



## Activities with Member Countries

# Pakistan

Researchers from IIASA and Pakistan have carried out a range of research collaborations since the Pakistan Academy of Sciences joined IIASA as the National Member Organization for Pakistan in 2007. Joint studies have analyzed how to increase Pakistan’s resilience to natural disasters and explored ways to increase agricultural productivity. Other projects have examined how Pakistan can capture the demographic dividend and benefit from a growing portion of its population that is of working age, and identified the most efficient ways to reduce air pollution in the country. Thirteen doctoral students from Pakistan have developed their international and interdisciplinary research skills along with expanding their networks by taking part in IIASA’s Young Scientists Summer Program or its southern African version. Knowledge transfer between Pakistan and IIASA is also facilitated through researchers working together on joint publications and through visits either by IIASA researchers to Pakistan or Pakistani researchers to IIASA. This IIASA Info Sheet provides a summary of this expanding and mutually beneficial relationship since 2008.

Highlights of Interactions Between IIASA and Pakistan (former member)	
<b>National Member Organization</b>	Pakistan Academy of Sciences
<b>Membership dates</b>	2007-2017
<b>Key research partners</b>	12 Pakistani organizations collaborate with IIASA including: <ul style="list-style-type: none"> <li>■ Global Change Impact Studies Centre (GCISC)</li> <li>■ Institute for Social and Environmental Transitions – Pakistan (ISET Pakistan)</li> <li>■ Lahore University of Management Sciences (LUMS)</li> <li>■ Pakistan Academy of Sciences (PAS)</li> <li>■ Pakistan Institute for Environment-Development Action Research (PIEDAR)</li> <li>■ Pakistan Institute of Development Economics (PIDE)</li> <li>■ Pakistan Institute of Engineering and Applied Sciences (PIEAS)</li> <li>■ Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)</li> <li>■ Population Council (Pakistan office)</li> </ul>
<b>Areas of research collaboration</b>	<ul style="list-style-type: none"> <li>■ Increasing Pakistan’s resilience to natural disasters</li> <li>■ Improving food security in Pakistan</li> <li>■ Projecting demographic change in Pakistan</li> <li>■ Rethinking water management and use for households, agriculture and energy</li> <li>■ Smart ways to clean up Pakistan’s air</li> <li>■ Assessing the environmental impact of energy use</li> </ul>
<b>Capacity building</b>	13 doctoral students from or studying in Pakistan have taken part in the Young Scientists Summer Program or its Southern African version
<b>Publication output</b>	12 publications have resulted from IIASA-Pakistan collaborations
<b>Other interactions</b>	Researchers, advisors, and diplomats have either visited IIASA from Pakistan or visited Pakistan from IIASA over 15 times

## Activities with Member Countries: Country

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IIASA Info Sheets provide succinct summaries of IIASA activities.  
They do not necessarily reflect the views of IIASA staff, visitors,  
or National Member Organizations.

This Info Sheet summarizes IIASA's recent interactions with Pakistan.  
It includes highlights with links to further information but is  
not meant to be a comprehensive report on all interactions.

Feedback and updates are encouraged and should be sent to Iain Stewart.

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## IIASA's National Member Organization in Pakistan

The Pakistan Academy of Sciences (PAS) is IIASA's National Member Organization (NMO) for Pakistan, representing the nation's academic and policy communities. PAS is the supreme scientific body of distinguished scientists in Pakistan and provides independent scientific opinion on all matters relating to scientific education, research and development in Pakistan. PAS has primary responsibility for IIASA in Pakistan and is supported by the NMO secretariat which is currently based at the Lahore University of Management Sciences (LUMS). The membership fees of IIASA are funded by the Planning Commission of Pakistan.

Professor Dr Kauser Abdulla Malik, the HEC Distinguished National Professor (Biotechnology) and Dean of Postgraduate Studies at Forman Christian College in Lahore, is the IIASA Council Member for Pakistan. The IIASA Council consists of one representative of each of IIASA's National Member Organizations and is responsible for setting the overall strategic direction of the Institute as well as governing IIASA. Dr Abubakr Muhammad, Assistant Professor of Electrical Engineering at the LUMS School of Science & Engineering, is the NMO Secretary for Pakistan.

PAS has established a Pakistan-IIASA National Committee to encourage links and develop collaborations between IIASA and Pakistan universities, institutes and government agencies, as well as to strengthen systems analysis research in Pakistan. The committee is comprised of members from both academia and government in Pakistan with experience of IIASA and/or its priority research areas. The current members are:

### Pakistan-IIASA National Committee Members

Professor Ahsan Iqbal; Federal Minister for Planning, Development and Reforms

Professor Ishfaq Ahmed; Chairman Board of Governors, National Center for Physics; former Advisor to the Prime Minister; former President of the Pakistan Academy of Sciences

Professor Kauser Abdulla Malik; Distinguished National Professor, Forman Christian College University

Dr Syed Javaid Khurshid; Director, Planning & Projects Coordination, Pakistan Atomic Energy Commission

Mr Ali Hassan Habib; Executive Director, WWF-Pakistan

Dr Shaukat Hameed Khan; former Member, Planning Commission of Pakistan

Dr Arshad Mohammad Khan; Executive Director, Global Change Impact Studies Centre

Dr Saeed Shafqat; Director, Center of Public Policy and Governance, Forman Christian College University

Mr Naseer Gilani; Chief, Water Section, Planning Commission of Pakistan

Dr Abubakr Muhammad; School of Science and Engineering, Lahore University of Management Sciences

**Professor Ishfaq Ahmed**, former Advisor to the Prime Minister and former President of the Pakistan Academy of Sciences was IIASA Council Member for Pakistan from 2007 to 2012.

**Dr Rashid Amjad**, Vice Chancellor, Pakistan Institute of Development Economics, collaborates with IIASA's demographers to analyze how Pakistan can capture the demographic dividend.

**Dr Arshad Mohammad Khan**, Executive Director, Global Change Impact Studies Centre was the IIASA NMO Secretary for Pakistan from 2008 to 2012.

**Dr Abubakr Muhammad**, Assistant Professor of Electrical Engineering at the LUMS School of Science & Engineering, coordinates institutional collaboration with the IIASA. He has served as the Pakistan NMO Secretary since 2012.

**Dr Adil Najam** was the third Vice Chancellor of the Lahore University of Management Sciences (LUMS) and is currently Dean of the Pardee School of Global Studies at Boston University. He served as the IIASA Council Member for Pakistan from 2012 to 2013.

*The Pakistan Academy of Sciences represents Pakistan and its scholarly community on IIASA's governing Council*

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Some leading Pakistani personalities in academia and government who are associated with IIASA

Some leading Pakistani personalities in academia and government who are associated with IIASA

**Dr Zeba Sathar**, Country Director, Population Council, Pakistan, works with IIASA's population experts.

A high-level consultative meeting in Islamabad in 2010, focusing on IIASA's Food and Water Research Theme, helped shape IIASA's Research Plan for 2011 to 2015. Over 60 representatives from Pakistani organizations attended, including four Chiefs of sections from Pakistan's Planning Commission (**Dr Aurangzeb Khan**, Chief (Environment); **Mr Noor Ahmad**, Chief (Food and Agriculture); **Mr M Irfan Qureshi**, Chief (Plan Coordination); **Mr Munir Ahmed Anjum**, Chief (Transport & Communication); **Dr Qamar-uz-Zaman Chudhary**, Director General, Pakistan Meteorological Department; **Mr Syed Mahmood Nasir**, Inspector General of Forests; and **Mr Imtinan Qureshi**, Executive Director, COMSATS Institute of Information Technology.

## Research Partners in Pakistan

*IIASA is continually developing collaborations with Pakistan and has recently worked with 12 organizations in Pakistan via formal and informal connections*

IIASA works with research funders, academic institutions, policymakers and individual researchers in Pakistan. The following list includes the names of the organizations or the individual's affiliated institutions that have all recently collaborated with IIASA.

CARE International, Pakistan  
 Global Change Impact Studies Centre (GCISC)  
 Institute for Social and Environmental Transitions – Pakistan (ISET Pakistan)  
 Karachi Institute of Technology and Entrepreneurship (KITE)  
 Lahore University of Management Sciences (LUMS)  
 Pakistan Academy of Sciences (PAS)  
 Pakistan Institute for Environment-Development Action Research (PIEDAR)  
 Pakistan Institute of Development Economics (PIDE)  
 Pakistan Institute of Engineering and Applied Sciences (PIEAS)  
 Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)  
 Population Council (Pakistan office)  
 University of the Punjab

## Recent Research Collaborations

### *Increasing Pakistan's resilience to natural disasters*

An international research project brought together experts from IIASA, India, Nepal, Pakistan, UK and USA to develop a suite of methods and analytical cases to evaluate the costs and benefits of measures to reduce the risks and impacts of water related disasters. The Pakistani case study focused on flood risk reduction options along the Lai River in urban Rawalpindi. Collaborators in Pakistan included the Pakistan office of the Institute for Social and Environmental Transitions, and the Pakistan Institute for Environment-Development Action Research (PIEDAR). Among other findings, the researchers highlighted the measures with the greatest benefit-cost ratio, as well as the value of developing and implementing coherent multi-hazard plans that cross sectors and scales (from local to national).

*IIASA's risk experts and a variety of Pakistani research collaborators have evaluated the costs and benefits of disaster risk reduction measures in Pakistan*

### *Improving food security in Pakistan*

The agricultural sector in Pakistan consumes 96% of the country's available fresh water resources. A growing population and uncertainty about how climate change may affect rainfall poses greater demands on Pakistan's water resources. A recent study examined whether an investment into water-saving irrigation options, such as canal lining, dredging, water-saving irrigation technologies, and on farm water storage are feasible options to improve profits of the farmers.

*Research projects are analyzing how to improve the management of Pakistan's land and water resources*

Pakistan is home to rangelands with some of the highest grazing intensity in the world. A recent analysis mapped and modeled the trade-offs and synergies between grazing intensity and ecosystem services provided by the rangelands, namely, carbon sequestration, biodiversity, and erosion prevention.

### *Projecting demographic change in Pakistan*

IIASA's demographers study and project the changing composition of population for all countries of the world. They produce one of the few independent alternatives to the demographic projections of the UN Population Division. As a testament to the quality of IIASA's demography, the IPCC in 2011 adopted IIASA's population projections as its source data in all modeling for the Fifth Assessment Report; and UNESCO has adopted IIASA's demographic methods as part of its literacy forecasting.

*IIASA's demographers are providing independent analysis and projections of Pakistan's future population*

In addition, the Institute's interdisciplinary setting has encouraged its demographers to research beyond the traditional boundaries of demography and to explore how changes in society, economy, and the natural environment influence the health and mortality, migratory patterns, and reproductive behavior of human society.

IIASA's work is underpinned by high-quality science, which is regularly published in high impact publications. A selection of current publications is presented here and full list can be found in appendix 5:

Petz K, Alkemade R, Bakkenes M, Schulp CJE, van der Velde M & Leemans R (2014). Mapping and modelling trade-offs and synergies between grazing intensity and ecosystem services in rangelands using global-scale datasets and models. *Global Environmental Change*, 29:223-234

Kull D, Mechler R & Hochrainer-Stigler S (2013). Probabilistic cost-benefit analysis of disaster risk management in a development context. *Disasters*, 37(3):374-400

Purohit P, Munir T & Rafaj P (2013). Scenario analysis of strategies to control air pollution in Pakistan. *Journal of Integrative Environmental Sciences*, 10(2):77-91

Wazir A, Goujon A & Lutz W (2013). Education and population: Closely linked trajectories for Pakistan. In: Sathar ZA, Royan R & (Eds) J Bongaarts (eds), *Capturing the Demographic Dividend in Pakistan*. Population Council, New York, USA pp.25-40.

**Selected publications  
resulting from IIASA-  
Pakistan collaborations**

A recent innovative example of this broader approach has been the development of research methods to project population by level of education. This equips researchers with the tools to explore the implications of different education policies on a country's future fertility, life expectancy, migration, and population level as well as economic growth and ability to adapt to climate change. In 2014 IIASA published the first projections of educational attainment by age and sex for 195 countries with *Oxford University Press*. Findings for Pakistan show how different policies over the next few decades could lead to the country's 2010 population of 174 million increasing to 212 million by 2100 or soaring to over 500 million.

Other joint studies with Pakistani collaborators include:

- Research with the Pakistan Institute of Development Economics, Pakistan office of the Population Council, and CARE International Pakistan among others examined how Pakistan can capture the demographic dividend and so benefit from the increasing portion of its population that is in the working age-group.
- Discussions over a possible collaboration with the Karachi Institute of Technology and Entrepreneurship to develop human capital projections for the city of Karachi.

### ***Rethinking water management and use for households, agriculture and energy***

*Pakistani scientists are working with IIASA researchers to develop strategies for water and land use management in a time of climate, demographic, political and economic change*

Pakistan faces rapid, large-scale environmental changes brought about by natural forces unleashed by climate change; historical forces driven by social, political and demographic changes; and global transitions triggered by new technologies. The impact of these changes is felt most in the water sector through depleting groundwater, deterioration in water quality, poor sanitation and difficulties in preservation of eco-systems. Beginning in 2012, the Pakistani NMO began to work with IIASA to examine options for water management in Pakistan and in the transboundary river basins on which the country depends. Dr. Abubakr Muhammad attended the launch of IIASA's Water Futures and Solutions (WFaS) Initiative, and IIASA participated in the "Symposium on Pakistan Water Futures" as part of the international workshop on "Intelligent

#### **IIASA's global contribution**

Many of today's most pressing challenges do not stop at international borders. IIASA's research areas such as climate change, water scarcity, and poverty are affected by multiple factors across the globe. In turn these global problems have impacts on nations, regions, and continents. Finding long-lasting solutions to these challenges requires scientific expertise that is free from the interests of a single nation. IIASA's National Member Organizations recognize this need and that their investment in IIASA is a contribution to a global public good. And the benefit of this contribution is paid back to global researchers, policymakers, and citizens in multiple ways as the following examples show:

1. IIASA supports the climate change research community by hosting the Representative Concentration Pathways (RCP) database. The database provides data on greenhouse gas emissions for four different future scenarios that underpin the analysis of thousands of climate change researchers. IIASA also calculated the data for one of the scenarios, all of which have been developed for the world's most comprehensive analysis of climate change—the IPCC's (Intergovernmental Panel on Climate Change) Fifth Assessment Report.
2. IIASA's research provides scientific guidance to the Convention on Long-range Transboundary Air Pollution of the United Nations Economic Commission for Europe. This international environmental treaty between 33 countries has slashed air pollution in Europe, improving people's health and countries' crop production. IIASA's GAINS model guided negotiators and policymakers as they worked on the treaty to identify the most cost-effective approach to cleaning Europe's air. The negotiators chose the GAINS model not only because of its accuracy and usability but also because it had been developed by an international team with funding from multiple countries, which assured them that the model was nationally unbiased.

Water Grids” at LUMS in 2013. Collaboration continues on the conceptual modeling of renewable resource consumption.

### Smart ways to clean up Pakistan’s air

Current economic growth will intensify air quality problems in Pakistan. If current practices continue, serious health impacts are expected for Pakistan’s population by 2030—statistical life expectancy could shorten on average by more than 100 months due to air pollution. Systems analysis has the breadth and depth to analyze such environmental problems and identify strategies that reap multiple benefits across sectors and regions, as well as avoid policies that lead to negative side effects in remotely connected activities.

Integrated assessment models deliver the holistic approach of system analysis and one such tool: IIASA’s GAINS model has been applied successfully to many international environmental negotiations to identify smart mixes of measures to simultaneously cut air pollution and greenhouse gas emissions in the most cost-effective way.

Collaborations with the Global Change Impact Studies Centre (GCISC) have applied GAINS to Pakistan, assessed future emissions of air pollutants and greenhouse gases, and analyzed the costs and benefits of implementing different emission control technologies. Results, show for example, that a full implementation of advanced control technologies could reduce emissions of particulate matter by 63% in 2030 compared with a business as usual scenario. In addition, IIASA researchers are building capacity in Pakistan to use GAINS, for example, by supervising two Pakistani doctoral students as part of IIASA’s Young Scientists Summer Program, and a Pakistani postgraduate student from the University of Punjab.

*Joint Pakistani-IIASA studies have extended an integrated assessment model to identify the most efficient and effective measures to tackle the country’s air pollution*

Through intense data gathering, computer modeling, and other advanced research methods, IIASA provides a country’s researchers and their policymakers with the essential numbers and tools to select the most effective policies. For example:

- A recent analysis explored the impact of different education and development policies on Pakistan’s future total population. If Pakistan follows a conventional development scenario over the coming decades, IIASA’s demographers project the country’s 2010 population of 174 million will peak this century at around 240 million and then fall to 195 million by 2100. Rapid development would lead Pakistan to following a similar scenario with its population reaching over 250 million this century and then falling to around 212 million by 2100. However, if development were to stall, Pakistan’s population is likely to continue to rise and reach over 500 million by 2100. (Source: Lutz W, Butz WP, KC S (Eds) (2014). *World Population & Human Capital in the Twenty-first Century*. Oxford University Press, UK).

Many of the research projects summarized in this Info Sheet draw on analyses from IIASA’s models, tools, and data including:

- Reducing air pollutants and greenhouse gas emissions simultaneously (GAINS model).
- Planning a sustainable energy system (MESSAGE model, Global Energy Assessment Scenario Database).
- Reducing energy poverty (Energy Access Interactive Tool [ENACT]).
- Improving food security through identifying yield gaps (GAEZ model) and assessing competition for land use between agriculture, bioenergy, and forestry (GLOBIOM model).
- Financial disaster risk management (CATSIM model).
- Projecting future population (Demographic multistate modeling).

IIASA’s models, tools, and data

### **Assessing the environmental impact of energy use**

*An international study with researchers from IIASA and Pakistan explored the current and future impact of the exploitation of energy resources on the environment*

The International Energy Agency has estimated that global primary energy demand will increase by 40-50% from 2003 to 2030. Since energy production, transportation and consumption put considerable pressure on the environment, there is serious concern regarding the sustainability of energy consumption. Therefore, researchers from IIASA and Pakistan Space and Upper Atmosphere Research Commission among other partners developed a versatile modelling platform to enable planners, environmentalists and governments to calculate, forecast and monitor the environmental impact of changes in the energy mix on local, regional and global scales. The project, known as EnerGEO ran from 2009 to 2013 and was funded primarily by the European Union.

#### **Research to support science diplomacy**

IIASA was established in 1972 to use scientific cooperation to build bridges across the Cold War divide and research growing global problems on a truly international scale. Today the soft power of science diplomacy continues to help IIASA's member countries through using scientific cooperation to improve international relations, and through international teams jointly researching controversial issues to find consensus such as through integrative assessments of the future for the Arctic or of the economic integration of Eurasia.

In addition, IIASA also maintains its original bridge-building objective through attracting member countries that represent a range of geo-political interests (see full list of members: Back page). For instance, both Russia and the US are members; as are Brazil, China, India, and South Africa. Several key factors also unite all IIASA member countries: their interest in systems analysis, scientific and academic infrastructure, economic stability and the geopolitical role in future global transitions. With this in mind, IIASA is also discussing membership with countries in the Middle East including Israel, Iran, Jordan, Qatar, Saudi Arabia, and Turkey.



Business can benefit from science through the analysis and knowledge it provides. In turn, science can benefit from business through its experience on the ground and in implementation. IIASA also recognizes that closer collaboration between business and its researchers can increase the impact of the Institute's work. Not surprisingly, IIASA is seeing a growing number of contracts with commercial partners, including:

- The global insurer, **Zurich Insurance Group**, began working with IIASA in 2013 to identify and address research gaps on flood resilience and community based disaster risk reduction, demonstrate the benefits of pre-event risk reduction over post-event disaster relief and to improve public dialogue around disaster resilience.
- The German carmaker, **Daimler AG**, has collaborated with IIASA researchers to assess biofuel potential from marginal and degraded lands in India and Brazil.
- The Brazilian energy company, **Petrobrás**, was one of nineteen sponsors of IIASA's Global Energy Assessment.
- The research institute of the Japanese carmaker, **Toyota**, has an ongoing collaboration with IIASA to research measures to reduce ozone emissions in Asia.
- The multinational consumer goods company, **Unilever**, funded IIASA's agricultural experts from 2008-10 to analyze yields and land suitability of key agricultural crops under a changing climate.

In addition, IIASA is exploring ways that it can work more closely with multinational corporations, particularly through input to the development of their global sustainable business plans.

## IIASA Working with business

## Capacity Building

### Young Scientists Summer Program

*Since 2008, twelve Pakistani students have developed research skills and networks by taking part in IIASA's Young Scientists Summer Program*

The Young Scientists Summer Program (YSSP) develops the research skills and networks of talented PhD students. Program participants conduct independent research within the Institute's research programs under the guidance of IIASA scientific staff. Funding is provided through IIASA's National Member Organizations. Since 2008 the following twelve Pakistani students have participated in this program:

**Syeda Mariya Absar** (YSSP '11 & Lahore University of Management Sciences) examined whether an investment into a water-saving irrigation system, such as drip irrigation system, would be a feasible option for agriculture in Pakistan.

**Shaukat Ali** (YSSP '13 & Chinese Academy of Sciences & Global Change Impact Studies Centre), a Pakistani national, developed a framework for a two-way coupling of regional climate models and hydrological models to study the impacts of climate change on water resources in East and South Asia.

**Muhammad Amjad** (YSSP '10 & Global Change Impact Studies Centre) developed an ecological network model to conduct an analysis of the ecosystem in Rawal Lake, Pakistan.

**Javeria Ashraf** (YSSP '11 & Global Change Impact Studies Centre) explored the direct climate-related threats on yields of major crops of Pakistan from 1961 till present.

**Muhammad Asif** (YSSP '09 & Global Change Impact Studies Centre) explored the feasibility of high performance computing environments at IIASA.

**Faheem Iqbal** (YSSP '09 & Global Change Impact Studies Centre) spatially modeled soil information for zero-till wheat sowing in the rice and wheat growing regions of Pakistan, in order to assess spatial differentiation of zero-till effects on wheat yields.

**Abdul Basit Jilani** (YSSP '09 & Pakistan Institute of Engineering and Applied Sciences) used the GAINS model to assess the amount and effect of particulate matter in Pakistan.

**Firdos Khan** (YSSP '12 & Global Change Impact Studies Centre) assessed the water flow in the Indus river and management of water at Tarbela dam under different climate change scenarios.

**Talha Manzoor** (YSSP '13 & Lahore University of Management Sciences) developed a model to investigate how consumer behavior affects their use and access to renewable resources.

**Tahira Munir** (YSSP '08 & Global Change Impact Studies Centre) used the GAINS model to assess air pollution and greenhouse gas mitigation strategies in Pakistan, and to identify suitable measures for reducing the negative health impacts of indoor air pollution.

**Syed Ali Asjad Naqv** (YSSP '12 & New School for Social Research, New York), a Pakistani national, applied an agent-based model that helps to understand human interactions and flows, and the resulting economic outcomes on low-income regions following a natural disaster.

**Syed Faisal Zaidi** (YSSP '08 & Global Change Impact Studies Centre) assessed the flood and drought risk in Jhelum basin of Pakistan with an analysis of the historical decadal variations and future predictions of annual and seasonal precipitation, temperature, and run-off in the basin.

### Regional Young Scientists Summer Program

*One Pakistani doctoral student has taken part in IIASA's regional Young Scientists Summer Program in South Africa.*

In 2012, IIASA launched its first regional YSSP called the Southern African Young Scientists Summer Program (SA-YSSP). The Program is organized jointly by IIASA and the University of the Free State in Bloemfontein, South Africa, with co-sponsorship by IIASA, the South African National Research Foundation, and the South African Department of Science and Technology. The following Pakistani doctoral student participated in the program:

**Noor Jamal** (SA-YSSP '13/'14 & University of Flensburg, Germany), a Pakistani national, conducted a technological, economic, and environmental analysis of electrification options in remote and rural areas of South Africa.

### IIASA-Pakistani scientific exchange through people

A recent selection of presentations that IIASA researchers have made in Pakistan:

**David Wiberg** on “Global Water Futures” at a ‘Symposium on Pakistan’s Water Futures’ at LUMS in Lahore in 2013.

**Volker Krey** on “Long-Term Energy and Emission Scenarios: The Scenario Development Cycle with MESSAGE in a Nutshell” at a training workshop on ‘Long-Term Demand Forecasting and Projection Techniques’ at the Pakistan Institute of Engineering and Applied Sciences in Islamabad in 2011.

**Anne Goujon** on “Multistate Population Projections by Levels of Education: the Case of Pakistan” at a training workshop on ‘Long-Term Demand Forecasting and Projection Techniques’ at the Pakistan Institute of Engineering and Applied Sciences in Islamabad in 2011.

A delegation of IIASA scientists including **Margaret Goud Collins**, **Michael Obersteiner**, and **David Wiberg** took part in the Pakistan NMO—IIASA research planning consultation related to the “Food and Water” theme of IIASA’s strategic plan. The meeting included over 60 high-level members of Pakistan’s governmental, academic, industry, and NGO communities and took place at the Pakistan Academy of Sciences in Islamabad in September 2010.

Other examples of scientific exchange include:

- Researchers from Pakistan have participated in IIASA events nearly 40 times since 2008.
- 12 publications have resulted from collaborations between IIASA and Pakistani nationals since 2008.
- On average between one and two Pakistani researchers have been employed by IIASA every year since 2008.
- Since 2008, 13 young scientists from Pakistan have gained international and interdisciplinary research experience through participation in IIASA’s Young Scientists Summer Program and its Southern African version.
- Researchers, advisors, and diplomats from Pakistan have visited IIASA 12 times since 2008, while IIASA scientists have visited Pakistan five times.

#### Appendices

The details behind the above facts can be found in the following appendices to the country sheet. The appendices are either attached or available on request from Sanja Drinkovic (drinkovs@iiasa.ac.at):

1. Employees with Pakistani nationality at IIASA (2008-2015)
2. Pakistani visitors to IIASA (2008-2015)
3. Conference participants from Pakistan to IIASA (2008-2015)
4. Travel by IIASA scientists to Pakistan (2008-2015)
5. Publications relevant to IIASA-Pakistan Collaborations (2008-2015)

## Prospects for Future IIASA-Pakistan Activities

*Enhancing the IIASA-Pakistan relationship offers benefits for Pakistan research, government policy, and international relations*

This Info Sheet summarizes recent research collaborations and capacity building activities between IIASA and Pakistan. Significant potential remains to further intensify the IIASA-Pakistan relationship through developing a range of new joint activities including:

- **Enhancing Pakistani expertise in applying system analysis to national problems:** Developing bespoke Pakistani versions of IIASA's global models would allow researchers and policymakers to look at complex global problems and their impact on Pakistan in a holistic and integrated way. For example, the Dutch government worked with IIASA to develop a Dutch version of the IIASA GAINS model. The new model helps ministries to identify cost-effective measures to improve air quality and reduce greenhouse gas emissions in the Netherlands at the same time as complying with the country's obligations under international air quality agreements.
- **Conducting international assessments in areas of Pakistani strategic interest:** IIASA conducted a Global Energy Assessment which brought together over 500 specialists to transform the way society thinks about, uses, and delivers energy. IIASA is embarking on four new future assessments, at the request of its member countries. Two will focus on issues of strategic interest to Pakistan: holistic, integrative assessments of plausible futures for global water challenges and tropical forests.
- **Academic training opportunities for young Pakistani scientists:** Numerous doctoral students have developed research skills in systems analysis by participating in the Young Scientists Summer Program and the Southern African version (see page 10: Capacity Building). There is potential to further enhance participation by young Pakistani scientists by, for example, becoming a partner in IIASA's forthcoming International School of Excellence.
- **New partnerships between IIASA and Pakistan institutions to win grants from international research funders:** IIASA's high-quality research and international research network makes it highly competitive in its applications for international research funds. Between 2006 and 2014, IIASA almost doubled its income by winning research grants that amounted to €69million. This was part of a total funding portfolio of €329 million of the external projects in which IIASA was and is involved. For example, researchers from IIASA, Pakistan Space and Upper Atmosphere Research Commission (SUPARCO), and other international partners worked jointly on the EU-funded EnerGEO project (€6 million from 2009-2013), which shows the potential for Pakistan researchers to collaborate with IIASA to access funds from third parties.
- **Using international scientific cooperation to support diplomacy:** IIASA was established in 1972 to use scientific cooperation to build bridges across the Cold War divide and research growing global problems on a truly international scale. Today the soft power of science diplomacy continues to help IIASA's member countries through using scientific cooperation to improve international relations, and through international teams jointly researching controversial issues to find consensus, free from the constraints of national self-interest (see box: Research to support science diplomacy: page 8). Recently, IIASA has launched a new international project to analyze the prospects for economic integration between Europe and the countries of the former USSR.



## About IIASA

Founded in 1972, the International Institute for Applied Systems Analysis (IIASA) conducts policy-oriented research into problems of a global nature that are too large or too complex to be solved by a single country or academic discipline. IIASA's research areas are energy & climate change; food & water; and poverty & equity.

IIASA is at the center of a global research network of around 2,500 scholars and over 550 partner institutions in over 65 countries. It is funded and supported by its National Member Organizations which represent the scholarly community in the following countries:

Australia, Austria, Brazil, China, Egypt, Finland, Germany, India, Indonesia, Iran, Israel, Malaysia, Mexico, Japan, Netherlands, Norway, Pakistan, Republic of Korea, Russia, South Africa, Sweden, Ukraine, United Kingdom, United States of America, Vietnam.

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