative (“clean”) one; and learning about new behavior patterns in repeated games, using a model for auction-based repeated trading between Eastern Europe and the former Soviet Union.

Three projects in ED brought insights into economic dynamics. One contributed to the application of DYN’s new model integration methodology for analysis of macro-economic growth. Another used a DYN-elaborated conceptual global climate-economy model to capture the phenomenon of irreversible decisions, finding that insufficient environmental protection efforts today may not be compensated for by future policy measures.

In a third project, a DYN model for market-driven social relationships showed how the labor market is affected by degree of regulation and how pollution decreases in developing countries as development increases.

In EDEM, one project focusing on the application of ecological network methodologies to urban systems and urban ecosystem health, specifically energy flow through four Chinese cities, indicated the importance of improving urban design in some cities. In a second project, DYN scientists looked at optimal forest management policy and analyzed a forest growth model that takes into account competition between trees.

www.iiasa.ac.at/Research/DYN

GLOBAL ENERGY ASSESSMENT (GEA)

Launched in 2007, the GEA is a multi-stakeholder activity that seeks to identify strategies and options for addressing, in a comprehensive and integrated fashion, the major global energy-related challenges, including poverty alleviation, economic growth, climate change mitigation, and greater security. The GEA is designed to provide advice to decision makers and private investors in governments, enterprises, and intergovernmental organizations who are stakeholders in the transition to energy for sustainable development. The products of the GEA will include materials ranging from interactive Web-hosted databases, through briefings for different groups of decision makers, to the major analytical report to be published in 2011. Completion of the GEA report, the review process, and dissemination objectives were the focus of GEA activities in 2010.

The Summary for Policymakers by the Executive Committee was presented to the GEA Governing Council in January for feedback. Since then work has mainly focused on finalizing the Second Order Draft (SOD) of all 25 Knowledge Modules (KMs, to become chapters in the final report), intensifying visibility of the GEA, and requesting inputs at stakeholder consultations. The Convening Lead Authors finished drafting KM texts and the work on the cross-cutting and integrative issues that comprise the chief value-added of the GEA. These include, for example, an assessment of energy access, that is, providing clean cooking services and electricity, including the policies and measures for universal provision.

The GEA review process began in late spring with the appointment of distinguished Review Editors, who appointed over 200 anonymous, independent, scientific and technical experts in the GEA fields from around the world. The 300 authors in the KM writing teams received reviewers’ comments at year end, and the review process is scheduled for completion in early 2011. Also during 2010, an agreement was reached with Cambridge University Press to publish the major analytical report of the GEA in 2011. UNIDO, the Austrian Government, and IIASA began preparing in 2010 for the Vienna Energy Form (VEF), to be held in June 2011 in Vienna.

www.GlobalEnergyAssessment.org
A key focus for ENE in 2010 was the completion of two central chapters, Knowledge Modules (KM) 17 and 19 of the Global Energy Assessment (GEA) to be published by Cambridge University Press in 2011.

The transformational scenarios of KM17—Energy Transition Pathways for Sustainable Development—identify main policy levers and measures to reach a wide range of ambitious sustainability objectives. The assessment concludes that the energy transformation is technically possible, and highlights potentials to significantly reduce the total energy bill if rapid and coordinated efforts are made to integrate global concerns, such as climate mitigation, into local and national policy priorities for energy security and air pollution control. A new multi-criteria modeling approach was developed to visualize the trade-offs and synergies of specific policy choices so that investment decisions under multiple policy objectives could be evaluated and prioritized.

GEA Knowledge Module 19—Energy Access for Development led by Shonali Pachauri—assesses the historical and current status of energy access both globally and regionally for major regions, including Asia, Africa, and Latin America. A large database on energy access within nations was compiled; research aimed to explicitly assess current energy use patterns in households across major regions and nations plus the costs and impacts of using alternative policy levers to accelerate the household energy transition.

ENE research also focused on the role of renewable energy in a future energy system, with Volker Krey and Keywan Riahi serving as Lead Author and Review Editor, respectively, of the IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN).

ENE played a central role in the Integrated Assessment Modeling Consortium (IAMC), developing one of the four new “representative concentration pathways” (RCPs) that will form the analytical backbone for the new climate projections for the IPCC Fifth Assessment Report (AR5) to be released in 2013. The Emissions Gap Report, led by UNEP with ENE scientist Keywan Riahi as lead author, was launched on 23 November with coordinated events around the world. The Report, which received a significant amount of media attention, became a reference document for many different groupings at the Cancun Climate talks (COP16).

In 2010 GEA Director Nebojsa Nakicenovic continued to serve on the high-level panel of the UN Secretary-General's Advisory Group on Energy and Climate Change. Nakicenovic also served on the International Advisory Board (IAB) of the Committee on Scientific Planning and Review of ICSU, as an international Board member for a new Korean government climate change policy project, and on the Scientific Steering Committee of the Global Carbon Project.

**TRANSITIONS TO NEW TECHNOLOGIES (TNT)**

For the Global Energy Assessment (GEA), to be published in 2011, TNT coordinated two knowledge modules: KM24 on technology innovation systems and policy and KM18 on urbanization. Drafts were completed in 2010 including an extensive peer-review process.

KM24 assembles the first-ever comprehensive global quantification of energy technology innovation investments across all technology life cycle stages and energy system components. It identifies energy end-use technologies as the dominant investment focus, showing the importance of innovation policy in this sector and of financial and other diffusion-related incentives to complement R&D and niche market technology deployment policies. KM24 also identifies the growing importance of Brazil, Russia, India, Mexico, China, and South Africa in energy technology innovation. It introduces the new concept of technological “granularity,” small-scale innovations offering the potential of a multitude of repeated experimentations, learning, and adaptations in diverse adoption environments. The policy conclusions draw on 20 new case studies on energy technology innovation, also to be published as a book in 2011.

KM18 synthesizes new data on urban energy use, its findings contrasting with the traditional view of urban systems as resource-wasteful. According to KM18, cities in developed economies generally use less final energy per capita than national averages, mainly because of public transport access. It identifies a new urban North-South divide, as cities in emerging economies generally have higher per capita consumption levels than their national averages, due mainly to much higher urban-rural income gradients. KM18 also shows the limitations of accounting frameworks, which tend to ignore “embodied” energy and GHG emissions associated with imports and exports to/from cities. KM18 also uses novel modeling approaches to illustrate the different impacts of different policies on urban energy and environmental footprints.

In 2010 TNT began a sequel development to the innovative agent-based model of technological complexity that considers technology components rather than discrete technologies. This aims to gain a deeper insight into technology spillover effects and test the hypothesis that the dynamics of large technical systems are scale-invariant (i.e., do not change with the level of detail of technology representation). The new model pushes the envelopes of both computational feasibility and representation of technological complexity because of the extremely large number of components and resulting technological combinations modeled. A new TNT-ENE initiative will investigate how the future dynamics of technological transitions displayed in GHG mitigation scenarios compare with historical experience. This research will yield an appropriate quantitative baseline for assessing the effects of policies aiming at accelerated technological change and transitions.
Institute-Wide Research & Special Projects

...decision makers and stakeholders around the world are increasingly asking for the improved understanding of complex problems and comprehensive solutions that can only be obtained through interdisciplinary models and analysis.

*Research for a Changing World* (IIASA Strategic Plan 2011–2020, p. 8)

**WATER ACTIVITIES**

Research related to water takes place across IIASA and is an important focus for studies by the FOR and LUC programs into agriculture. In 2010 research included an analysis of the optimal investment strategy in drip and sprinkler irrigation systems under precipitation uncertainty. A collaboration between IIASA, the Beijing Forestry University, and the Swiss Federal Institute for Aquatic Science and Technology made a global assessment of the use of green and blue water in agriculture.

IIASA is one of 23 research partners that make up the four-year, EU-funded, research project SCENES that has developed a set of comprehensive scenarios of Europe’s freshwater futures up to 2025. Another EU-funded project, Water and Global Change, brought together more than 25 institutions in the hydrological, water resources, and climate communities to clarify the overall vulnerability of global water resources. IIASA is providing global spatial data on key components of the water cycle from 1900 to 2100 regarding agricultural, industrial, and domestic uses.

While agriculture is the largest water user worldwide by far, energy production is another consumer of water. A Knowledge Module of the Global Energy Assessment examines the trade-offs between energy, water, and land. A further IIASA study looked at whether the lack of water in the Sahara would stop the development of solar power farms in North Africa.

Ongoing work at IIASA examines the resilience and adaptive capacity of social-ecological systems in river basins. IIASA also worked with its National Member Organizations in India, the Netherlands, and Pakistan to hold workshops in 2010 to consult stakeholders in these countries and so help shape the new research plan for the Food and Water research area.

**INTEGRATED MODELING ENVIRONMENT (IME)**

Now in its fifth year, the Integrated Modeling Environment (IME) Project achieved further significant progress, adding functionality to its advanced Web-based modeling environment for interactive multiple-criteria analysis (MCA) of complex problems of discrete alternatives. Web services, such as a multiple-criteria analysis of energy scenarios for the Global Energy Assessment (GEA), were also developed collaboratively with programs. An EU-funded project on Web-based Decision-Support Systems (DSS) for the operators of energy-efficient buildings was begun, which will be adaptable to the needs of IIASA programs.

There was further research on possible discounting methods for use in evaluations of long-term decisions on the implications of extreme events (scenarios). These provide important insights for models connected with investments in mitigation of extreme events: (i) reinforcement of dikes, dams, networks; (ii) land use and agriculture planning under weather variability; (iii) economic growth under shocks; and (iv) economic evaluation of extreme event mitigation strategies.

A new decision-theoretic approach was published to devise robust security management solutions to protect public goods from systemic threats. Case studies included electricity network and food security studies in Ukraine. New algorithms were developed for multiple-criteria analysis of linear programming models to be linked in 2011 with the new MCA Web site.

[www.iiasa.ac.at/Research/IME](http://www.iiasa.ac.at/Research/IME)
GREENHOUSE GAS INITIATIVE (GGI)

For the third year running, GGI brought together researchers from various IIASA programs in a number of collaborative research projects—in 2010, 18 researchers from eight IIASA programs.

A GGI project on modeling forest structure comprised two research tracks. The first addressed full integration of acclimation, competition, and disturbance processes—for the first time across the different scales of individual plasticity (e.g., in response to climate change) and long-term population–landscape-level competition and disturbance. The second provided understanding of the key qualitative features of highly complex forest growth dynamics needed for optimal forest management (e.g., competition among trees for light).

Another project devised a prototype model of a robust emissions trading market under uncertainties such as volatility due to random “disequilibrium” spot prices and speculations/bubbles. From this model, an international emissions trading (IET) scheme under the Kyoto Protocol was developed to lower the cost of achieving sets of greenhouse gas emission reductions for different countries: emissions would be reduced where it is cheapest and emission certificates then traded to meet the nominal targets in each country.

A project on saving water with renewables aimed to identify the effects on future water use and availability of a transition from fossil fuel use and export to renewable power use and export in Middle East and North Africa (MENA) countries, many of which have ambitious renewable energy targets, involving export of energy to Europe. The most likely technology is concentrated solar power (CSP), which, like fossil fuels, uses substantial amounts of water during energy generation.

In the project on integrated nitrogen management in China, it was estimated that an integrated nitrogen management approach could increase agricultural production by up to 50 percent while maintaining current levels of nitrogen discharge to soil, water, and air at the local scale, that is, 25 percent lower, compared with the business-as-usual case.

In an integrated project on using stratospheric sulfur injections as a “last resort” to halt climate change, GGI researchers looked at the factors surrounding the choice of a suitable start year and injection profile for such an intervention.

www.iiasa.ac.at/Research/GGI

EXtREME EvENTS IN HuMAN SOCIETY (XEVENTS)

The goal of this IIASA initiative is to explore the dynamics of human-caused extreme events and their impact on human systems. The project also aims to understand how turning points in trends could be anticipated, and when these turning points trigger “flips” in a system’s behavior. As the social mood of a population strongly biases social events, a key goal of the project is also to identify early-warning signals of “unknown unknowns” arising in social behaviors and actions.

The first activity of the Xevents project began in February 2010 with the “Game Changers” study which collaborated with a focus group of decision makers in both government and industry to assess possible future transformations by game changers, namely, low-probability, high-impact drivers of the global economy. How might a transformed global economic system look in 2030? What could trigger such a transformation? These global-level issues were then examined at a more detailed level as part of five concrete case studies: the global forest industry; the communications technology ecosystem; the digitalization of printed communications; life sciences; food and drink.

The Game Changers study also carried out major workshops for Scottish and Finnish governments and decision makers. New analytical tools were developed in association with the study.

www.iiasa.ac.at/xevents

HEAltH AND GlobAl CHANGE (HGC)

In 2010 IIASA’s Landis MacKellar chaired the International Council for Science (ICSU) Planning Committee on Health in the Changing Urban Environment, which produced an ICSU global science plan in this area.

HGC collaborated with the Institute for Population Research at Peking University (IPR-PKU) to produce a special volume of Population and Environment on urbanization and the environment in China. In addition, HGC agreed to future collaborative work with IPR-PKU on health issues in China, including extensive inter-institutional cooperation, exchange, and joint research activities.

HGC continued to produce policy-relevant science in its areas of substantive expertise: urbanization and health, infectious disease, including malaria, influenza, and TB; linkages between health and poverty in the developing world; and external causes of death (suicide, homicide, accidents).

www.iiasa.ac.at/Research/HGC
IIASA’s Strategy 2011–2020

In today’s increasingly globalized world, fundamental shifts are taking place in economic and political power, resulting in growing global environmental problems and potentially explosive social conflicts. In response to these global challenges, IIASA will focus its research expertise over the next decade on three major problem areas: Energy and Climate Change; Food and Water; and Poverty and Equity, as well as on three of the main drivers of global transformation: Population; Technology; and Economic Growth. Supporting these activities will be research to advance the methods of systems analysis, ongoing efforts to maximize the impact of the Institute’s research on policy, and capacity-building activities.

ENERGY AND CLIMATE CHANGE

In 2010, 2.5 billion people had no access to modern forms of energy, yet world primary energy demand is expected to increase by 36 percent between 2008 and 2035. Meanwhile, energy production and consumption contribute to over 80 percent of global greenhouse gas emissions and are driving climate change across our planet. Over the next decade IIASA will use advanced systems analysis methodology, including its integrated assessment models MESSAGE and GAINS, to research how the world can best transform to a global low-carbon (green) energy system. The systems analytical approach will identify the best decarbonization options from an economic perspective and also with a view to fostering social and environmental wellbeing. IIASA’s interdisciplinary and international approach will shed new light on some of the greatest energy and climate change challenges of our time, for instance, ways of improving the efficient use of resources and also of revitalizing the greenhouse gas reduction debate.

DRIVERS OF GLOBAL TRANSFORMATIONS

The three key drivers of global transformations are people, technologies, and economic growth. People are the agents of change; technologies are the tools they use. Together, they produce economic growth which, as seen by the recent growth in the emerging economies, can dramatically change the global economic and political landscape. IIASA has an established reputation in integrating demographic methodology such as population projections with related research areas, and studying the uptake and diffusion of technologies. Over the next decade, the Institute’s researchers will explore the ways in which new technologies spread among the general population and how diffusion can be accelerated; the interactions between population, education, poverty, and equity; and sustainable economic development.

ADVANCED SYSTEMS ANALYSIS

At the core of IIASA’s research is advanced systems analysis, which uses mathematical models and analytical techniques to investigate complex systems in an integrated and interdisciplinary manner. Over the next decade IIASA will develop more sophisticated methodologies for systems analysis via a new research program that looks, among other things, at advances in the assessment of dynamical systems, as well as integrated modeling and decision support. An Advanced Systems Analysis Forum will complement the program, introducing external experts specialized in areas such as complexity theory, behavioral and experimental economics, and artificial intelligence.
POVERTY AND EQUITY

Knowledge about the causes of poverty has not been translated into effective policies to reduce poverty. In 2010, 80 percent of humanity lived on less than US$10 a day. Part of the research challenge is to untangle the web of interrelated influences that determine levels of human wellbeing. Through systems analysis, IIASA will explore what drives the social, economic, environmental, and political factors that create such deep inequities in our societies. Specifically over the next decade, IIASA will conduct research into improving the energy access of the poor, breaking the cycle of poverty and ecosystem degradation, reducing poverty through education and economic growth, and reducing the vulnerability of the poor to natural disasters and infectious diseases.

The major challenge of IIASA’s new strategy is to deliver truly integrative analyses that provide insights into the issues at the intersection of these global problems.

FOOD AND WATER

The world’s population is expected to increase by one billion by 2030, but in 2010, 925 million people were already undernourished and 884 million had inadequate access to safe freshwater. Sustainably meeting the growing global demand for food and water requires an improved understanding of the complex interplay of diverse human societies and ecosystems. Over the next decade IIASA will research ways of improving the security of the supply and distribution of food and water, using resources such as global agricultural models (e.g., GAEZ and GLOBIOM), global datasets of natural resources, and methodological advances in the study of evolution and ecology. IIASA will also analyze ways of safeguarding the sustainability of ocean fish stocks and the ecosystems on which they depend, of optimizing the use of terrestrial ecosystem services, and of managing scarce freshwater resources.

POLICY AND GOVERNANCE

The goal of IIASA’s research is to provide policymakers across the globe with real-world solutions to complex problems. To achieve this, the Institute offers open access to high-quality models, data, and analyses on the Web with user-friendly interfaces so that those involved in making decisions can study problems and find solutions relevant to their regional or local circumstances. The Policy and Governance Forum will link the Institute’s researchers more closely to the policy community through ongoing collaboration with policymakers so that research questions can be answered in the most appropriate way to meet their needs. In the Forum, national and regional policy organizations would provide region-specific data and policy perspectives, while IIASA would provide the global modeling and analysis expertise.

CAPACITY BUILDING

While research will remain IIASA’s main mission, capacity building and education will also play an important future role. The Institute will build on its successful Young Scientists Summer Program (YSSP) and Postdoctoral Program to create new educational capacities. IIASA will also offer courses and other study opportunities at IIASA itself and in IIASA’s member countries. (See pages 16–17.)
Young Scientists

Since 1977 over 1,500 young scientists from 80 countries have developed interdisciplinary research skills and joined a network of international researchers by participating in IIASA’s Young Scientists Summer Program (YSSP).

IIASA YSSP PARTICIPANTS 2010
1 Muhammad Amjad, Pakistan 2 Wenfang Chen, China 3 Yang Cheng, China 4 Regina Clewlow, USA 5 Avery Cohn, USA 6 Maud Comboul, France 7 Siyi Feng, China 8 Sarthak Gaurav, India 9 Hamed Ghoddusi, Iran 10 Benjamin Haller, USA 11 Haiguang Hao, China 12 Christine Heumesser, Austria 13 Nimi Hoffmann, Germany 14 Linke Hou, China 15 Alexey Ilin, Russia 16 Igor Istomin, Russia 17 Jessica Jewell, USA 18 Tanya Jukkala, Finland 19 Bernadett Kiss, Hungary 20 Balazs Könnýü, Hungary 21 Sergiy Knyzyuk, Ukraine 22 Ivan Lakya, Ukraine 23 Rennie Lee, USA 24 Olli Lehtomen, Finland 25 Roktaek Lim, Republic of Korea 26 Ling Liu, China 27 Stephey Makungwa, Malawi 28 Hayley McIntosh, South Africa 29 Aviv Melamud, Israel 30 Wei-Shiuen Ng, Singapore 31 Jennifer Nixon, USA 32 Doris Oberdabernig, Austria 33 Preeti Preeti, India 34 Aapo Rautiainen, Finland 35 Wolf Reuter, Germany 36 Katrina Running, USA 37 Carl Salk, USA 38 Mikko Savolainen, Finland 39 Vitalii Skrypnychenko, Ukraine 40 Aline Soterroni, Brazil 41 Stefan Storey, United Kingdom 42 Arame Tall, Senegal 43 Sergey Timonin, Russia 44 Markus Tum, Germany 45 Alma Vega, USA 46 Chen Wang, China 47 Maria Wetterlund, Sweden 48 Glenn Wright, USA 49 Rui Xing, China 50 Xuchao Yang, China 51 Marianne Zeyringer, Austria

www.iiasa.ac.at/YSSP
Postdoctoral Research Fellows

Five postdoctoral scholars gained hands-on research experience at IIASA in 2010 while enriching the Institute’s intellectual environment.

Dr. Erling Lundevaller (Sweden) is focusing on methods for demographic projections, including micro-simulation where the life course of each individual is followed. This allows, inter alia, the spatial-temporal aspects of fertility and mortality to be analyzed, allowing the future composition of populations to be predicted.

Dr. Upasna Sharma (India) is researching issues related to communication of uncertainty associated with climate forecasts and climate hazard warnings, particularly, how the target audience of these forecasts and warnings interpret, understand, and respond to uncertainty.

Dr. Anna Scolobig (Italy) is working on the interplay of science, legislation, and policy in landslide risk management in Italy. Her fieldwork includes the design and testing of a risk perception questionnaire, a communication strategy, and a participatory stakeholder process for choosing appropriate mitigation measures at selected sites in southern Italy.

Dr. Nuno Bento (Portugal) will be investigating growth dynamics in transport to find stronger patterns of change in the sector and new patterns indicating structural changes linked to increasing urbanization and environmental issues.

Dr. Rupert Mazzucco (Austria) is working on computational models of non-allopathic speciation and biodiversity formation along environmental gradients as part of the Evolution and Mathematics project.

Dr. Jose Siri (United States) is researching how urbanization patterns and urban structure affect the transmission of mosquito-borne disease, and how better understanding of the dispersal of humans, vectors, and infection in this context can lead to more effective and efficient public health policy.

Dr. Xiaojie Chen (China) will use evolutionary game theory and adaptive dynamics to focus on the evolutionary dynamics of biological and social systems, especially the emergence and stability of cooperation in social networks.

Dr. Jose Siri (United States) is researching how urbanization patterns and urban structure affect the transmission of mosquito-borne disease, and how better understanding of the dispersal of humans, vectors, and infection in this context can lead to more effective and efficient public health policy.

Following the successful alumni event held at IIASA in October of 2009, membership increased to almost 1,000 in the following months, with quite a few young scientists joining the Society at the end of the YSSP program in August 2010.

Several small Board meetings resulted in the formulation of a paper with suggestions for the future of the Society within the Institute. Peter de Janosi was active in formulating and advising Hans-Holger Rogner, Ruth Steiner, and Linda Kneucker as they worked on the proposal for an Alumni Office within the Institute.

The next alumni event—sponsored jointly by the Institute and the Society—will be held in May 2011 at IIASA. Finally, the Society has launched a new Web site, which was developed by Linda Kneucker, with a great deal of assistance and support by Stefan Pfenninger, a colleague who volunteered to help prepare the site.

www.iiasa.ac.at/IIASA_Society

IIASA Alumni

The IIASA Society is an independent association of IIASA alumni.
New and Returning Researchers

Fifty-six promising and leading researchers joined or returned to IIASA in 2010. They come from 20 countries and have backgrounds in a wide variety of disciplines ranging from geography to engineering. They join the researchers already at IIASA. IIASA’s success owes much to the talent and commitment of its researchers and the staff that support them.

NEW AND RETURNING RESEARCHERS 2009

1 Werner Bayer, Austria 2 Gergely Boza, Hungary 3 Zachary Brown, USA 4 Chunjie Chi, China 5 Shobhakar Dhakal, Nepal 6 Magali Dreyfus, France 7 Hamed Ghoddusi, Iran 8 Probal Ghosh, India 9 Karin Maria Gunther Axelsson, Sweden 10 Sarah Hall, Sweden 11 Benjamin Haller, USA 12 Susanne Hanger, Austria 13 David Hoflacher, USA 14 Hongli Ju, China 15 Chiho Kaito, Japan 16 Peter Klimek, Austria 17 Yuji Kobayashi, Japan 18 Terukazu Kumazawa, Japan 19 Kaarle Kupiainen, Finland 20 Olli Lehtonen, Finland 21 Marilis Lehtveer, Estonia 22 Harold Lentner, USA 23 Myroslava Lesiv, Ukraine 24 Manfred Lex, Austria 25 Juuso Liesiö, Finland 26 Ola Lindroos, Sweden 27 Junguo Liu, China 28 Anders Lunnan, Norway 29 Fabian Mollet, Switzerland 30 Liudmila Mukhortova, Russia 31 Steven Ney, Germany 32 Andrew Noymer, USA 33 Tapio Palokangas, Finland 34 Elsie Pamuk, USA 35 Stefan Pfenninger, Switzerland 36 Ndola Prata, USA 37 Dora Reiner, Austria 38 Wolf Reuter, Germany 39 Ruggero Rossi, Italy 40 Masaki Samejima, Japan 41 Nikola Sander, Germany 42 Victoria Schreitter, Austria 43 Anna Scolobig, Italy 44 Linda See, United Kingdom 45 Martin Spielauer, Austria 46 Stefan Thurner, Austria 47 Selma Ulusoy, Germany 48 Davnah Urbach, Switzerland 49 Diana Urgéne Vorsatz, Hungary 50 Hugo Vail, France 51 Marijn van der Velde, Netherlands 52 Oscar van Vliet, Netherlands 53 Daniela Weber, Austria 54 Keith Williges, USA 55 Masoud Yazdanpanah, Iran 56 Bin Zhao, China
In 2010 some 209 research scholars, research assistants, and postdoctoral research scholars from 43 different countries worked at IIASA. Together, these scientists contributed 115 person-years to IIASA’s research.
International Funding for International Research

IIASA’s main funding came from prestigious scientific institutions, National Member Organizations (NMOs), in 17 countries in Africa, the Americas, Asia, and Europe. Additional funding came from contracts, grants, and donations from governments, international organizations, academia, business, and individuals. These many diverse income sources enabled IIASA to perform research that is truly independent. IIASA would like to thank all those who have given their financial support in 2010.

In 2010 IIASA’s income was €15.8 million, 49 percent of which came from National Member Organizations and 50 percent from contracts, grants, and donations.

In 2010 research represented 68 percent of total expenditure, with 19 percent being spent on infrastructure and only 11 percent on scientific services.

Thank you to our generous donors!

In 2010 IIASA launched its first Annual Fund campaign supporting young scientists from developing countries, while endowment fund efforts to support the creative exploration of new frontiers in systems analysis research at IIASA continued.

IIASA is very grateful to the individuals listed here and six anonymous donors for their contributions and for their belief in the goals and mission of this Institute.

**SUMMARY OF FINANCIAL ACTIVITIES**

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<thead>
<tr>
<th></th>
<th>2010 (€)</th>
<th>2009 (€)</th>
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<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMO contributions</td>
<td>7,753,271</td>
<td>7,988,404</td>
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<tr>
<td>Contracts, grants, donations</td>
<td>7,899,830</td>
<td>8,143,684</td>
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<tr>
<td>Other income</td>
<td>179,216</td>
<td>246,586</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>15,832,317</td>
<td>16,378,674</td>
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<tr>
<th></th>
<th>2010 (€)</th>
<th>2009 (€)</th>
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<tbody>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
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<tr>
<td>Research</td>
<td>10,352,286</td>
<td>10,810,509</td>
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<tr>
<td>Infrastructure</td>
<td>2,951,636</td>
<td>2,941,600</td>
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<td>Scientific services</td>
<td>1,613,068</td>
<td>1,626,802</td>
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<tr>
<td>Depreciation</td>
<td>287,466</td>
<td>313,966</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>15,204,456</td>
<td>15,692,877</td>
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</tbody>
</table>
Contracts, Grants, and Donations 2010

- Austrian Development Agency, Vienna, Austria
- Austrian Exchange Service, Vienna, Austria
- Austrian Federal Forests, Pankersdorf, Austria
- Austrian National Bank, Anniversary Fund (OeNB), Vienna, Austria
- Austrian Science Fund, Vienna, Austria
- Federal Ministry for Science and Research, Vienna, Austria
- Joanneum Research, Graz, Austria
- Kommunalkredit Public Consulting GmbH, Vienna, Austria
- Max F. Perutz Laboratories GmbH, Vienna, Austria
- Transport and Environment asbl, Brussels, Belgium
- The China Sustainable Energy Program, Beijing, China
- National Emergency Supply Agency, Helsinki, Finland
- Metso Corporation, Helsinki, Finland
- UPM-Kymmene Corporation, Helsinki, Finland
- Itella Corporation, Itella, Finland
- Finnish Innovation Fund, Helsinki, Finland
- Ministry of Employment and the Economy, Helsinki, Finland
- Elinkeinoelämän Tutkimuslaitos, Helsinki, Finland
- Sanoma Corporation, Helsinki, Finland
- Secretariat of the Economic Council, Prime Minister’s Office, Finland
- Daimler AG, Stuttgart, Germany
- Forschungsverbund Berlin e.V., Berlin, Germany
- The Alfred Wegener Institute for Polar and Marine Research, Potsdam, Germany
- Institute of Communication and Computer Systems, National Technical University of Athens, Greece
- Italian Agency for New Technology, Energy and the Environment, Rome, Italy
- AP EnvEcon, Dublin, Ireland
- Global Environmental Forum, Ibaraki, Japan
- Research Institute of Innovative Technology for the Earth, Kyoto, Japan
- Tokyo Electric Power Company, Tokyo, Japan
- Toyota Motor Corporation, Aichi, Japan
- The International Livestock Research Institute, Nairobi, Kenya
- Korea Science and Engineering Foundation, Daejeon-City, Republic of Korea
- Ecosy, Utrecht, Netherlands
- European Climate Foundation, The Hague, Netherlands
- Ministry of Housing, Spatial Planning and the Environment, The Hague, Netherlands
- Netherlands Environmental Assessment Agency, Bilthoven, Netherlands
- Norwegian Meteorological Institute, Oslo, Norway
- Russian Academy of Sciences, Moscow, Russia
- Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
- Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, Stockholm, Sweden
- Stockholm Centre on Health of Societies in Transition, Huddinge, Sweden
- Federal Office for the Environment, Berne, Switzerland
- Scottish Government, Edinburgh, United Kingdom
- CATF – Clean Air Task Force, Boston, MA, USA
- Duke University, Durham, NC, USA
- Global Environment & Technology Foundation, Arlington, VA, USA
- Pew Research Center, Washington, DC, USA
- University of Southern California, Los Angeles, CA, USA
- European Commission, DG Environment, Brussels, Belgium
- European Commission, DG Environment, LIFE, Brussels, Belgium
- European Commission, DG Fisheries and Maritime Affairs, Brussels, Belgium
- European Commission, DG Information Society and Media
- European Commission, DG Research, Brussels, Belgium
- European Commission, Executive Research Council Executive Agency, Brussels, Belgium
- European Commission, Executive Agency for Competitiveness and Innovation, Brussels, Belgium
- United Nations Industrial Development Organization, Vienna, Austria
- European Science Foundation, Strasbourg, France
- International Energy Agency, Paris, France
- United Nations Environment Programme, Paris, France
- Food and Agriculture Organization of the United Nations, Rome, Italy
- United Nations Environmental Programme, Nairobi, Kenya
- United Nations Economic Commission for Europe, Geneva, Switzerland
- United Nations Population Fund, New York, NY, USA
- The World Bank, Washington, DC, USA
ABOUT IIASA

IIASA is an international, independent, interdisciplinary research institution with 39 years’ experience in researching global change. IIASA is sponsored by its National Member Organizations. On 1 January 2011 these were:

**AUSTRIA** The Austrian Academy of Sciences
**BRAZIL** Center for Strategic Studies and Management in Science, Technology and Innovation (CGEE)
**CHINA** The National Natural Science Foundation of China
**EGYPT** The Academy of Scientific Research and Technology (ASRT)
**FINLAND** The Finnish Committee for IIASA
**GERMANY** The Association for the Advancement of IIASA
**INDIA** The Technology Information, Forecasting and Assessment Council (TIFAC)
**JAPAN** The Japan Committee for IIASA
**MALAYSIA** Academy of Sciences Malaysia
**NETHERLANDS** The Netherlands Organization for Scientific Research (NWO)
**NORWAY** The Research Council of Norway
**PAKISTAN** The Pakistan Academy of Sciences
**POLAND** The Polish Academy of Sciences (Observer Country)
**REPUBLIC OF KOREA** National Research Foundation of Korea (NRF)
**RUSSIA** The Russian Academy of Sciences
**SOUTH AFRICA** The National Research Foundation
**SWEDEN** The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)
**UKRAINE** The Ukrainian Academy of Sciences
**UNITED STATES OF AMERICA** The National Academy of Sciences