International Institute for Applied Systems Analysis (IIASA)

IIASA & Brazil

Professor Dr. Pavel Kabat

IIASA Director General and Chief Executive Officer
IIASA’S ORIGIN AND NICHE
THE 1960s

Sources: US Department of Interior, The Guardian
Premier Alexei Kosygin and President Lyndon Johnson during the meeting in Glassboro in 1967
HISTORICAL FOCUS: EAST - WEST

2000: 12 NMOs + 3 affiliate NMOs (Global North)
TODAY’S FOCUS: GLOBAL

2017:24 – 25 NMOs
(Global North and Global South)
IIASA 2017 – 24 COUNTRIES
(NATIONAL MEMBER ORGANIZATIONS)

- International, independent, interdisciplinary
- Research on major global problems
- Solution oriented, integrated systems
Bridging new divides........
RESEARCHING GLOBAL CHALLENGES

- Integrated
- Interdisciplinary
- International
- Independent
- Solution-oriented
- Long term
- Trade-offs

= Systems Analysis
Shall I Compare Thee To A Summer’s Day?

by William Shakespeare

Shall I compare thee to a summer’s day?
Thou art more lovely and more temperate.
Rough winds do shake the darling buds of May,
And summer’s lease hath all too short a date,
Sometime too hot the eye of heaven shines,
And often is his gold complexion dimm’d;
And every fair from fair sometime declines,
By chance or nature’s changing course untrimm’d;
But thy eternal summer shall not fade
Nor lose possession of that fair thou ow’st;
Nor shall Death brag thou wander’st in his shade,
When in eternal lines to time thou grow’st:
So long as men can breathe or eyes can see,
So long lives this, and this gives life to thee.
Vertical and horizontal investment—that is, research program (vertical) investment to maintain core capability versus cross-program (horizontal) investment to promote integration and collaboration.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Research Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-cutting research</td>
<td>ASA</td>
</tr>
<tr>
<td>Nexus++</td>
<td>✅</td>
</tr>
<tr>
<td>Equitable governance</td>
<td>✅</td>
</tr>
<tr>
<td>Socioeconomic heterogeneity</td>
<td>✅</td>
</tr>
<tr>
<td>Systemic risk &amp; network dyn.</td>
<td>✅</td>
</tr>
<tr>
<td>Climate community scenarios</td>
<td>✅</td>
</tr>
<tr>
<td>Dynamic vegetation models</td>
<td>✅</td>
</tr>
<tr>
<td>Large-scale integrated projects supporting global transformations</td>
<td>ASA</td>
</tr>
<tr>
<td>Arctic Futures</td>
<td>✅</td>
</tr>
<tr>
<td>Eurasian Econ. Integration</td>
<td>✅</td>
</tr>
<tr>
<td>Tropical Futures</td>
<td>✅</td>
</tr>
<tr>
<td>Water Futures</td>
<td>✅</td>
</tr>
<tr>
<td>TWI2050</td>
<td>✅</td>
</tr>
<tr>
<td>IS-WEL</td>
<td>✅</td>
</tr>
</tbody>
</table>
IIASA HIGHLIGHTS 2011-2015

http://www.iiasa.ac.at/web/home/about/achievements/Highlights.html
IIASA ENHANCED SYSTEMS RESEARCH FRAMEWORK
2016-2020

Science, Policy, Society Partnerships

Systems Approaches for Global Transformations

IIASA Research Plan 2016 – 2020

Given the changing international and scientific landscape, what will continue to make IIASA unique and relevant over the next 10-20 years? And value added to organizations such as:
IIASA’S UNIQUE APPROACH

1. IIASA’s members
2. IIASA’s truly integrated and international research
3. IIASA’s science to policy has impact
4. IIASA’s science diplomacy
IIASA NATIONAL MEMBERS:
Represent scientific and science to policy community of a country and are often the National Academy or principal research funding agency.
IDENTIFY AND IMPLEMENT MUTUALLY BENEFICIAL ACTIVITIES (examples)

<table>
<thead>
<tr>
<th>GLOBAL</th>
<th>REGIONAL</th>
<th>NATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Global Energy Assessment</td>
<td>• Arctic Futures Initiative</td>
<td>• Linking globally focused IIASA studies to national interests</td>
</tr>
<tr>
<td>• Climate Change Scenarios</td>
<td>• Eurasian Economic Integration</td>
<td>• IIASA models and methods applied to national issues</td>
</tr>
<tr>
<td>• Global Food Analysis</td>
<td>• Tropical Futures Initiative</td>
<td></td>
</tr>
</tbody>
</table>

IIASA’s value proposition is a combination of global, regional and national system analytical collaborative projects and capacity development and training activities.
Young Scientists Summer Program 2008-2015

China 54
USA 77
France 4

Publications from country collaborations 2008-2014

Germany 691
Austria 1052
Israel 3
GAINS – Integrated Assessment Model to identify cost-effective measures to improve air quality and reduce greenhouse gas emissions

<table>
<thead>
<tr>
<th>National versions of GAINS model</th>
<th>China</th>
<th>Netherlands</th>
<th>Republic of Korea</th>
<th>Russia</th>
<th>Sweden</th>
<th>Turkey?</th>
</tr>
</thead>
</table>

IAMC - Advancing the methods of integrated assessment modeling

IAMC Founders

IIASA

Japan

USA

Canada?
Integrated land-use modeling for globally consistent national and regional land use and restoration policies that safeguard and enhance other ecosystem values, in particular those distinguished by the CBD.
MESSAGE: Model for Energy Supply System Alternatives and their General Environmental Impacts

**INPUT**

- Energy system structure (including vintage of plant and equipment)
- Base year energy flows and prices
- Energy demand projections (e.g. MAED)
- Technology and resource options & their techno-economic performance profiles
- Technical and policy constraints

**OUTPUT**

- Primary and final energy mix
- Electricity generating mix
- Capacity expansion/retirement
- Emissions & waste streams
- Resource use (energy, water, land, etc.)
- Trade & import dependence
- Investment requirements
- Prices
Distribution of MESSAGE to IAEA Member States
IIASA –IAEA collaboration

Model transferred to 102 countries by the end of 2015
In 2002, MESSAGE was introduced to Brazilian researchers at the Energy Planning program at the Universidade Federal do Rio de Janeiro.

Energy Research Company of Brazil’s Ministry of Mines and Energy uses MESSAGE as its official modeling tools.

MESSAGE helps Brazilian energy planners design long-term strategies.
REGIONAL APPROACH

ARCTIC

EURASIA

MIDDLE EAST

TROPICS

PACIFIC RIM
Tropical Futures Initiative

• Goal: to cover all three tropical basin (South America, Congo Basin and Southeast Asia)

• What is so special about TFI?
  – Global changes and the tropics (go well beyond the forests with integrated systems analysis)

• Multi year project with seed funding by IIASA. Need additional (international) funding

• Partners: IIASA; Brazil (INPE and IPEA); Indonesia (MoA, MEMR, WWF, ICRAF); Bandung Institute of Technology; Congo Basin (COMIFAC)
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IIASA AS A GLOBAL HUB FOR SYSTEM ANALYSIS RESEARCH

• 1,815 visitors & collaborators in 2015
• Plus ~25% of IIASA alumni (3,875 people worldwide) remain actively involved in IIASA research
• Plus ~650 partner institutions
• In sum, ~3000 researchers from some 65 countries involved in IIASA’s research network (external faculty)
• And it is not just research networks: IIASA researchers took part in 112 advisory boards and steering committees in 2015
ATTRACTING THE BEST RESEARCHERS

Professor Paul Crutzen
Nobel Prize for Chemistry (1995)

Professor Tjalling Koopmans
and Professor Leonid Kantorovich
Nobel Prize in Economics (1975)

Professor Thomas C. Schelling
Nobel Prize for Economics (2005)

Professor Lawrence Klein
Nobel Prize in Economics (1980)

Authors of the Intergovernmental Panel
on Climate Change Reports
Nobel Peace Prize (2007)
ATTRACTING THE BEST RESEARCHERS

OF TODAY

Professor Jeffrey Sachs

OF TOMORROW

Professor Johan Rockström
RESEARCHER MOBILITY

Number of Researchers Employed by IIASA (2010-16)

Full versus Part Time Researchers Employed by IIASA in 2016

<table>
<thead>
<tr>
<th>Research Staff</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leavers</td>
<td>106</td>
<td>119</td>
<td>97</td>
</tr>
<tr>
<td>Newcomers</td>
<td>129</td>
<td>125</td>
<td>115</td>
</tr>
<tr>
<td>Returning researchers</td>
<td>27</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td>Nationalities</td>
<td>48</td>
<td>49</td>
<td>45</td>
</tr>
</tbody>
</table>
"It is often at the intersection of disciplines that the most exciting and groundbreaking advances are made."
INTERNATIONAL COLLABORATIONS (2015)

562 publications
including 315 peer-reviewed articles

1014 authors
from 462 institutions
in 50 countries
OPEN IIASA

• Open access to publications:

6935 publications freely available

• Open access to data:

24 databases and tools freely available

• Developing an open access to data policy including community-developed IIASA modeling tools
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IIASA RESEARCH HAS HAD A POSITIVE IMPACT

2. EU National Emissions Ceiling Directive
3. EU Thematic Clean Air Strategy
4. EU Climate and Energy Strategy for 2030
5. Climate and Clean Air Coalition to reduce short-lived climate pollutants
6. Objectives of the UN Secretary General’s Sustainable Energy for All Initiative
7. Shaping the Sustainable Development Goal on Energy
8. Helps Brazil with long term planning for future energy
9. Emission scenarios for IPCC Third, Fourth and Fifth Assessment Reports
10. Pioneer and development of integrated assessment models
11. Climate smart agriculture in China
12. Catastrophe Bonds to make Mexican public finances resilient to major natural disasters
13. Pest management practices in forests in North America and Scandinavia
14. Forest management practices in Russia
15. Underpins US Dept of Justice antitrust case against Microsoft (technology lock-in)
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3. IIASA’s science to policy has impact
4. IIASA’s science diplomacy
IIASA Charter (1972): “Convinced that science and technology, if wisely directed, can benefit all mankind, Believing that international co-operation between national institutes promotes co-operation between nations and so the economic and social progress of peoples; Hereby resolve to establish an International Institute for Applied Systems Analysis.”
GLOBAL NETWORK OF FOREIGN MINISTRY SCIENCE AND TECHNOLOGY ADVISERS

- Science diplomacy short course at IIASA, 18-19 October 2016
- Co-organized with Fletcher School of Law and Diplomacy at Tufts University, and the International Network of Government Science Advice
- Teaching from science advisors from foreign ministries in Japan, New Zealand, UK and USA
- Participants from foreign ministries in Argentina, Chile, Ghana, Kazakhstan, Kenya, Malaysia, Oman, Panama, Poland, Senegal, South Africa, Ukraine, and Vietnam among others.
Bridging new divides........
CONTENTS

1. Brazil and IIASA – Joint objectives
2. Summary of Brazil and IIASA partnership
3. National Member Organization
4. Some Leading Brazilian Personalities Associated with IIASA
5. Research Partners
6. Research Collaborations: Selected Highlights
7. Capacity Building
8. Further Information
BRAZILIAN STRATEGIC RESEARCH THEMES 2017

BRAZILIAN THEMES
- Multi-use forest management
- Food safety
- Climate Change
- Research and Infrastructure
- Technology and Innovation

IIASA THEMES
- Systems Approaches:
  - Ecosystem Services & Management
  - Water
  - Energy
  - Air Quality and Greenhouse Gases
  - Transitions to New Technologies
### SUMMARY (2011-2017)

<table>
<thead>
<tr>
<th>National Member Organization</th>
<th>The Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership start date</td>
<td>2011</td>
</tr>
<tr>
<td>Research partners</td>
<td>32 organizations in Brazil</td>
</tr>
</tbody>
</table>
| Areas of research collaborations | Toward a sustainable energy future in Brazil  
|                               | Global Energy Assessment and Brazil  
|                               | Stopping deforestation in Brazil  
|                               | Co-benefits: Improving air quality and tackling climate change  
|                               | Projecting demographic change in Brazil  
|                               | Advancing the modeling of complex systems                                       |
| Capacity Building             | 12 doctoral students from Brazil have participated in IIASA's Young Scientists Summer Program. In 2016, a new Brazil-IIASA Doctoral Sandwich and Postdoctoral Fellowship program that will fund up to three Brazilian Ph.D. students and up to three Brazilian postdocs at IIASA was announced. |
| Other Interactions            | 82 publications have resulted from Brazilian-IIASA collaborations. Researchers, advisors, and diplomats from Brazil have visited IIASA 36 times, while IIASA scientists have visited Brazil over 79 times. |
NATIONAL MEMBER ORGANIZATION

- The Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES).
- Professor Concepta McManus Pimentel, Director of International Relations, represents CAPES at IIASA’s Council.
- Ms. Cyntia Sandes Oliveira, International Relations Advisor, is the NMO Secretary for Brazil.
SOME LEADING BRAZILIAN PERSONALITIES ASSOCIATED WITH IIASA

Connie McManus Pimentel  Carlos Nobre  José Goldemberg  Bernardo Strassburg

Glaucius Oliva  Suani T. Coelho  Paul Artaxo  Eduardo Delgado Assad
32 institutions in Brazil, including:

- Amazon Environmental Research Institute (IPAM)
- Brazilian Corporation of Agricultural Research (EMBRAPA)
- Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES)
- Center for International Forestry Research (CIFOR), Brazil office in Rio de Janeiro
- Center for Strategic Studies and Management (CGEE)
- Federal University of Mato Grosso
- Institute of Applied Economic Research (IPEA)
- Ministry of Science, Technology, Innovation, and Communications (MCTIC)
- National Center for Natural Disaster Monitoring and Alarms (Cemaden)
- National Council for Scientific and Technological Development (CNPq)
- National Institute for Space Research (INPE)
- Sao Paulo State University
RESEARCH COLLABORATIONS

Selected Highlights:

- Sustainable Agriculture
- Energy Future in Brazil
- The World in 2050
- CD-LINKS
- Projecting changing population in Brazil
CAPACITY BUILDING

• 12 doctoral students from Brazil have won places on IIASA’s Young Scientists Summer Program since 2008.
CAPACITY BUILDING

- Two Brazilian researchers have participated in IIASA’s postdoctoral program.
BRAZIL-IIASA DOCTORAL SANDWICH AND POSTDOCTORAL PROGRAM

Postdocs:

Ph.D. students: Rafael Cancella Morais Vágrna da Costa Pereira Luís Gustavo Tudeschini
FURTHER INFORMATION

IIASA
www.iiasa.ac.at

The Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES) Foundation
www.capes.gov.br