



Services to the Research Community: Models, Tools, and Data

IIASA serves as a repository for key datasets on energy, climate, population, and land cover, developed by the Institute and its international research network. IIASA works to ensure that our data and tools are available for use by researchers and policymakers worldwide. Our models and tools are developed in collaboration with stakeholders and applied to challenges at the global, regional, national and sub-national level. IIASA also acts as a convening hub to compare, improve and unify models. This sheet provides an overview of these resources. For more detail, please visit the [IIASA Web site](#).

Data

Climate and energy

IIASA hosts a number of key databases for scenarios and data used by the international climate and energy research communities. For example, IIASA hosts both the **Representative Concentration Pathways (RCP)** and **Shared Socioeconomic Pathways (SSP)** databases, which form the next generation of scenarios for the Intergovernmental Panel on Climate Change (IPCC). The Institute also hosts the **scenarios database** for the IPCC Fifth Assessment Report (AR5). Key energy databases include the **Global Energy Assessment Scenarios Database**, as well as scenarios databases for the **AMPERE** and **LIMITS** projects, international projects conducted by a consortium of energy researchers from around the world.

- [Representative Concentration Pathways \(RCP\) Database](#)
- [Shared Socioeconomic Pathways \(SSP\) Database](#)
- [Energy and Carbon Emissions Inventories Database](#)
- [Global Energy Assessment Scenario Database](#)
- [AMPERE Scenario Database](#)
- [IPCC AR5 Scenarios Database](#)
- [LIMITS Scenario Database](#)
- [Primary, Final and Useful Energy Database](#)
- [Scaling Dynamics of Energy Technologies](#)

Land use, land cover and water

IIASA hosts important, worldwide databases related to land cover, agriculture and water, including the **Global Agro-ecological Zones (GAEZ)**, developed by IIASA and the UN Food and Agriculture

Organization to provide key data for food security, and land use and water planning. The **Geo-Wiki** database provides remote sensing validation data produced by IIASA's global network of citizen scientists. IIASA also provides country-level data from research projects, such as the **Hybrid Land Cover of Russia**, **Land Resources of Russia**, and **Russian Forests and Forestry Database**.

- [Global Agro-ecological Zones \(GAEZ\)](#)
- [Geo-Wiki](#)
- [Harmonized World Soil Database](#)
- [Hybrid Land Cover of Russia](#)
- [Land Resources of Russia](#)
- [Russian Forests and Forestry Database](#)
- [Water and Global Change programme \(WATCH\) database](#)

World population

IIASA's new **population projections**, released in 2014, provide the broadest-ever population projections for every nation in the world, including projections for education, age, and sex up to 2100. These projections form the societal core of the SSP databases. IIASA researchers have been at the forefront of demographic methodology development since the 1970s. These projections are available online.

- [World Population and Human Capital Projections 2014 \(Wittgenstein Center Data Explorer\)](#)

Models and Tools

Air pollution and climate

Traditional air pollutants and greenhouse gases have many common sources. These emissions may interact in the atmosphere, and—jointly and individually—lead to harmful environmental consequences at local, regional, and global scales. IIASA's **GAINS model** explores cost-effective emission control strategies to tackle local and regional air quality as well as greenhouse gases so as to maximize benefits at all scales.

- [Greenhouse Gas - Air Pollution Interactions and Synergies \(GAINS\)](#)

Public versions with national or subnational level data and analysis can be accessed for [Europe](#), [China](#), [South Asia](#) and [Annex I countries](#). Another regional version (Latin America and Caribbean) and a global application are under development and will be available for public access in 2015.

Additionally, a number of national applications (accessible and operated within project consortia) of the GAINS model have been developed including specific versions for France, Italy, the Netherlands, Poland, Russia, South Korea, and Sweden.

Energy and technology

IIASA provides a number of energy models for researchers and policymakers exploring alternative energy scenarios and their impacts on emissions and climate mitigation strategies. For example, the **Energy Multi-Criteria Analysis Tool (MCA)** provides an interactive online platform for decision makers to assess sustainable energy development pathways, while the **LSM2** model can be used to

examine the economic development of technology substitution processes over time. For bioenergy planning, the **BEWHERE model** combines environmental and land-cover data with economic constraints and production potential, to help determine optimal locations for new bioenergy plant construction.

- [Energy Multi-Criteria Analysis Tool \(MCA\)](#)
- [Energy Access Interactive Tool \(ENACT\)](#)
- [Logic Substitution Model \(LSM2\)](#)
- [Model for Energy Supply Strategy Alternatives and their General Environmental Impact \(MESSAGE\)](#)—country versions have been developed with local partners in Brazil and China as well as being used by more than 70 countries as part of energy planning activities of the IAEA (International Atomic Energy Agency).
- [Techno-economic model for renewable energy systems optimization \(BeWhere\)](#)—country and regional versions have been developed with local experts for Austria, China, Europe, the European Alps, India, Indonesia, Japan, and Sweden.

Land use and agriculture

Land use models can help researchers and policymakers understand the linkages and interconnections between land use, food production and food security, water resources, climate change, and other questions. For example, IIASA's **Global Biosphere Management Model (GLOBIOM)** is used by policymakers and international organizations such as the International Food Policy Research Institute (IFPRI) to support agriculture and climate policy development around the world.

- [Environmental Policy Integrated Model \(EPIC\)](#)
- [Global Agro-ecological Zones \(GAEZ\)](#) – many country-scale and regional-scale studies have been conducted with more detailed data with Mauritius the most recent study.
- [Global Forest Model \(G4M\)](#)
- [Global Biosphere Management Model \(GLOBIOM\)](#)—national versions of GLOBIOM have been developed with local partners for Brazil, Canada, the Congo basin, and Indonesia.
- [World Food System Model \(WFS\)](#)

Disaster

The IIASA **Catastrophe Simulation Model (CATSIM)** helps policymakers, particularly in developing countries, devise public financing strategies for disaster mitigation and recovery, which can be implemented in both pre- and post-disaster contexts. It has informed more than 24 countries including India, Indonesia, Mexico and the Philippines as well as the Indian Ocean region.

- [Catastrophe Simulation \(CATSIM\)](#)

Convening Hub

IIASA regularly convenes global modeling teams to conduct intercomparisons between sectoral models in order to develop unified approaches, and to analyze the differences in methodologies and results in order to better understand their relative merits, and improve their usefulness in applications.

Recent model intercomparison projects have taken place via the Integrated Assessment Modeling Consortium (IAMC), of which IIASA is a founding member, and have explored, for example, the [role of technology for achieving ambitious climate targets](#). Other projects have compared agricultural models as part of [AgMIP](#) to, for instance, analyze the [future of food demand](#); or compare global hydrology models in the [Water Model Intercomparison Project](#); or investigate [climate change impacts on a broad range of sectors](#) as part of the [Inter-Sectoral Impact Model Intercomparison Project](#).