



IIASA Overview

1.1 What is IIASA?

Founded in 1972, IIASA is an international scientific institute that conducts policy-oriented research into problems that are too large or too complex to be solved by a single country or academic discipline. Problems like climate change that have a global reach and can be resolved only by international cooperative action. Or problems of common concern to many countries that need to be addressed at both the national and international level, such as energy security, population aging, and sustainable development. Funded by scientific institutions in the Americas, Europe, Asia, Oceania, and Africa, IIASA is independent and unconstrained by political or national self-interest. IIASA's mission is to:

provide insights 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 protect the environment.

1.2 Who is IIASA?

Over 300 mathematicians, social scientists, natural scientists, economists, and engineers from over 45 countries carry out research at IIASA in Laxenburg, Austria, at the heart of Europe. These range from world-renowned scholars – four Nobel Prize laureates have worked at IIASA – to young scientists just embarking on their careers. In addition, research networks consisting of around 2,500 associated and visiting researchers from 65 countries collaborate with IIASA, including collecting and processing local and regional data for integration into IIASA's advanced scientific models. It is through such scientific collaboration that IIASA is building bridges among countries.

1.3 Quick Facts

- In 2014, 323 researchers from 45 countries worked at IIASA, 1,400 collaborators visited IIASA, and ~25% of IIASA alumni were actively involved in the Institute. Together, they made up IIASA's global research network of ~2,500 scholars and over 550 partner institutions in over 65 countries.
- Annual budget in 2014 was €19.4 million, of which 56% was from IIASA's National Member Organizations (NMOs): prestigious scientific institutions in 22 countries in the Americas, Asia, Europe, Oceania, and Africa (see section 1.4).
- Additional funding comes from contracts and grants. Between 2006 and 2014, IIASA's research was awarded grants that amounted to €69 million. This was part of a total funding portfolio of €329 million of the external projects in which IIASA was and is involved in collaboration with its member countries.

- IIASA had its most successful year to date in terms of scientific publishing in 2014. Its researchers published nearly 250 journal articles and IIASA's research was cited over 9,100 times (source: SCOPUS).
- IIASA has 3,475 alumni from over 90 countries among them leading personalities in academia, government, and the private sector.
- A total of 1,772 young scientists from 84 countries have participated in IIASA's Young Scientists Summer Program since 1977.

1.4 IIASA Member Countries/ National Member Organizations (NMOs)

Click on country name to see main activities between IIASA and member country since 2008.

Australia	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Austria	The Austrian Academy of Sciences
Brazil	The Center for Strategic Studies and Management in Science, Technology and Innovation (CGEE)
China	The National Natural Science Foundation of China (NSFC)
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)
Indonesia	The Indonesian National Committee for IIASA
Japan	The Japan Committee for IIASA
Korea, Republic of	National Research Foundation of Korea (NRF)
Malaysia	Academy of Sciences Malaysia (ASM)
Mexico	Mexican National Committee for IIASA
The Netherlands	The Netherlands Organization for Scientific Research (NWO)
Norway	The Research Council of Norway (RCN)
Pakistan	The Pakistan Academy of Sciences
Russian Federation	The Russian Academy of Sciences (RAS)
South Africa	The National Research Foundation (NRF)

Sweden	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)
Ukraine	The Ukrainian Academy of Sciences
United Kingdom	Research Councils of the UK
United States of America	The National Academy of Sciences (NAS)
Vietnam	Vietnam Academy of Science and Technology (VAST)

1.5 Short History

- IIASA was the result of an initiative by the United States and the Soviet Union to create links between scientists from East and West during the Cold War;
- In October 1972 the IIASA charter was signed in London by 12 National Member Organizations;
- In 1994 a Ministerial Conference renewed the mandate for the Institute to conduct independent, scientific research with a global perspective; since then members from Asia, the Americas, Oceania, and Africa have joined IIASA;
- In 2009 IIASA’s governing body, the IIASA Council, approved a new ten-year research strategy to reposition IIASA’s research in the light of the transformational changes taking place in the world.

1.6 Research Framework

IIASA’s mission is to provide scientific 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. Systems analysis approaches are used to explore multiple complex global systems – for example, climate change, energy, agriculture, atmosphere, risk and population dynamics – and most significantly the ways in which they interact.

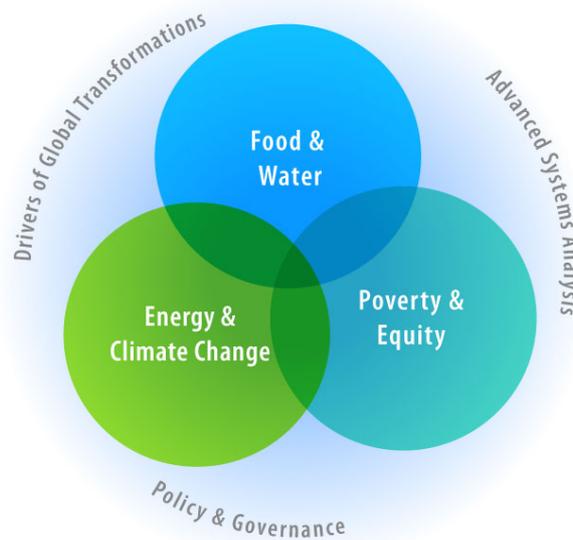
IIASA has a long and successful history of developing systems-based integrated solutions and policy advice for some of the world’s most pressing problems, including energy resources, climate change, environmental pollution, population demographics, land use and sustainable development, risk and resilience. IIASA is both international, with active collaborations in over 60 countries, and politically independent, with its governance and core funding provided by prestigious scientific institutions across its [National Member Organizations](#) (NMOs) in 23 countries, which together represent over 60% of the global population.

IIASA’s research is strategically focused in three main areas:

- [Energy & Climate Change](#) – focuses on the interactions between energy production, greenhouse gas emissions, air pollution, climate change, and the application and diffusion of new technologies.
- [Food & Water](#) – covering a broad scope of disciplines from biology to Earth science, aims to balance the maintenance of biodiversity with the needs of agriculture and food security.

- [Poverty & Equ](#)
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Research in the three global problem areas is supported by research into the main [drivers of the transformations](#) taking place in our world: population, technology, and economic growth.

All IIASA research is peer-reviewed according to the highest international standards and policy-relevant and geared toward provision of robust solutions to the challenges of international, regional, and national [policy and governance](#).

The methodology used at IIASA since the foundation of the Institute in 1972 is [advanced systems analysis](#). Both methodology and data are constantly updated and refined in-house to respond to emerging research needs.

IIASA's greatest strength is that its multidisciplinary research is problem-driven and solution-oriented, conducted with scientific excellence and policy relevance as its main principles.

A summary of recent research highlights across these major research areas can be found in [IIASA's Annual Report](#).

1.7 Research Programs

Currently nine research programs carry out research at IIASA into the dynamics of global change. A brief overview, including recent research highlights, of each of these individual research programs is provided below. One of the most significant advantages of IIASA is the ability to bring together scientists from across these programs, and our international partners, to build interdisciplinary teams that can undertake research at the intersections of these research areas, such as the nexus

between food, energy, risk, water, population, climate, and land use, all within a science-to-policy framework. This is a truly unique position among international research institutes.

Advanced Systems Analysis (ASA)

The [Advanced Systems Analysis](#) (ASA) Program's mission is to develop novel methods for systems analysis and exploratory applications of systems approaches to areas of global change science, thus ensuring IIASA remains internationally recognized as the leader in systems analysis and integrated assessments on a global scale. The program operates by means of small-scale exploratory collaborative interdisciplinary projects.

ASA's research deals with complex socio-environmental systems using a stylized approach, organized around three areas: optimal behavior of systems; interdependencies within systems; and resilience of systems.

Ecosystems Services and Management (ESM)

The [Ecosystems Services and Management](#) (ESM) Program aims to improve our understanding of ecosystems in today's changing world—in particular, the current state of ecosystems, and their ecological thresholds and buffering capacities.

The strategic goal of ESM is supporting policy makers in developing rational, realistic and science-based regional, national and global strategies for the production of food, feed, fiber, and bio-energy that sustain ecosystem services and safeguard food security. By using advanced theories of applied systems analysis, new information technologies and integrated biophysical, social and economic modeling techniques; ESM is charting possible pathways to the future by linking ecosystems, society, policy, and governance.

Energy (ENE)

The goal of the [Energy](#) Program is to provide scientific and strategic analysis to better understand the dynamics of future energy transitions, their main driving forces, enabling factors, barriers, as well as their consequences for the social, economic and environmental dimensions of human wellbeing. The Program aims to support policy making by studying mechanisms and levers that would permit the transformation of the present energy system to one that is cleaner and more sustainable. The research strategy combines basic and applied research with a focus on integrated assessment, energy policy modeling, and the development of decision-analytical frameworks for policy integration. Science-based policy advice is achieved through an *integrated* assessment and modeling of how to simultaneously address the major energy policy challenges in the areas of environment (climate change and air pollution), energy poverty (or access to affordable and clean energy for the poor), energy security and reliability. The Program's niche builds upon the systematic and holistic analysis of energy policy objectives and their interactions in order to identify possible synergies and trade-offs. This includes the identification of salient co-benefits from meeting a range of energy-development objectives that at the same time are robust against the multiple uncertainties that the future entails.

Evolution and Ecology (EEP)

Developing new methods and pioneering their applications, the [Evolution and Ecology Program](#) (EEP) analyzes and forecasts how ecological and evolutionary dynamics shape populations,

communities, and ecosystems, and how behavioral adaptations, incentives, and regulations determine the fate of groups of interacting agents.

Modern approaches to describing complex adaptive systems need to account for nonlinear feedbacks, non-equilibrium dynamics, discontinuities and break points, collective phenomena, systemic transitions, behavioral dynamics, as well as multi-level and multi-scale interactions among processes and agents. Ecology is the quintessential systems science, dealing with such challenges in a holistic way. This approach is complemented by studies of adaptation and evolution, to account for the ubiquitous capacity of agents to alter their features and interactions in response to environmental change. Furthermore, applied mathematics and theoretical physics contribute advanced tools to the diverse mix of methodologies that is characteristic of EEP's research. On this basis, EEP is building bridges between fundamental and policy-oriented, theoretical and empirical, biological and mathematical, and analytical and computational approaches to the systems analysis of the living world.

Mitigation of Air Pollutants and Greenhouse Gases (MAG)

Given the current impasse in global climate policy regimes and the urgency for a quick reversal in global greenhouse gas emission trends to avoid dangerous climate change, IIASA's [Mitigation of Air Pollution and Greenhouse Gases](#) (MAG) program develops new perspectives to highlight measures that make cost-effective contributions to development, human health, agricultural production and biodiversity at the local scale and in the near term, and at the same time yield positive side-effects on climate change. The program develops a systems perspective of the interactions between anthropogenic activities, emission control measures, economic impacts, their health, vegetation, ecosystems and climate effects, and how they interact across different spatial and temporal scales. Fed into a common framework (the 'Greenhouse gas – Air pollution Interactions and Synergies' – GAINS model), a variety of systems methods are used to identify concrete measures that yield multiple benefits for local and global policy objectives.

These analyses are of immediate policy relevance for industrialized and developing countries. They provide scientific guidance to a range of international policy initiatives, such as the Convention on Long-range Transboundary Air Pollution, the climate and air quality policies of the European Union, the Arctic Council, and the newly founded Climate and Clean Air Coalition.

Risk, Policy and Vulnerability (RPV)

The [Risk, Policy and Vulnerability](#) (RPV) program examines environmental and socio-economic risks with the aim of providing an analytical foundation for the management and governance of natural disasters, addressing climate change, and easing the technological and ecological transitions to sustainability. RPV is organized around five research themes:

- *Risk Analysis and Modeling* develops and applies novel methodologies to assess risks arising in socio-economic-ecological systems.
- *Understanding disaster resilience* links agendas on sustainable development, disaster risk management, and climate change adaptation.
- *Socioeconomics of risk management and climate adaptation* is concerned with the significant knowledge gaps regarding comprehensive risk management interventions in terms of their efficiency, effectiveness, equity and acceptability.

- *Risk Pooling and Sharing* examines disaster risk insurance and other financing mechanisms with special emphases on how they distribute the disaster burden and provide incentives to reduce disaster impacts.
- *Governance in Transition* analyzes how governance structures shape policy outcomes by contributing to research on decision-making processes, public acceptance, risk perception, cognitive biases, and cultural perspectives, as well as participatory governance design.

Transitions to New Technologies (TNT)

The strategic goal of the [Transitions to New Technologies](#) (TNT) Program is to further the understanding of the patterns, dynamics, and constraints of technological change, and its drivers and impacts, particularly in areas key for framing global sustainability conditions.

TNT's research aims for improved empirical understanding that feeds into new modeling approaches of technological change as input to national and international policy processes. The emphasis is on the treatment of technological uncertainty, spatial and actor heterogeneity, and assessments of the potential economic and societal impacts of the pervasive diffusion and adoption of new technologies.

An important objective of TNT is to disseminate policy-relevant research findings through global forums and major international scientific assessments. These include, most notably, the Intergovernmental Panel on Climate Change (IPCC), the Global Energy Assessment (GEA), the International Council for Science (ICSU), and strategically chosen new initiatives such as the Sustainable Development Solutions Network (SDSN), Global Carbon Project (GCP), and ICSU's Future Earth initiative.

Water (WAT)

The objectives of IIASA's [Water](#) Program (WAT) are to compile, consolidate and enhance knowledge of global water supply and demand balances, to advance the incorporation of hydrology and hydrologic uncertainty into integrated assessment modeling efforts and scenario development, and to provide a sound scientific basis for responding to current and future global water challenges by assessing the robustness and complementarity of portfolios of measures being proposed as solutions, throughout various water-related sectors and management scales, against a range of possible future socio-economic changes and technological innovations, in the context of global environmental challenges such as climate change.

World Population (POP)

IIASA's [World Population Program](#) (POP) addresses the human development dimension of global change. It comprehensively studies the changing size and composition of human populations around the world and analyzes both their impacts and the differential vulnerabilities by age, gender and level of education.

Over the past years, POP has spearheaded several methodological innovations that have significant impact for our understanding of contemporary global challenges. These range from the development of the first probabilistic population projections to work on redefining age and aging, as well as innovative analysis of demographic aspects of cognitive aging, labor force participation and health.

POP is also a world leader in the analysis of population and environment interactions and, in particular, in developing scenarios on population and climate change in the context of IPPC.

1.8 IIASA Futures Initiatives

IIASA has recently established a series of initiatives to focus research on global issues that are undergoing major transitions and of interest to a significant number of IIASA member countries. The projects focus on international hotspots such as the Arctic or Eurasian integration or cross-sector areas like energy or tropical land-use. System analysis is one of the few methods that has the breadth and depth to find long lasting solutions to these global challenges.

Global Energy Assessment

The Global Energy Assessment (GEA), published in 2012, aims to transform the way society thinks about, uses, and delivers energy. It provides technical guidance on measures to foster sustainable resource consumption and mitigate climate change. It also includes policy-relevant guidance for governmental and intergovernmental organizations, decision-support material for the commercial and energy sectors, plus analyses relevant to academics. Specialists from many disciplines, industry groups, and policy areas worldwide contributed to the GEA.

Arctic Futures Initiative

IIASA is in the process of setting up an Arctic Futures Initiative in order to conduct a holistic, integrative assessment of plausible futures of the Arctic, that cuts across different disciplines and individual countries' strategic interests. IIASA's neutrality and scientific expertise will enable it to integrate the multiple perspectives of different countries, researchers, policy makers, business, and the media.

Tropical Futures Initiative

The Tropical Futures Initiative is a novel approach to tackling tropical deforestation through policy assessment and capacity building. The multiyear project coordinated by IIASA includes the following partners: The Indonesian national agency on Reducing emissions from deforestation and forest degradation (REDD+), the Indonesian Delivery Unit to the President (UKP4), the Brazilian Institute for Applied Economic Research (IPEA), and the Brazilian Institute for Space Research (INPE). The Initiative plans to expand from tropical deforestation into interconnected issues such as greenhouse gas emissions, air pollution, agriculture, and water.

Eurasian Economic Integration

The international and interdisciplinary research project "Challenges and Opportunities of Economic Integration within a wider European and Eurasian Space," coordinated by IIASA, aims to discuss and analyze critical issues of economic cooperation between the enlarged EU, Customs Union of Russia, Belarus, and Kazakhstan and their neighbors including China, Japan, and Korea, which could lay the foundation for a broader pan-European/Eurasian Economic Space.

Water Futures and Solutions

Water Futures and Solutions is a partnership between IIASA, UNESCO, the World Water Council, and the Korean Government. It aims to provide a scientific basis for responding to worldwide water

challenges by testing possible optional solutions against a number of scenarios for socioeconomic change and to bring together decision makers to discuss a common vision for the future.

1.9 Programs and Fellowships for Young Scientists

Postdoctoral Fellows Program

- Goals: to encourage and promote the development of young researchers and offer them the opportunity to further their careers by gaining hands-on professional research experience in a highly international scientific environment; and to enrich IIASA's intellectual environment and help achieve research program goals.
- Highlights:
 - Fellows conduct their own research within one of IIASA's research programs or special projects on topics closely related to IIASA's agenda.
 - 12–24-month opportunity
 - 42 postdoctoral scholars from 17 countries since the program began in 2006

Young Scientists Summer Program (YSSP)

- Goals: To expose young scientists to an international and interdisciplinary environment of analyzing complex global problems; to introduce young scientists to new research methods; to train a new generation of scholars.
- Highlights:
 - Offered annually June-August
 - Unique research opportunities for advanced science students
 - Hands-on research with IIASA senior research staff
 - 1,772 young scientists from 84 countries since 1977

Southern African Young Scientists Summer Program

- Goals: provides the opportunity for doctoral candidates to advance their research under the direct supervision of senior scientists from IIASA and South Africa, and at the same time contribute to IIASA's on-going scientific agenda and to the South African Department of Science and Technology's "Grand Challenges."
- Highlights:
 - Participants conduct research at the University of the Free State in Bloemfontein, South Africa.
 - 3-month opportunity
 - 80 young scientists from 20 countries since the program began in 2012