

## What is IIASA?

Founded in 1972, IIASA is an international scientific institute that conducts policy-oriented research into problems that are too large or 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 that need to be addressed at both the national and international level, such as energy security, population aging, and sustainable development. Funded by research funding agencies in Africa, the Americas, Asia, and Europe, IIASA is independent and unconstrained by political or national self-interest. The IIASA 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.*

## Who is IIASA?

Over 300 mathematicians, social scientists, natural scientists, economists, and engineers from 50 countries carry out research at IIASA in Austria, at the heart of Europe. These range from world-renowned scholars—five Nobel Prize laureates have worked at IIASA—to young scientists just embarking on their careers. In addition, research networks consisting of almost 4,000 associated and visiting researchers from 86 countries collaborate with the institute, including collecting and processing local and regional data for integration into advanced scientific models developed at IIASA. It is through such scientific collaboration that IIASA is building bridges among countries.

## Quick facts

- In 2017, 382 researchers from 48 countries worked at IIASA, 2,421 collaborators visited the institute, and around 25% of alumni were actively involved in its work. Together, they made up a global network of over 3,500 scholars and over 830 partner institutions.
- There were 611 IIASA publications in 2017, of which 396 were peer-reviewed journal articles, and IIASA research was cited 18,212 times (source: SCOPUS).
- IIASA has 4,028 alumni from 87 countries among them leading personalities in academia, government, and the private sector.
- A total of 1,920 young scientists from 87 countries have participated in the IIASA Young Scientists Summer Program since 1977.
- Annual budget in 2017 was €21 million, of which 58% was from prestigious research funding agencies in member countries spanning Africa, the Americas, Asia, Europe and Oceania (see page 2).
- Additional competitive funding from contracts and grants totaled €52 million between 2012 and 2017. This is part of a funding portfolio of €265 million—the total awarded to external partner and consortia projects featuring collaborations with IIASA.

IIASA in Brief: More information about IIASA and its activities at [www.iiasa.ac.at/infokit](http://www.iiasa.ac.at/infokit)

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## IIASA governance, member countries, and National Member Organizations

Twenty-three countries, representing over 61% of the world's population and 71% of the world's economy, are members of IIASA. Countries are represented by their National Member Organizations which are part of the IIASA [governing Council](#) and provide or facilitate the core funding of the institute (see table below). In return IIASA helps its members to:

1. Find solutions to the complex global challenges that impact a country's economy, environment, and society.
2. Develop their research base for systems analysis.
3. Establish new multilateral scientific relationships that contribute to a country's soft power.

Country	National Member Organization
<a href="#">Austria</a>	The Austrian Academy of Sciences
<a href="#">Brazil</a>	The Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES)
<a href="#">China</a>	The National Natural Science Foundation of China (NSFC)
<a href="#">Egypt</a>	The Academy of Scientific Research and Technology (ASRT)
<a href="#">Finland</a>	The Finnish Committee for IIASA
<a href="#">Germany</a>	The Association for the Advancement of IIASA
<a href="#">India (Observer)</a>	The Technology Information, Forecasting and Assessment Council (TIFAC)
<a href="#">Indonesia</a>	The Indonesian National Committee for IIASA
<a href="#">Iran</a>	Iran National Science Foundation (INSF)
<a href="#">Israel</a>	The Israel Committee for IIASA
<a href="#">Japan</a>	The Japan Committee for IIASA
<a href="#">Korea, Republic of</a>	National Research Foundation of Korea (NRF)
<a href="#">Malaysia</a>	Academy of Sciences Malaysia (ASM)
<a href="#">Mexico</a>	Mexican National Committee for IIASA
<a href="#">The Netherlands</a>	The Netherlands Organization for Scientific Research (NWO)
<a href="#">Norway</a>	The Research Council of Norway (RCN)
<a href="#">Russian Federation</a>	The Russian Academy of Sciences (RAS)
<a href="#">South Africa</a>	The National Research Foundation (NRF)
<a href="#">Sweden</a>	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)
<a href="#">Ukraine</a>	The Ukrainian Academy of Sciences
<a href="#">UK</a>	Research Councils of the UK
<a href="#">USA</a>	The National Academy of Sciences (NAS)
<a href="#">Vietnam</a>	Vietnam Academy of Science and Technology (VAST)

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## Short history

- IIASA was the result of an initiative by the USA 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 Africa, the Americas, Asia, and Oceania have joined IIASA.
- In 2009 the institute's governing body, the IIASA Council, approved a new ten-year research strategy to reposition IIASA research in the light of the transformational changes taking place in the world.

## IIASA research framework

The IIASA mission is to provide scientific insight and guidance to policymakers worldwide by finding solutions to global problems through applied systems analysis.

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. These include energy resource issues, climate change, environmental pollution, land use, risk and resilience, and population growth. These multiple dimensions require a unique approach that can link diverse complex systems. The IIASA research framework, discussed in detail in the [Research Plan 2016–2020](#), shows how the institute can provide the holistic, systems analysis approach that is needed (*see Figure 1*).

The previous IIASA research framework was divided into problem areas (e.g., energy and climate), their drivers (e.g., economic and population growth), and impacts (e.g., environmental degradation). However, problems, drivers, and impacts are closely related elements of systems analysis, and advances in scientific understanding have shown that integrating drivers and impacts can give insights into innovative new solutions.

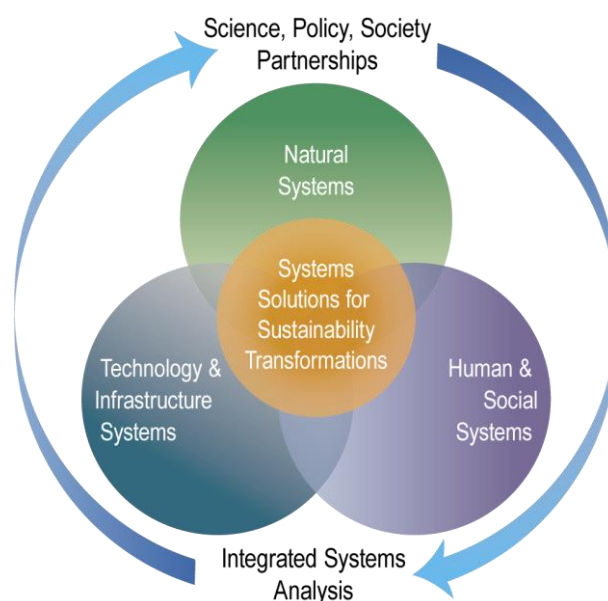


Figure 1: The IIASA research framework.



**Figure 2: The IIASA research themes.**

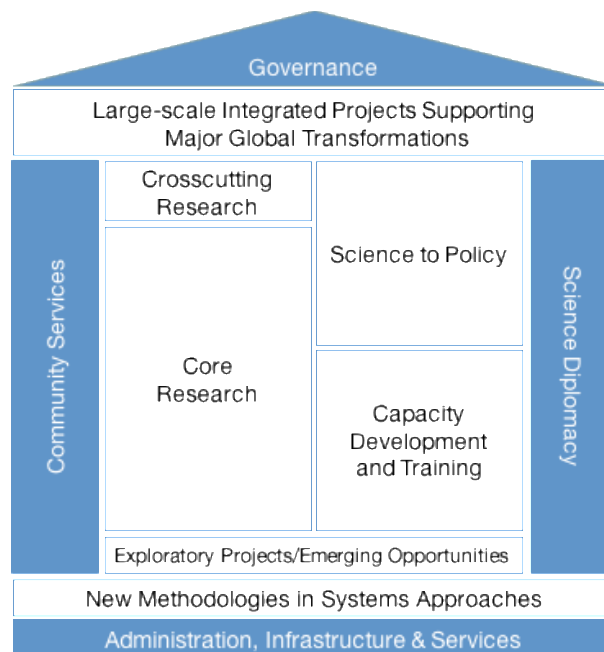
This framework provides both the foundation for the institute’s research direction over the next five years and the necessary flexibility to modify IIASA activities to accommodate changing scientific or policy priorities.

Within this general framework, IIASA has strategic research themes (*see Figure 2*). The outer circles show the current nine research programs and the proposed new Global Health Program. The inner circle represents integrated research activities at IIASA. Importantly, the diagram shows how each of the research programs intersect and contribute to these integrated projects, an increasing focus of IIASA research.

The institute achieves its impact primarily by:

- Undertaking large-scale, multi-year integrated projects to analyze the major global transformations.
- Undertaking world-class research, through its research programs, cross-cutting activities, and international networks.
- Undertaking small-scale, exploratory projects around emerging issues.
- Developing new methods in systems approaches, not only in research but also in how that research is delivered to policymakers and other stakeholders.
- Working in partnership with policy and decision makers, globally, regionally, and nationally, to translate this research into robust policy options.
- Building global capacity in systems analysis and IIASA methods and tools.

In addition, IIASA hosts and maintains a number of databases and models used by scientists and policymakers. The institute also plays an important role in science diplomacy, using science to build bridges across increasingly complex political divides.



**Figure 3: The various roles of IIASA and its paths to impact. Note that the relative sizes of the elements in the diagram do not represent relative resource allocations or effort within each role.**

A summary of recent IIASA highlights across these major roles can be found in the report [Research for a Changing World: IIASA Highlights 2011–2015](#).

Using global concepts, models, and datasets, the holistic, multidisciplinary approach at IIASA produces integrated pathways for many global transitions, which in turn can be downscaled to regional, and often national, scales. Conversely, the institute also investigates regional dynamics themselves to investigate how they might affect global transformations.

## Large-scale integrated projects supporting major global transformations

IIASA has multiple major research initiatives that are designed to work at the intersection of global issues, in addition to internally funded, methodology-focused projects that cut across several disciplines.

### The World in 2050 (TWI2050)

[TWI2050](#) is a new initiative to develop integrated pathways for achieving the UN Sustainable Development Goals (SDGs). Despite the agreed importance of the SDGs, the world lacks a clear understanding of the cost of inaction and how they can all be achieved at once. TWI2050 will map out a business-as-usual pathway highlighting implications for economic wellbeing, social inclusion, and environmental sustainability at the global scale and in key regions. This will be compared with sustainable development pathways to understand the operational implications of achieving inclusive economic and social development goals within planetary boundaries.

### Integrated Solutions for Water, Energy, and Land (IS-WEL)

The [IS-WEL](#) partnership aims to develop an assessment framework for informing decision-making regarding the sustainable development of water, energy, and land resources at urban, regional, and global scales. The project will focus on the food-water-energy nexus in the context of other major global challenges such as urbanization, environmental pressure and equitable and sustainable futures.

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## CD-Links

The [Linking Climate and Development Policies – Leveraging International Networks and Knowledge Sharing](#) (CD-LINKS) project aims to develop pathways to show how climate change mitigation could be integrated into sustainable development, and what synergies or trade-offs might arise.

## Arctic Futures Initiative

Research efforts regarding the Arctic are multiple, but fragmented. There is a need for an integrated assessment of plausible futures, cutting across different disciplines and individual countries' strategic interests. The [Arctic Futures Initiative](#) works collaboratively with key Arctic institutions and organizations to bring together affiliated stakeholders to support an integrated, “end to end” science-to-decision-making framework.

## Eurasian Economic Integration

During recent decades, international economic policies have been turning towards regional integration. The [Challenges and Opportunities of Economic Integration within a Wider European and Eurasian Space](#) Initiative aims to discuss and analyze critical issues of economic cooperation between the EU, Eurasian Economic Union, and their neighbors, extending, where relevant, to the USA as well as the key Asian players, such as China, India, Japan, and Korea.

## Tropical Futures Initiative

The [Tropical Futures Initiative](#) (TFI) aims to tackle tropical deforestation through policy assessment and capacity building. Since its launch, TFI has worked very closely with government institutions in Indonesia as well as various research institutes to adapt and apply IASA models that are relevant for the region. The Global Biosphere Management Model (GLOBIOM) is used as an entry point in supporting policymakers to conduct integrated assessments of land use. The work done in Indonesia will be based on the template of a REDD-Policy Assessment Center initiative in Brazil and the Congo Basin.

## Water Futures and Solutions

[Water Futures and Solutions](#) applies systems analysis to help identify water policies and management practices that work together consistently across scales and sectors. This Futures Initiative produces stakeholder informed assessments, which employ multi-model ensembles of socioeconomic and hydrological models.

## Cross-cutting projects

IIASA has a number of internally funded, methodology-focused projects which examine unaddressed research challenges that require an integrated and interdisciplinary focus. These include: [Equitable Governance of Common Goods](#); [Socioeconomic Heterogeneity in Model Applications](#); [Systemic Risk and Network Dynamics](#); the new climate community scenario framework; and dynamic vegetation models: the next generation.

## Research programs

Currently nine research programs carry out research at IIASA into the dynamics of global change. A brief overview of each of these individual programs is provided below.

### Advanced Systems Analysis Program (ASA)

[ASA](#) is uniquely positioned to use the latest developments in systems analysis and modeling to expedite the transfer of application to methods and methods to application to either solve problems that cannot be addressed by existing tools or solve problems more efficiently. ASA's sophisticated

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methods offer insights into previously intractable problems, helping applied scientists reach solutions to complex, real-world problems cutting across social, economic, and environmental dimensions. Conversely, ASA also brings new applied problems to the attention of the mathematical community, triggering spill-over methodological developments.

### **Air Quality and Greenhouse Gases Program (AIR)**

[AIR](#) explores new ways of delivering cost-effective reductions to air pollution that aid human health, agriculture, and biodiversity, while also yielding positive side-effects for climate change. Integration with other IASA programs results in pioneering research into the interplay between rural and urban air pollution. AIR provides a perspective that integrates multiple policy objectives; time and spatial scales; and economic sectors. This assists decision makers in devising smart solutions that deliver tangible benefits to society.

### **Ecosystems Services and Management Program (ESM)**

The goal of [ESM](#) is to support development of realistic strategies for the production of food, fiber, and bio-energy that sustain ecosystem services and safeguard food security. Guiding production and consumption choices that are consistent across scales and compatible with equitable access to multiple ecosystem services is a scientific challenge that ESM is uniquely positioned to address. Using its cluster of linked land-resource assessment tools ESM identifies incremental and transformational policies for ecosystem management and improved human wellbeing.

### **Energy Program (ENE)**

[ENE](#)'s research spans many domains, including research in energy security, energy and poverty, and energy-environment links, and necessarily adopts a holistic and integrated perspective. A main strength of the program is its ability to understand salient trade-offs and synergies between multiple policy objectives in different sectors. Quantitative assessments of the energy needs for poverty eradication enables policymakers to link energy planning to development goals.

### **Evolution and Ecology Program (EEP)**

In social dynamics, behaviors adapt through individual and collective learning, and in biological dynamics, genes adapt through evolution under selection pressures. Addressing these universal challenges in managing the biosphere, [EEP](#) devises models of complex adaptive systems. EEP work raises global awareness that rapid adaptations cannot be ignored if living systems are to be understood, predicted, and managed. The program also serves as a hub for the development of cutting-edge methods for analyzing adaptive systems; and pioneers applications to case studies.

### **Risk and Resilience Program (RISK)**

The major risks facing the world—from food and water security to global climate change—are complex, systemic, and far-reaching. [RISK](#) takes an interdisciplinary, systems perspective with the vision of transforming the way societies manage these risks while confronting the global trends amplifying them. The program puts strong emphasis on enhancing the resilience of vulnerable communities, countries, and regions. Through research and active engagement, RISK's work has influenced deliberations on the UN International Mechanism for Loss and Damage, and the Sendai Framework.

### **Transitions to New Technologies Program (TNT)**

The next technological revolution toward sustainability will most certainly transform the world. [TNT](#) focuses on the causes of technological change and on policies for development and diffusion of new technological systems. Large networks, in-house databases, and modeling frameworks have been

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developed, allowing TNT to address technological change from an interdisciplinary and international perspective, and to inform policy measures for achieving a sustainable future. The program helps integrate innovation and technological change; engages in community research activities; and provides timely policy advice.

### **Water Program (WAT)**

The expertise in applied systems analysis offered by [WAT](#) provides an interdisciplinary approach ensuring harmonized data, methods, and tools; consistency across sectors and scales; and continuity of outputs. WAT acts as a knowledge hub for systems analysis approaches to the global water challenge, disseminating multi-model, multi-sector, multi-scale analysis. These activities give the program a strong position within major international research projects and a strong influence on the science-policy dialogue.

### **World Population Program (POP)**

[POP](#) leads the world in the study of the changing number and distribution of humans on the planet, and the consequences for sustainable development. This complements IIASA work on environmental topics, and makes IIASA the only global change research institute with significant in-house competence on the human population and its wellbeing. POP directs international discussions on population policy away from a narrow focus on population growth alone, to a multi-dimensional perspective with explicit consideration of age-structures, place of residence, education, and health.

## **Programs and fellowships for early-career researchers**

Capacity development and training at IIASA is an integral part of the institute's activities, and its mission to ensure that IIASA analyses and systems approaches inform solutions to the world's challenges. The institute's most visible capacity development activities are the Young Scientists Summer Program and Postdoctoral Program. However, IIASA research programs have also conducted targeted training in IIASA methods as elements of research collaborations or in partnership with National Member Organizations efforts to build national capacities in systems analysis.

### **Postdoctoral program**

The IIASA postdoctoral program aims to encourage and promote the development of early-career researchers. The fellowships offer them the opportunity to gain hands-on professional research experience in a highly international scientific environment. In return, they enrich the intellectual environment at IIASA and help achieve research goals.

Fellows conduct their own research within one of the research programs or special projects on topics closely related to the IIASA agenda.

In addition to the IIASA-funded postdoctoral fellowships, there are a number of IIASA fellowships funded by our National Member Organizations (NMOs), and bilateral deals have been agreed with Brazil, Finland, Mexico, the Republic of Korea, and Sweden

In 2017, there were a total of 27 postdocs at IIASA. This included, 14 funded by IIASA, seven funded by NMO bilateral postdoctoral fellowship programs, two funded by the Peter de Jánosi fellowship program, and one funded by the Luis Donaldo Collosio fellowship program.



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## Young Scientists Summer Program (YSSP)

The renowned IIASA YSSP allows students to work alongside distinguished IIASA researchers for three months, gaining new insight into their own field of research as well as those of the institute. By introducing young scientists to new research methods in this way IIASA trains a new generation of scholars. Overall 1,920 young scientists from 87 countries have benefitted from the program since 1977.

### Further reading

IIASA Strategic Plan 2011–2020 [www.iiasa.ac.at/Strategy](http://www.iiasa.ac.at/Strategy)

IIASA Highlights 2011–2015 [www.iiasa.ac.at/Highlights2015](http://www.iiasa.ac.at/Highlights2015)

IIASA Research Plan 2016–2020 [www.iiasa.ac.at/ResearchPlan](http://www.iiasa.ac.at/ResearchPlan)

IIASA PURE (Publications Repository) [pure.iiasa.ac.at](http://pure.iiasa.ac.at)

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