ENGAGEMENT WITH MEMBER COUNTRIES

India

INFOSHEET 2020-2025

Highlights of interactions between IIASA and India

Member Organization

Technology Information, Forecasting and Assessment Council (TIFAC)

Selected partners

Over 45 Indian organizations have collaborated with IIASA, including:

- Ashoka Center for People-centric Energy Transition (ACPET), New Delhi
- Automotive Research Association of India (ARAI), Pune
- Birla Institute of Technology and Science (BITS), Goa
- Center for Study of Science, Technology and Policy (CSTEP)
- Center for Sustainability, Environment, and Climate Change, Pune
- Council on Energy, Environment and Water (CEEW), New Delhi
- Department of Environment, Forest and Climate Change (DoEFCC), Government of Uttar Pradesh, Lucknow
- Directorate of Environment and Climate Change, Government of Haryana, Chandigarh
- Gautam Buddha University, Greater Noida, Uttar Pradesh
- Integrated Research and Action for Development (IRADe)
- Indian Institute of Management (IIM) Ahmedabad
- Indian Institute of Science Education and Research (IISER) Pune
- Indian Institute of Technology (IIT) (Bombay, Delhi, Kanpur, Roorkee)
- International Finance Corporation, The World Bank Group, New Delhi
- International Institute for Population Sciences (IIPS), Mumbai
- International Institute of Migration and Development (IIMAD)
- Indian Society for Applied Research and Development, New Delhi
- Jawaharlal Nehru University, New Delhi
- National Environmental Engineering and Research Institute (NEERI)
- National Institute of Advanced Studies (NIAS), Bengaluru
- National Institution for Transforming India (NITI) Aayog
- Sri Ramachandra Institute for Higher Education and Research (SRIHER)
- The Energy and Resources Institute (TERI), New Delhi

Areas of research collaboration

- Identifying co-benefits and developing strategies to reduce air pollution in India.
- Developing clean air plans for the Indo-Gangetic Plain (IGP) states.
- Developing tools and approaches to explore the feasibility of decarbonization pathways and identifying opportunities to strengthen climate policies.
- Designing innovative, holistic, and science-based approaches to safeguarding and restoring Indian ecosystems and biodiversity.
- Exploring the interconnectedness between energy and wellbeing within the context of India.
- Studying pathways for sustainable food and land use systems in India.
- Designing ways to address skill shortages and ensuring fair skill flows between India and other countries.
- Capacity building in systems modeling of national energy and power systems.
- Analysis of Micro, Small, and Medium Enterprises (MSME) and the transport sector.
- Generation and analysis of low carbon climate change mitigation pathways.

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Highlights of interactions between IIASA and India

Capacity building

Over 20 doctoral students from India or studying in Indian institutions have participated in the IIASA Young Scientists Summer Program in 2020-2025.

Publication output

IIASA has co-authored over 130 publications with institutions in India, and its researchers from India have authored over 240 publications.

Scientific exchange

Over 150 participants from India joined IIASA events. Over 40 researchers and professionals from India visited IIASA. IIASA scientists have visited India over 90 times. Over 40 Indian nationals have been employed at IIASA in the period 2020-2025.

International Institute for Applied Systems Analysis
IIASA

IIASA Engagement with India

IIASA Info Sheet 2026

The electronic version of this document is available at
https://iiasa.ac.at/members/india

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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 recent interactions between IIASA and India. 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 the External Relations Department.

1. Introduction

The International Institute for Applied Systems Analysis (IIASA) was established in 1972 as an international, independent, non-governmental, multidisciplinary research institute located in Laxenburg near Vienna, Austria. As of February 2026, IIASA has 18 national members and one regional member, representing 36 countries across Africa, the Americas, Asia, and Europe. India formally joined IIASA as a member in 2007, represented by the Technology Information, Forecasting and Assessment Council (TIFAC) as the IIASA National Member Organization.

Research collaborations between IIASA and India date back to the 1970s and continue to bring new insights into the challenges the country and the wider region face, as well as into the potential solutions. Beyond the already existing collaborations, there is also significant potential to grow the relationship between IIASA, the Indian scholarly community, and governing bodies through joint research projects, science diplomacy, scientific exchange, and collaborative capacity building activities.

2. IIASA's Unique Value Proposition for India

IIASA offers India a strategic, low-cost, high-leverage platform to strengthen national analytical capacity, internationalize Indian science, and amplify India's influence in global science and policy processes. Continued membership is therefore best understood not as only an institutional affiliation, but as a strategic investment that amplifies India's scientific and policy leadership.

IIASA actively collaborates with India, co-developing evidence-based solutions to inform policy in priority areas aligned with the Government's goals of achieving **net-zero emissions by 2070** and realizing **Viksit Bharat 2047**. Leveraging its expertise in science diplomacy, as well as interdisciplinary systems analysis, IIASA works with Indian researchers and the Government of India to foster sustainable growth, ensure justice and economic efficiency, facilitate the digital transformation, strengthen partnerships, and promote good governance at all levels.

IIASA offers a valuable portfolio of critical resources and connections to support these efforts:

- IIASA's applied systems analysis directly supports evidence-based decision-making across different scales of governance with a focus on integrated assessment of energy, climate, air quality, land, water, health, and economic outcomes, as well as quantification of co-benefits, trade-offs, and distributional impacts that are essential for inclusive and sustainable development.
- IIASA acts as a neutral, apolitical platform under international law that facilitates scientific collaboration across geopolitical divides. It serves as a mechanism that shapes global research agendas on climate, AI governance, health, and sustainable finance.
- IIASA offers proven decision-support tools such as **GAINS**, **MESSAGEix**, **GLOBIOM**, and the **FABLE Calculator**, already adapted to Indian context.
- IIASA acts as a channel to international forums, such as the G20, BRICS, UN processes, and multilateral development initiatives, where credible science reinforces diplomatic influence.
- IIASA uses the most advanced methodologies in systems analysis with a special recent focus on AI, for example by integrating AI in agent-based models (ABMs), to better understand the drivers and impacts of the global polycrisis and offer data-driven solutions.

- IIASA opens doors for its partners to tap into additional global funding opportunities and resources.
- IIASA research is focused on addressing real-world problems in partnership with decision makers, community members, and practitioners from the countries involved to ensure that results contribute to policy.
- IIASA actively facilitates knowledge transfer and capacity building to strengthen the national scientific capacity of its Member States, as well as national and sub-national policymaking.
- IIASA offers a neutral space for international scientific collaboration. Under the protection of Austrian law, scholars from nations currently involved in conflicts work together peacefully, collaboratively, and constructively at IIASA.

The Institute plays a leading role in setting the research agenda within the international scientific community. It connects national scientific communities to a dynamic global network of researchers, policymakers, and practitioners through capacity building, in-person meetings, workshops, joint research initiatives, tool development, collaborative projects, and virtual webinars.

IIASA offers an opportunity for its member countries to broaden their global partnerships through inclusive, multilateral collaboration, providing access to a wide network of international partners. As India prepares to assume the BRICS presidency in 2026, it can leverage IIASA's existing collaborations with BRICS members to strengthen its scientific and policy partnerships. As IIASA expands its focus on critical global challenges of high relevance to the BRICS, such as resilient and equitable health systems, climate change, AI governance, and multilateralism, India's membership would further enhance its role in shaping international research and policy discussions.

In the last decade, IIASA helped to establish several centers of excellence for systems analysis in different parts of the world, partnering with local researchers to advance the discipline. Those include the North Africa Applied Systems Analysis Centre (NAASAC) in Egypt, the South African Systems Analysis Centre (SASAC) in South Africa, the Archimedes Center in Israel, and the Asian Demographic Research Institute (ADRI) in China. These centers help IIASA create a community of professionals that shares experiences nationally and is well connected, both regionally and internationally, to enable impactful policymaking at all levels. Building on collaborations with over 45 Indian institutions, IIASA can help strengthen India-based systems analysis hubs embedded in universities, national laboratories, and think tanks. These hubs would connect to IIASA's global modeling infrastructure, open-source tools, and international research networks, ensuring that analytical capacity is both retained and scaled domestically, consistent with the vision of **Atmanirbhar Bharat**.

IIASA also provides a variety of capacity development opportunities for future leaders in science, politics, business, and culture through its **Young Scientists Summer Program (YSSP)**, **Summer Schools**, and its **Postdoctoral Fellowships**. IIASA's training and capacity development programs focus on long-term capability enhancement through training the trainers, advanced modeling courses, and multi-year scientific exchanges. They offer Indian researchers the opportunity to independently apply, adapt, and extend IIASA's open modeling frameworks. Their collaborations produce policy-relevant research focused on their home countries and help them to become proficient in the scientific and diplomatic skills needed to operate at the highest levels of international science and policy. This model emphasizes brain circulation, not brain drain, enhancing institutional capacity across India's research and policy ecosystem. IIASA also organizes diverse capacity development activities (e.g. workshops, seminars) in India with a focus on ongoing research activities at the Institute in areas of mutual strategic interest.

For India, partnership with IIASA is a strategic multiplier, integrating national priorities with global science, enhancing policy impact, and reinforcing India's leadership in shaping solutions to the world's most complex challenges. IIASA proposes to transition the India–IIASA relationship from individual participation toward co-designed, mission-driven collaboration that:

- Aligns IIASA research with national priority missions on climate, clean energy, air quality, sustainable agriculture, resilience, and digital transformation.
- Positions Indian institutions as co-leads of IIASA global initiatives on systems analysis and sustainability transitions, enhancing India's visibility and influence in international science.
- Supports coordination across research domains, ministries, and sectors.
- Provides timely policy relevant insights for sustainable development.

This approach complements India's growing emphasis on convergence research, integrated planning, and mission-mode innovation.

3. Highlights of IIASA Research Projects and Collaborations with India

Since 2020, the collaborations between IIASA and India were centered around six priority research areas, aligned with the shared objectives of the IIASA and Indian research agendas; the potential to engage with wide ranging research, academic, and policy partners across India and Asia; and the interests of policymakers and researchers in India and the international community. Those priority areas include: the Sustainable Development Goals (SDGs), India's National Clean Air Action Program, Disaster and Climate Resilience on the Indian subcontinent, Artificial Intelligence and Digital India, the Indian Energy Model, and NEXUS – An Integrated Solution to Water, Energy, Land, and Ecosystem Security.

To address those priorities, IIASA researchers work directly with a wide range of diverse stakeholders in India. These collaborations are typically formalized through joint research projects, below are a few selected examples.

COMMITTED

Climate Policy Assessment and Mitigation Modeling to Integrate National and Global Transition Pathways for Environmental-Friendly Development (COMMITTED) is project, which aims to enhance sharing of good practices on greenhouse gas emissions (GHG) modeling between EU and Asian countries. The Consortium comprises major global integrated assessment modeling teams, as well as institutions from major Asian economies, including the Indian Institute of Management Ahmedabad (IIMA), the Energy and Resources Institute (TERI), and 10 other international partners.

The project is intended to reinforce global climate change mitigation efforts by supporting national experts' work on GHG emissions modeling, strengthen capacity building for GHG emissions modeling and exchange best practices and know-how between leading EU and Asian modelers (including China and India), working closely with the government.

Based on this project, IIASA experts were invited by the Asian Development Bank (ADB) to participate in a separate study titled "Study of Estimating the Cost of Climate Announcements." The results of the study were submitted to the Department of Economic Affairs of the Ministry of Finance of India.

EUCDs

The European Union Climate Dialogues (EUCDs) project is aimed at developing sectoral modeling capacity for Micro, Small and Medium Enterprises (MSME), transport, Land Use and Land Cover (LULC), and power sectors across 5 Indian institutions, including: National Institute of Advanced Studies (NIAS), Center for Study of Science, Technology and Policy (CSTEP), The Energy and Resources Institute (TERI) with MS Swaminathan Research Foundation (MSSRF), and Integrated Research and Action for Development (IRADe). IIASA provided capacity development, helpdesk support, and review of project deliverables.

As part of the project, in 2021-2024, IIASA actively participated in several knowledge exchange workshops in India with a focus on low carbon modeling. The purpose of the workshops was to engage in discussions with the relevant stakeholders to exchange knowledge and experiences related to low carbon modeling between European experts from the Joint Research Centre (JRC) and Indian experts.

EDITS

The Energy Demand Changes Induced by Technological and Social Innovations (EDITS) network brings together experts from various disciplines to regularly discuss and engage in multifaceted energy demand research. The EDITS community works together based on common interest in interlinked topics, on transferring methodological knowledge, and on exploring modeling innovations across demand-side models. Within the framework, IIASA collaborates with the Center for Study of Science, Technology and Policy (CSTEP), Climate Analytics India, and over 40 other partners from all over the world.

The aim of the EDITS network is to identify gaps and potentials to enhance modeling, analysis, and communication of the demand-side solutions for climate mitigation and the SDGs. EDITS focuses on enhancing both the human and the technical resources of demand-side research and policy support by operating an expert network and a demand-side model complementarity exercise. EDITS reviews current practices, gaps and potentials in empirical research and demand-side modeling across three demand sectors: buildings, transport and industry. The work is extended to identifying interlinkages across sectors along a low energy demand future, as well as understanding the implications of cross-cutting aspects (such as digitalization, inequalities, energy access, decent living standards) for the sectors.

In 2023, EDITS organized the seminar titled "Energy and Wellbeing: The Indian Case Study" in Delhi, which explored in great detail the intricate relationship between energy and wellbeing within the context of India. The event was organized by a diverse international consortium, including: the University of Plymouth (UK), Prayas Energy Group (India), The Center for Study of Science, Technology and Policy (India), University of Oxford (UK), Central European University (Austria), and PBL (Netherlands).

ENGAGE

Exploring National and Global Actions to reduce Greenhouse gas Emissions (ENGAGE) is a global consortium of international and multidisciplinary leading research groups, coordinated by IIASA, aiming to co-produce knowledge for designing cost-effective, technologically sound, socially and politically feasible pathways that can meet the objectives of the Paris Agreement. ENGAGE quantified avoided climate change impacts at the regional and national levels and identified concrete policy portfolios that **maximize co-benefits and minimize trade-offs**. As part of this project, IIASA actively collaborates with the Energy and Resources Institute (TERI), the Indian Institute of Management Ahmedabad (IIMA), and 25 other international partners around the world.

The project was focused on knowledge co-production through an iterative stakeholder dialogue process, including workshops, surveys, and frequent interactions and feedback among scientists, policy makers, civil society, the private sector, and other key stakeholders.

ENGAGE helped quantify avoided climate change impacts through analysis of the exposure and associated costs for individual sectors and regions to climate change at different levels and timing for global peak temperature. A particular focus was on quantifying the benefits (or trade-offs) of climate policies on biodiversity, food, poverty, water, air quality, health, and employment, particularly for vulnerable populations. The findings of the ENGAGE project team have been collated in a **Summary for Policymakers**.

FABLE

The Food, Agriculture, Biodiversity, Land, and Energy (FABLE) Consortium is a global network of researchers who develop national pathways that are consistent with global sustainability objectives, including the Sustainable Development Goals (SDGs) and the Paris Climate Agreement targets. Through its focus on systems-based approaches and integrated assessments, FABLE brings together knowledge institutions from around the world to advance the analytical capacity for strategic land use planning, seeking to improve the understanding of which strategic decisions can benefit the overall transformation of food and land use systems toward sustainability. The consortium brings together over 100 national institutes and 24 country teams.

FABLE country teams are at the heart of FABLE's mission. By engaging multiple country partners, FABLE also aims to improve insights into interactions between regional and country scale pathways with global scale concerns. Country teams develop national bottom-up pathways for sustainable food and land use systems that describe the changes needed to achieve mid-century sustainability objectives. They also engage with national governments to promote ambitious sustainable policies.

The **FABLE India Team** is led by the Centre for Management in Agriculture, Indian Institute of Management Ahmedabad (IIMA). The team's main areas of interest revolve around pathways for sustainable food and land use systems, the food-energy-water nexus and its interlinkages with biofuel policies, closing the yield

gap to achieve India's future food demand along with environment sustainability, water issues, healthy and sustainable diets, increasing land use efficiency, protecting the forest land while keeping agricultural production levels, and increasing the sustainability of the livestock production system.

FAIRSTREAM

The Soft Systems Analysis: Streamlining Participatory Approaches and Agent-Based Models to Explore Ideas of Fairness at the Food-Water-Biodiversity Nexus (FAIRSTREAM) project was focused on developing and demonstrating a co-production methodology for the inclusion of equity and justice (fairness) alongside efficiency in developing sustainable policy options across the food-water-biodiversity nexus. As part of this project, IIASA works closely with the Society for Promoting Participative Ecosystem Management (SOPPECOM) and the Indian Institute of Science Education and Research (IISER).

In early 2023, the first FAIRSTREAM workshop was organized in India, with several IIASA researchers participating. A second workshop was held in 2024, bringing together food, water, and biodiversity stakeholders from the Upper Bhima Basin. Around 30 village and NGO representatives, experts, researchers, and practitioners met to discuss desirable futures and associated policies and practices regarding water management, biodiversity conservation, and food security in the Basin.

This work led to the development of a **baseline report of the Upper Bhima sub-basin**, and informed a field survey, which improved the general understanding of the local population's risk behavior and biodiversity concerns. On-ground efforts were backed by conceptual work, including a coproduction toolkit, a research article on transdisciplinary process design, and a review article on India's food-water-biodiversity nexus. Work conducted as part of the project has for the first time enabled a simulation model that can replicate the interactions of the water cycle, individual households, and changes in biodiversity at hyper-resolution on a daily basis in major hydrological basins, while integrating knowledge from hydrology, ecology, environmental economics, and sociology.

ISWEL

The Integrated Solutions for Water, Energy, and Land project (ISWEL) project was aimed at developing tools and capacities to support the sustainable management of water, energy, and land, through the development of a truly integrated nexus approach. Indian stakeholders involved in the consultations included: Celestial Earth, Government of Punjab, Indian Institute of Technology (IIT), National Institute of Hydrology, National Institute of Hydrology, NITI Aayog, The Energy Resources Institute (TERI), and University of Kashmir. In addition, the ISWEL team has engaged with a number of national and regional organizations, mostly through the so-called Indus Basin Knowledge Forum, supported by the International Water Management Institute (IWMI), the World Bank, the International Centre for Integrated Mountain Development (ICIMOD).

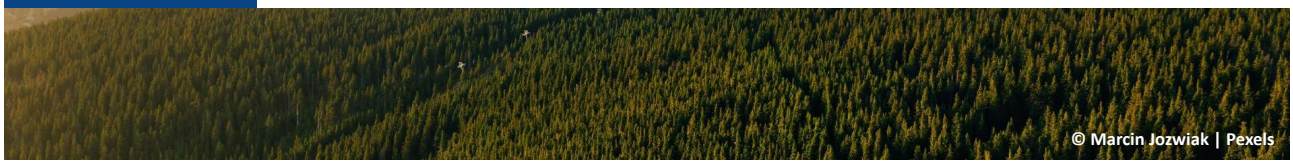
The project focused on two transboundary basins facing multiple development and environmental challenges: the Indus and the Zambezi basins. The results of the modeling and analytical work that was undertaken in both basins as part of the project are hosted in the **Water, Energy and Land Nexus Basins Scenario Explorer**.

LINKS4SKILLS

Link4Skills is a global project coordinated by the Kozminski University and focused on addressing skill shortages through four processes: upskilling established populations, raising wages, automation, and migration. The project spans Europe, Africa, Asia, and America, analyzing skill shortages and flows. As part of the project, IIASA collaborates with the International Institute of Migration and Development (IIMAD) and 12 other international partners.

The project involves the development of an AI-Assisted Skill Navigator for stakeholders in employment and vocational training organizations across origins and destinations. Dedicated work packages investigate emerging and established migration skill corridors between the EU and selected countries such as India, Morocco, Ghana, Nigeria, Philippines, Indonesia, and Ukraine, to make enriched inventories of skill partnerships. The project achieves its aims via demographic microsimulations, combining skill supply and demand data and trends, and by data collections and stakeholders' expertise overseas.

NEWPATHWAYS



The NEWPATHWAYS project seeks to inform and support the breaking of multiple deadlocks that have kept global emissions and fossil fuel use at high levels, thereby strengthening climate action to limit global warming. As part of the project, IIASA collaborates with the Indian Institute of Management Ahmedabad (IIMA) and the Council on Energy, Environment and Water (CEEW), as well as over 20 other partners from all over the world.

The project aims to inform solutions for strengthening climate action by combining the development of next-generation global and national low-emission transformation pathways with an analysis of opportunities, risks, synergies, and trade-offs associated with these pathways using knowledge from the social sciences, economics, and policy analysis. The project emphasizes co-creation with stakeholders from the private and public sectors to ensure the relevance of outcomes and improve accessibility to tools. Dissemination efforts include policy briefs, high-level policy meetings, and international conferences, aiming to engage a broad audience and ensure the practical application of project findings.

RESIST

The Resilience of Ecosystem Services Provided by Intact and Sustainably Managed Terrestrial Ecosystems (RESIST) project, led by IIASA, aims to integrate scientific evidence on key ecosystem processes driving climate change and socio-economic aspects driving stakeholder decision-making, both of which ultimately affect the resilience of ecosystem services. As part of this project, IIASA collaborates with the Birla Institute of Technology and Science (BITS), the Indian Institute of Science Education and Research (IISER), the Indian Institutes of Technology (IIT), and three other international partners.

Researchers use a multidisciplinary modeling framework that accounts for biophysical feedbacks between natural ecological processes and socio-economic aspects driving stakeholder decision-making. This framework enables researchers to derive sustainable management strategies for ecosystems based on an active stakeholder dialogue and to address currently intractable science-policy questions, such as how to enhance the mitigation potential of intact natural ecosystems while reducing further degradation of intensively managed land.

The project is focused on three case studies: Brazil, India, and Israel. For the Indian case study, researchers build upon stakeholder interests in India, which have been identified by the **fairSTREAM** project, and use the results to parameterize the proposed modeling framework to assess both natural and anthropogenic aspects driving ecosystem degradation. The goal is to identify sustainable management recommendations that foster long-term resilience of both natural and intensified ecosystems.

4. Selected Examples of IIASA Models, Tools, and Data

IIASA develops a wide range of advanced models that integrate scientific knowledge across disciplines to address complex global challenges. These models are designed to capture the interconnected dynamics between human, environmental, and technological systems, providing robust tools for exploring alternative futures and informing evidence-based policy decisions.

Several IIASA models cover key areas of strategic priority for the government of India. These tools can inform India's long-term low-emission strategies, climate adaptation planning, clean air programs, and science-based Sustainable Development Goals (SDG) implementation. In addition, IIASA offers **focused workshops** covering its tools, and several IIASA models have been tailored to the Indian context and are extensively applied by Indian organizations, such as NITI Aayog. Below are a few selected examples.

FABLE Calculator

The FABLE Calculator is an open-source tool designed to help governments, researchers, and organizations explore sustainable food and land use pathways. The tool provides insights by modeling 88 agricultural

products across crops and livestock; land and water use for food production from 2000 to 2050; and trade, losses, waste, and environmental constraints. Used by research teams and governments worldwide, the FABLE Calculator helps develop long-term integrated pathways, supporting decision-making and prioritization, as well as facilitating cross-sectoral dialogues to build a common vision for sustainable food and land use systems.

The Calculator is extensively used by the **India Country Team** of the **FABLE Consortium**.

GAINS

The Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model assesses emission and pollution reduction strategies that combat air pollution and climate change simultaneously. GAINS estimates historic emissions of 10 key air pollutants and 6 GHGs for each country based on data from international energy and industrial statistics, emission inventories and on data supplied by countries themselves. It assesses emissions on a medium-term time horizon, with projections being specified in five-year intervals through the year 2050. Scientists in many nations around the globe use GAINS as a tool to assess emission reduction potential in their region. The model is continuously refined to improve representation of key sources and new mitigation opportunities, as well as address new emerging challenges.

IIASA plays a central role in the **IGP–HF project**, which promotes evidence-based and regionally coordinated air quality planning through both country-specific and integrated airshed-level approaches covering Bangladesh, India, Nepal, Pakistan, and Bhutan, applying and adapting its **GAINS model** to regional and local contexts within the IGP–HF airshed. As part of the project, two versions of the model were used in India: a regional application for the Indo-Gangetic Plain (GAINS-IGP) and local application (GAINS-City). Through the **GAINS-IGP** and GAINS-City applications, IIASA provides the analytical foundation for developing Clean Air Plans across the region. These plans are prepared in close coordination with national and subnational government counterparts, including the Ministry of Environment, Forest and Climate Change (MoEFCC), state Departments of Environment and Pollution Control Boards, as well as leading academic and research institutions such as IIT Delhi, IIT Kanpur, and TERI. The project aims to ensure consistency between national/regional and sub-national level modeling, evaluate the cost-effectiveness of air quality policy options, strengthen access to analytical tools and databases, and build technical and decision-making capacity through targeted training for local experts and policymakers across the IGP–HF region. This work later fed into the **new clean air strategy for the Uttar Pradesh state of India**, developed by IIASA in collaboration with the Government of Uttar Pradesh and the World Bank.

In addition, GAINS was used to **determine the $PM_{2.5}$ contributions from different income groups**, as well as production of waste. It was then used to calculate the pollution generated, track that pollution, and provide a map of exposure to $PM_{2.5}$.

Using the GAINS model NITI Aayog and the International Energy Agency (IEA) identified that current policies in India may not be sufficient to address the growth of emissions, while decarbonizing India's road transportations could bring major co-benefits, notably reducing air pollution. Their findings are presented in **a report**, which suggests different policy options to expedite the transition to sustainable road transport, emphasizing energy efficiency improvements and adopting cleaner energy sources.

Geo-Wiki

The Geo-Wiki Project is a global network of volunteers who participate in earth observation-driven citizen science through the Geo-Wiki tool. The Geo-Wiki portal offers all citizen scientists the opportunity to participate in environmental monitoring of the earth's surface by evaluating satellite and aerial images in detail. By using these innovative techniques, Geo-Wiki has been used to successfully integrate citizen-derived data sources with expert and authoritative data. Data can be input via desktop or mobile devices, with campaigns and games used to incentivize input. These innovative techniques have been used to successfully integrate citizen-derived data sources with expert and authoritative data to address pressing policy-related questions.

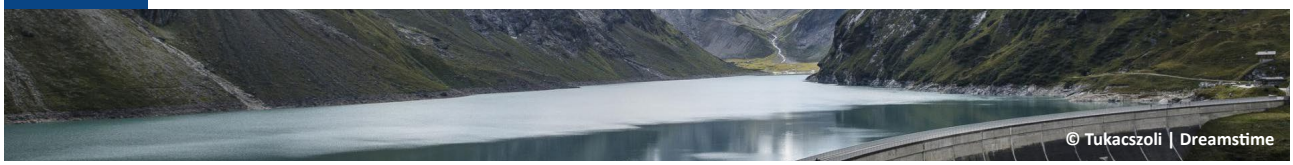
Since its inception, Geo-Wiki has grown rapidly, with currently over 22,000 registered users having contributed more than 18 million image classifications from around the world. Furthermore, the Geo-Wiki toolbox has expanded to include numerous applications which help to address a variety of global challenges (e.g. land use change, food security, pollution, and more).

GLOBIOM

The IIASA Global Biosphere Management Model (GLOBIOM) is used to analyze the competition for land use between agriculture, forestry, and bioenergy, which are the main land-based production sectors. The model can provide scientists and policymakers with the means to assess, on a global basis, the rational production of food, forest fiber, and bioenergy, all of which contribute to human welfare. The partial-equilibrium model represents various land use-based activities, including agriculture, forestry, and bioenergy sectors.

The model is built following a bottom-up setting based on detailed grid-cell information, providing biophysical and technical cost information. This detailed structure allows a rich set of environmental parameters to be taken into account, and its spatial equilibrium modeling approach represents bilateral trade based on cost competitiveness.

CWatM



The IIASA Community Water Model (CWatM) is an open-source model used to examine how future water demand will evolve in response to socioeconomic change and how water availability will change in response to climate, enabling assessment of water supply and human and environmental water demands at both global and regional levels.

CWatM is the first step toward developing an integrated modeling framework, which will be able to provide vital information to decision and policymakers. The integrated modeling framework will consider water demand from agriculture, domestic, energy, industry, and the environment. It will also take into account the investment needed to alleviate future water scarcity and provide a portfolio of economically optimal solutions. In addition, it will be able to track the energy requirements associated with the water supply system; for example, pumping, desalination, and inter-basin transfer.

In an **ongoing project**, IIASA researchers are coupling PlantFATE with CWATM to build a model of vegetation and soil-water dynamics. The coupled model will be applied to predict ecosystem services in India, Israel, and Brazil.

MESSAGEix

The IIASA Model for Energy Supply Strategy Alternatives and their General Environmental Impact (MESSAGE) has been a central tool in energy-environment-economy systems analysis in the global scientific- and policy arena. It played a major role in the Intergovernmental Panel on Climate Change (IPCC) assessment reports; it provided marker scenarios of the Representative Concentration Pathways and the Shared Socioeconomic Pathways; and underpinned the analysis of the Global Energy Assessment. It is currently known as MESSAGEix.

In the past, IIASA collaborated with NITI Aayog to create a national energy model using the MESSAGEix framework. The model was refined using Indian Energy Security Scenarios (IEASS) 2047 data. This effort culminated in the report **"India's Energy and Emissions Outlook,"** which analyzed scenarios for India's Nationally Determined Contributions (NDCs). Recently, MESSAGEix-GLOBIOM-GAINS Integrated Assessment Model and related research were presented to India Climate and Energy Modeling Forum upon invitation by Niti Aayog.

PlantFate

PlantFate is a novel eco-evolutionary vegetation model designed to unravel the intricate dynamics of forests and their response to environmental change. The model is designed to elucidate the dynamics of biodiverse plant communities by scaling individual plant function to the ecosystem scale. PlantFATE describes how individual plants acclimate to their environment by adjusting their physiology within the biophysical constraints imposed by their size, architecture, and species-specific traits. It also embeds individual plants in a physiologically structured population model, where the structured population comprises individuals from a diversity of plant species and life-history stages. Finally, it describes the feedbacks between the population structure and the competitive environment, which govern the outcomes of competition within and among species.

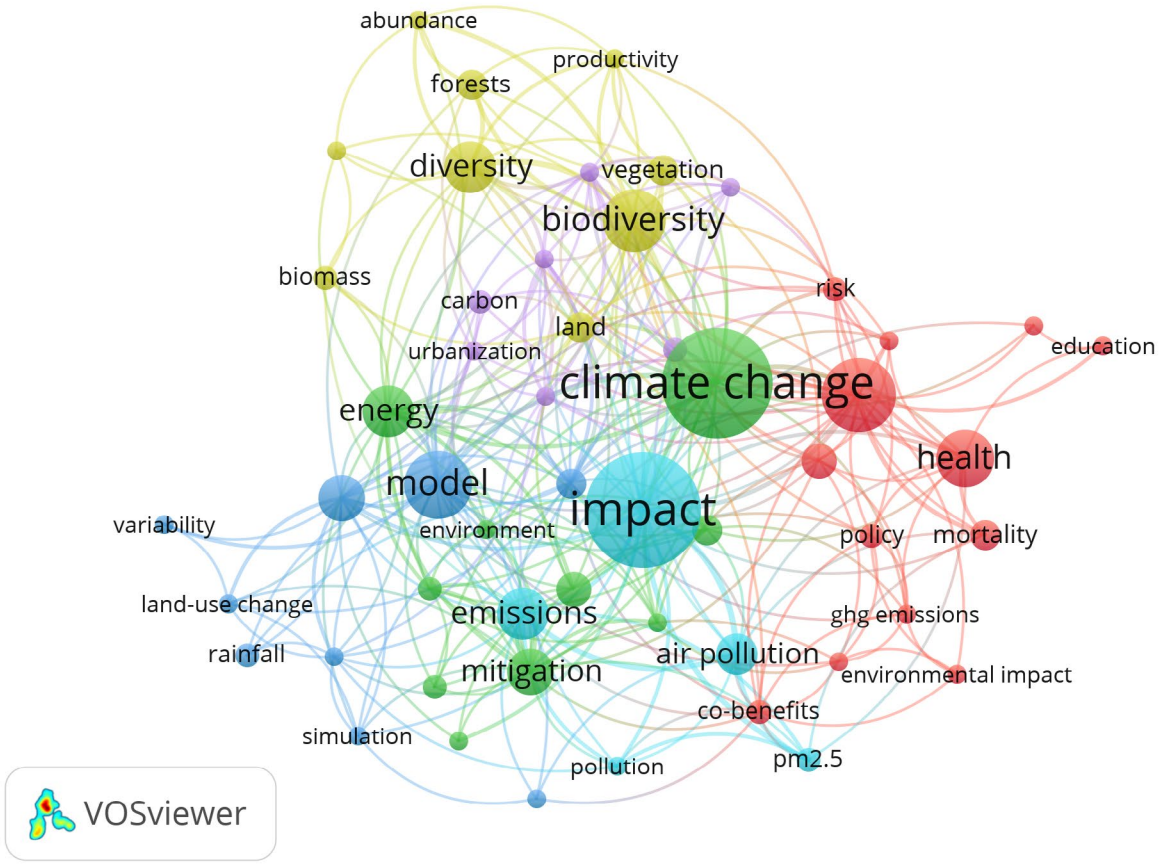
PlantFATE stands as a powerful tool to guide conservation efforts and inform policy decisions. In an **ongoing project**, IIASA researchers are coupling PlantFATE with CWATM to build a model of vegetation and soil-water dynamics. The coupled model will be applied to predict ecosystem services in India, Israel, and Brazil.

5. Key Data on IIASA Engagement with Indian Policy

IIASA is not just a research partner but a trusted policy resource for the Indian government, directly supporting the delivery of the country's strategic priorities across different sectors and scales. The Institute's models, peer-reviewed research, and expert inputs are increasingly embedded in Indian government documents, reflecting both the scientific credibility and policy relevance of IIASA's work in the Indian context.

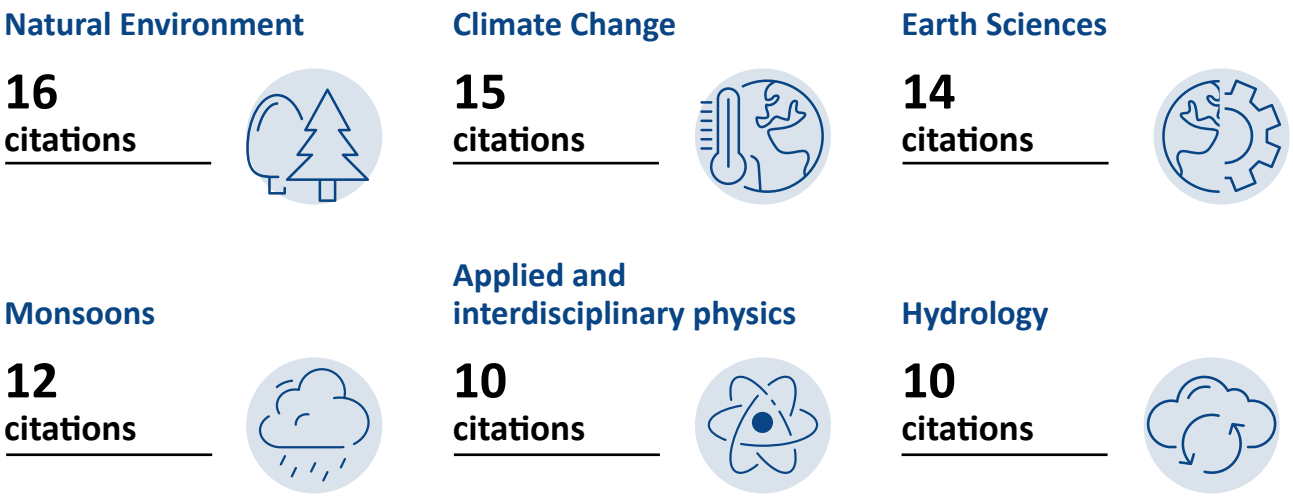
Between 2020 and 2025, IIASA researchers coauthored over 2,900 scientific articles in the fields of environmental, social, earth and planetary, agricultural, and energy sciences, which gathered over 90,000 citations. Of these publications, over 130 were coauthored in collaboration with Indian institutions. IIASA publications were cited 20 times in local and national Indian government documents.

Figure 1. Key topics of IIASA publications produced in collaboration with Indian organizations in 2020-2025 (Source: Web of Science)



Main policy subject areas addressed by the Indian Government citing IIASA researchers include natural environment, climate change, earth sciences, monsoons, applied and interdisciplinary physics, hydrology, meteorology, oceanography, precipitation, health, and air pollution.

Figure 2. Key policy areas in which the Government of India cites IIASA research (Source: Overton)



Top three government sources citing IIASA research in those years are:

- Ministry of Earth Sciences (10 citations or 50%)
- Ministry of Health and Family Welfare (8 citations or 40%)
- Ministry of Science and Technology (2 citations or 10%)

Funders of IIASA research cited in policy documents

The main funders of the research cited in the Indian policy documents were the UK Natural Environment Research Council (NERC), the Ministry of Science and Technology of India, European Research Council (ERC), and the European Commission (EC).

6. How the Government of India Benefits from IIASA Research

IIASA researchers work closely with representatives of key central government bodies, including, among others, NITI Aayog and the Ministry of Environment, Forest and Climate Change (MoEFCC), providing analytical inputs, training, modeling support, and scenario analysis to inform national strategies.

We present a few selected case studies illustrating how India benefits from policy-relevant research conducted at IIASA. The case studies showcase how the Institute's expertise in modeling and systems analysis helps the government of India address the country's interconnected priorities with regard to energy transitions, climate change mitigation and adaptation, air pollution management, and economic resilience.

Working with the Government of Uttar Pradesh to develop a new clean air strategy

Working with the Government of Uttar Pradesh and the World Bank, IIASA researchers helped develop a forward-looking clean air strategy for the Uttar Pradesh state of India, based on air quality levels, trends, and prominent pollution sources. The document offers the country's first state-level clean air strategy grounded in scientific analysis and an airshed-based approach. IIASA carried out all the modeling work and provided technical support for the development of the strategy.

Titled **"Uttar Pradesh Clean Air Plan: Airshed-Based Air Quality Analysis and Recommendations (UCAP)"**, the document provides a 10-year roadmap to reduce $PM_{2.5}$ levels by targeting key sources such as household emissions from cooking with solid fuels, transport, industries, and agriculture. Moving beyond city-level plans, UCAP recognizes that air pollution often travels between urban and rural areas, emphasizing the necessity of cooperation with neighboring states. The strategy reviews the impact of current state policies as well as alternative policies and actions needed to further advance emission reductions with the goal to achieve India's National Ambient Air Quality Standards for $PM_{2.5}$, ultimately ensuring cleaner air for citizens.

The implementation of UCAP will be supported by the upcoming Uttar Pradesh Clean Air Management Project (UPCAMP), which will be financed by the World Bank. UPCAMP will focus on strengthening airshed institutional mechanisms for long-term planning, expanding air quality monitoring networks, and piloting innovative clean air measures like tunnel kiln technology, state-of-the-art supersites, and AI-enabled Decision Support System (DSS) to track pollution trends, among others.

Providing technical expertise to scale up climate modeling in India

IIASA was actively involved in the **Helping Foster Strategic Partnerships for the Implementation of the Paris Agreement (SPIPA)** project, spearheaded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the main development agency of Germany. The project was conceptualized to support priority focus areas of the Government of India and was conducted in close cooperation with the Ministry of Environment, Forest and Climate Change (MoEFCC).

The overall objective of the project was to support policy dialogue between the EU and India, as well as enhance cooperation between India, EU Member States, and other key stakeholders. Project activities were focused on three areas: providing a forum for capacity building, networking, and knowledge management; fostering knowledge exchange with regard to the development of cross-cutting adaptation strategies; and providing support for initiatives that contribute to enhanced mitigation efforts in India.

IIASA participated as a technical partner, organizing a series of **webinars** with a focus on modeling tools, such as the IIASA **GAINS Model**. The objective of this activity was to support India-EU collaboration on the development of modeling capacities, enhance knowledge of climate modeling, and help improve the quality of modeling tools and integrated modeling analysis frameworks in India. A detailed report of all activities implemented as part of the SPIPA project is **available here**.

From India, experts based at the Centre for Study of Science Technology and Policy (CSTEP), Energy and Resources Institute (TERI), Council on Energy, Environment and Water (CEEW), and Integrated Research and Action for Development (IRADe) were involved. In addition, upon request of the MoEFCC, experts and research scholars from Indian Institute of Science (IISc), Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and central universities also participated.

Building on SPIPA, the **EU Climate Dialogue project** aimed to enhance India's capacity to develop low-emission scenarios to meet Paris Agreement goals, focusing on NDCs and pathways to net-zero emissions. These initiatives have collectively strengthened India's energy modeling and scenario-planning capabilities. IIASA is currently partnering with TERI and IIMA, both teams developing Indian energy system models in MARKAL and AIM/HUB respectively within the **COMMITED project**.

Supporting India's G20 Presidency and working with the government toward the net-zero transition

In 2023, IIASA Director General, Albert van Jaarsveld, visited New Delhi to participate in a conference, organized by NITI Aayog and titled "Green and Sustainable Growth Agenda for the Global Economy", sharing his insights and expertise on the pivotal role of technology and policy in driving sustainable economic growth while creating new employment opportunities. Following the visit, IIASA was invited to produce inputs for the G20 process during the 2023 G20 New Delhi summit, with a focus on the future of multilateralism and key multilateral institutions.

At the request of the G20 Sherpa, IIASA researchers collaborated with a group of high-level experts to produce **four policy briefs** on multilateral institution reforms. The institute convened a consultative process with 25 renowned external experts from around the world to produce a series of policy papers presenting recommendations on several areas of UN reforms, including: strengthening the United Nations to confront collective challenges; climate finance, effective health care and global pandemic preparedness; and strengthening the WTO and the global trade system for sustainable development. Many of the recommendations in these policy papers found traction and resonance in the **G20 New Delhi Leaders' Declaration**.

Building upon this collaboration, IIASA researchers also contributed to a report prepared for the Government of India, exploring scenarios for achieving net-zero emissions while balancing its developmental priorities. Titled **"Synchronizing Energy Transitions Toward Possible Net-Zero for India: Affordable and Clean Energy for All"**, the report aims to inform the energy needs for meeting high levels of the Human Development Index (HDI) in net-zero scenarios. The findings are relevant for planning India's climate policies to attain net-zero emissions by 2070 with a focus on the energy sector. The report was launched by the Principal Scientific Advisor to the Government of India and was circulated among relevant national ministries, state governments, and think tanks.

Producing climate scenarios underpinning the Network for Greening the Financial System

The Network for Greening the Financial System (NGFS) is a group of central banks, supervisors, and observers including the Reserve Bank of India (RBI) and 137 other members across the world.

Having joined the NGFS in 2021, the RBI fulfilled one of the recommendations of **a substantial report** developed by its own researchers. The report found that the macroeconomic effects of climate change are already significant for India and that food price inflation is particularly affected. India's weather patterns have changed significantly in recent decades, and this has had a strong impact across a range of key economic indicators.

A consortium of climate and economic experts from IIASA and several other organizations have been providing annual, quantitative global mitigation scenarios to the Network, detailing sectoral transitions and assessing the potential for transition and physical risks. The scenario set, hosted in the **IIASA NGFS Scenario Explorer**, is essential for future climate risk assessments and is widely used in research, financial services, climate risk consulting, and business, helping to inform measures and rules, developed by central banks to foster a more sustainable, dynamic, and modern economy, both at the national and global levels. IIASA researchers provide mitigation scenarios using the **Model for Energy Supply Strategy Alternatives and their General Environmental Impact (MESSAGEix)** to inform transition risks, and also now lead the work package on physical risks.

Working with NITI Aayog to Support National Energy Modeling

In 2018, IIASA collaborated with NITI Aayog to launch India's national energy systems model. The NITI model was co-developed with IIASA support, and is based on IIASA's MESSAGEix modeling framework. As part of these activities, training was provided for young professionals in India to strengthen modeling and analytical capacity in Indian institutions.

IIASA researchers also collaborated with NITI Aayog as part of **"India's Energy and Emissions Outlook,"** using the framework to analyze the future development of India's complex energy system and look at how India's commitments on climate change, as outlined in its Nationally Determined Contribution (NDC), will affect its future energy and emissions scenarios.

Later, in 2019, this work fed into the **West Bengal State Energy Plan and Action Plan**, which is extensively based on the model assessment done on the IIASA MESSAGEix framework.

Currently, building on this work, IIASA researchers continue to work with NITI Aayog within the framework of the India Climate and Energy Modelling Forum (ICEMF) — a platform for leading energy experts, think tanks, researchers, modelers and policy makers to collaborate and examine important climate, energy and environment related issues, including their economic linkages, through integrated modeling exercises. IIASA researchers are among the ICEMF Steering Committee Members and have been actively involved in several events in 2023-2025.

7. Capacity Building Opportunities at IIASA

Developing the next generation of researchers and decision-makers is central to IIASA's mission, and highly relevant to India's ambition to strengthen skills, innovation, and global influence in science. Through its flagship training programs IIASA provides Indian researchers with a unique platform to apply systems thinking to the context of their home country and translate their research into real-world impact.

IIASA's training and capacity development programs focus on long-term capability enhancement through training the trainers, advanced modeling courses, and multi-year scientific exchanges. Indian researchers gain the tools to independently apply, adapt, and extend IIASA's open modeling frameworks, building enduring domestic expertise.

Participation not only equips scientists with advanced methodological expertise and experience using IIASA's world-class models but also provides access to a truly international network of peers, policymakers, and practitioners. These opportunities act as a bridge between research and practice: participants return with new skills, perspectives, and professional connections that enrich their home institutions, strengthening the national talent pool. The following section highlights selected examples of Indian experts who have benefited from these opportunities.

IIASA Young Scientists Summer Program (YSSP)

For over 50 years, IIASA hosts up to 50 doctoral students from around the world as part of its Young Scientist Summer Program (YSSP) — a three-month course designed for advanced PhD students working on a topic that is compatible with ongoing research at IIASA and who wish to explore the policy implications of their work. Participants work under the direct mentorship of experienced IIASA scientists in a unique interdisciplinary and international research environment. YSSP fellows produce a paper serving as the first step toward a publishable journal article and have the opportunity to build contacts for future collaboration within the institute's worldwide network.

Many of the former YSSP participants return to IIASA as staff members, others hold esteemed positions in their home countries and research institutions all over the world.

YSSP'25

Poornima Kumar (University of Oxford) carried out research on "Linking a System Dynamics Model of Digitalization with FeliX to Explore the Integrated Impacts of Digital Adoption on Energy and Emissions" under the supervision of the IIASA Energy, Climate, and Environment Program.

Shreeyash Malode (Indian Institute of Technology Kanpur) carried out research on "Integration of MESSAGEix Framework and Emission Trading System Modeling: Assessment of Indian Carbon Market (ICM) Policy and 1.5°C Scenarios for Energy Transition" under the supervision of the IIASA Energy, Climate, and Environment Program.

Avijit Pandit (Norwegian University of Science and Technology) carried out research on "Scenarios of Dietary Transition: Exploring Linkages between Changing Demography, Consumption Patterns, and Biogeochemical Nutrient Cycles in Food System" under the supervision of the IIASA Biodiversity and Natural Resources Program.

YSSP'24

Amrutha Gopinathan Sathee Devi (International Institute for Population Sciences) carried out research on "The impact of air pollution on decent living standards: evidence from a district-level panel data" under the supervision of the IIASA Economic Frontiers Program. Her participation was funded by the Jyoti and Kirit Parikh Fellowship.

Sowdamini Sesha Prasad (University of Tasmania) carried out research on "Integrating fed aquaculture into GLOBIOM to account for growing global feed resource competition" under the supervision of the IIASA Biodiversity and Natural Resources Program.

YSSP'23

Gaurav Ganti (Humboldt University of Berlin) carried out research on "Pathways to inform the equitable implementation of the Paris Agreement" under the supervision of the IIASA Energy, Climate, and Environment Program. He won the IIASA Peccei Award for his research.

Ankita Gaur (University College Cork) carried out research on "Evidence-based scenarios for Global South passenger mobility in large-scale IAMs: A case study for South Asian countries" under the supervision of the IIASA Energy, Climate, and Environment Program.

Nabin Pradhan (University of Michigan) carried out research on "Estimating inequality using nighttime lights and machine learning" under the supervision of the IIASA Advancing Systems Analysis Program.

Rajdeep Singh (Indian Institute of Technology) carried out research on "Optimal vaccine allocation strategies" under the supervision of the IIASA Economic Frontiers Program. His participation was funded by the Jyoti and Kirit Parikh Fellowship.

YSSP'22

Prerita Agarwal (University of Edinburgh) carried out research on "Air quality benefits from mitigation of Black Carbon emissions in Northern India" under the supervision of the IIASA Energy, Climate, and Environment Program.

Swaptik Chowdhury (RAND Graduate School) carried out research on "Exploring equity in energy sector decarbonization policies" under the supervision of the IIASA Advancing Systems Analysis Program.

Chayasmita Deka (Indian Institute of Technology) carried out research on "Adoption of electric-vehicles by middle-income Indian population: A comparison of gain and norm motivators and other factors" under the supervision of the IIASA Advancing Systems Analysis Program. Her participation was funded by the Jyoti and Kirit Parikh Fellowship.

Mel George Vallimyalil (University of Maryland) carried out research on "Distributional impacts of diverse 1.5ºC mitigation pathways on energy poverty" under the supervision of the IIASA Energy, Climate, and Environment Program.

Pooja Ramamurthi (Princeton University) carried out research on "Understanding the relationship between norms, beliefs and appliance ownership in urban India and the US" under the supervision of the IIASA Energy, Climate, and Environment Program.

YSSP'21

Ali Balhasan (International Institute for Population Sciences) carried out research on "The puzzling decline of female labour force participation in India and its prospects: an age period-cohort approach" under the supervision of the IIASA Population and Just Societies Program.

Trisha Gopalakrishna (University of Oxford) carried out research on "Trade-offs and synergies between ecosystem benefits from forest restoration in India" under the supervision of the IIASA Biodiversity and Natural Resources Program.

Chandrakant Singh (Stockholm University) carried out research on "Self-influencing feedback of deforestation on the actors responsible" under the supervision of the IIASA Biodiversity and Natural Resources Program.

Siddharth Joshi (University College Cork) carried out research on "Assessing the role of rooftop solar PV in global energy transitions" under the supervision of the IIASA Energy, Climate, and Environment Program. He is currently working as a research scholar in the same Program. He won the IIASA **Mikhalevich Award** for his study. He is currently a research scholar at IIASA.

Shipra Singh (Jawaharlal Nehru University) carried out research on "Trait-based modeling of temperate forests in western Himalaya, India" under the supervision of the IIASA Advancing Systems Analysis Program. She later re-joined IIASA as a Postdoctoral Fellow.

Sagar Rathod (Colorado State University) carried out research on "Impacts of energy transition on global particulate matter air quality" under the supervision of the IIASA Energy, Climate, and Environment Program.

YSSP'20

Milan Das (International Institute for Population Sciences) carried out research on "Educational differences in timing and quantum of fertility in India: a cohort approach" under the supervision of the former IIASA World Population Program.

Jyoti and Kirit Parikh Fellowship

The Jyoti and Kirit Parikh Fellowship was established in 2018 by a generous gift from IIASA alumni Jyoti and Kirit Parikh with the aim to provide much needed support and funding for talented researchers from India to participate in the YSSP. This experience helps Indian researchers develop interdisciplinary research skills, as well as forge international research relationships.

Jyoti Parikh was an IIASA research scholar from 1976 to 1978, and 1980 to 1986. Her policy work emphasizes the importance of different stakeholders, including at the grassroots level. Kirit Parikh is also an eminent researcher who has been involved in several different international organizations, including the United Nations.

Since the establishment of the Fellowship, six participants from India have received it and visited IIASA as part of the YSSP, including four participants in the period 2020-2025.

Postdoctoral Fellowships

IIASA also offers a range of (bilateral) postdoc opportunities for early career researchers. These include fully funded research positions of up to two years to study topics related to the IIASA research agenda. In the period 2020-2025, IIASA hosted two postdoctoral fellows from India.

Jaideep Joshi first joined IIASA in 2020 as a **Marie Curie Fellow**. His research focused on predicting global vulnerability of forests to drought using plant functional trait evolution. He is currently a guest research scholar in the Exploratory Modeling of Human-natural Systems Research Group of the IIASA Advancing Systems Analysis Program.

Shipra Singh first joined IIASA in 2021 as a YSSP participant and then re-joined IIASA in 2023 as an **IIASA Postdoctoral Fellow**. Her postdoctoral research focuses on assessing the utilization of Forest Ecosystem Services across environmental gradients in the Indian Himalayan region.

Other Activities

IIASA organizes diverse capacity development activities in India (e.g., workshops, conferences, seminars, etc.) with a focus on ongoing research activities at the Institute in areas of mutual strategic interest. For example, following the Institute's successful collaboration with NITI Aayog, which launched its national energy systems model based on IIASA's MESSAGEix modeling platform, IIASA provided training for young professionals in India to help strengthen modeling and analytical capacity in Indian institutions.

IIASA also organized several knowledge exchange workshops, bringing together diverse stakeholders from India and the EU. The workshops focused primarily on low carbon modeling and helped to support technical exchange on the development and implementation of strategies, policies, and measures in India for transition to climate neutrality by fostering an exchange of best practices and know-how on greenhouse gas emissions modeling between Indian and EU modeling teams, working closely with their respective governments. The primary aim was to strengthen India's domestic capacity in energy analysis, systems modeling for the development of low emission scenarios to meet the goals of the Paris Agreement.

Scientists from India Leading Research Efforts at IIASA

Indian researchers at IIASA play an important role in advancing the Institute's global scientific agenda while ensuring that issues of critical relevance to India remain part of the conversation. They are active contributors to international research focusing on energy, climate change, sustainability, pollution, ecosystem and biosphere management, biodiversity, and sustainable development. Below are the short biographies of a few selected researchers:

Sandeep Chowdhary is a social data scientist currently working as a research scholar in the Sustainable Service Systems Research Group of the IIASA Energy, Climate, and Environment Program. He works on the LowAI project where he uses large language models (LLMs) and machine learning to identify the social norms related to climate change in online communities by leveraging social media data.

Siddharth Joshi is a research scholar in the Integrated Assessment and Climate Change Research Group of the IIASA Energy, Climate, and Environment Program. He specializes in high resolution spatiotemporal assessment of renewable energy potential, as well as solar energy assessment, deployment, and verification. He is an expert in the use of big data, machine learning, and remote sensing applications that aid in

development and enrichment of energy system models. He has experience of consulted the national government, industries, and think tanks on renewable policies and energy sovereignty studies. At IIASA, he leads the integration and representation of renewables in global energy system models. He leads the COMMITTED and RECONNECT projects, as well as the work package on hydrogen economy and future energy system as part of the HYway project.

Ipsita Kumar is a research scholar in the Integrated Biosphere Futures Research Group of the IIASA Biodiversity and Natural Resources Program. She has an interdisciplinary background focusing on the food-energy-water nexus. She works on the Global Biosphere Management Model (GLOBIOM).

Shonali Pachauri is the Transformative Institutional and Social Solutions Research Group Leader and Principal Research Scholar at IIASA. Prior to this, she served as acting director of the former Transitions to New Technologies Program and as senior research scholar in the former Energy Program at IIASA. She coordinates and leads research on analyzing heterogeneities in energy and infrastructural access and use. Her work explores pathways for achieving universal access to decent living energy services for human wellbeing and assessing the wider impacts of this for sustainable development.

Omkar Patange is a research scholar associated with the IIASA Economic Frontiers Program. He works on Just Transitions to Net-zero Carbon Emissions for All (JustTrans4ALL) project, focusing on the empirical analysis of drivers of just energy transitions and resulting implications for wellbeing, using household-level data and econometric methods. His research interests include mitigation strategies for deep decarbonization of energy and allied systems, their social and environmental implications, and the institutional and governance challenges emerging from energy system transitions.

Pallav Purohit is a senior research scholar in the Pollution Management Research Group of the IIASA Energy, Climate, and Environment Program. He developed and implemented the global fluorinated greenhouse gas module in the IIASA Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model and coordinated various policy applications involving the GAINS model in industrialized and developing countries. His research interests include integrated assessment of air pollution and greenhouse gases, short-lived climate pollutants, energy economics, policy, and planning.

Sreyam Sengupta is a researcher in the IIASA Energy, Climate, and Environment Program. His broad research interest lies at the intersection of land-based carbon dioxide removal (CDR) with biodiversity conservation and social justice. He is involved with the GENIE project, as part of which he explores the co-benefits and trade-offs between climate change mitigation through land-based CDR methods and biodiversity conservation.

Parul Srivastava is a research scholar in the Pollution Management Research Group of the IIASA Energy, Climate, and Environment Program. She works on the development of gridding routines for the Greenhouse Gas Air Pollution Interaction and Synergies (GAINS) model's sectors using spatial data along with downloading and validating observation data of monitoring stations for GAINS regions to understand the current impact of air pollution. She has also worked on the source apportionment and fine particulate matter ($PM_{2.5}$) exposure impact calculations for South Asia, Vietnam, and Chile projects. She is currently working on updating and improving oil and gas infrastructure data in the GAINS model for the EUCLIMIT6 project.

Deepthi Swamy is a research scholar in the Sustainable Service Systems Research Group of the Energy, Climate, and Environment Program. Her research focuses on improving the endogenous representation of behavioral drivers of demand-side energy consumption within integrated assessment models. Her work aims to develop mitigation and sustainability scenarios that account for the dynamic feedbacks between human behavior, energy use, the economy, and the environment, advancing a systems approach to inform decision-making for sustainable development.

Shubham Tiwari is an energy systems modeler and research scholar in the Agriculture, Forestry, and Ecosystem Services Research Group of the IIASA Biodiversity and Natural Resources Program. His current research focuses on evaluating the technical feasibility and market potential of sustainable aviation fuel (SAF) deployment across specific regional and national case studies. Additionally, he is actively engaged in developing prominent carbon dioxide removal (CDR) pathways, particularly bioenergy with carbon capture and storage (BECCS) and DAC, to support long-term decarbonization strategies. Furthermore, he is working on renewable energy expansion roadmaps while considering nature restoration and ecosystem services as important constraints.

8. Selected Leading Personalities from India Associated with IIASA

Rangan Banerjee, Director, Indian Institute of Technology (IIT). From February 2022 he is on lien from IIT Bombay where he served as the Forbes Marshall Chair Professor in the Department of Energy Science and Engineering. He is a prominent collaborator of IIASA.

Anshu Bharadwaj, Programme Director at NITI Aayog, Government of India, where he plays a vital role in shaping the country's development strategies, particularly in the domains of clean energy, technology, and sustainability. He is a former officer of the Indian Administrative Service (IAS), Karnataka, and served in various administrative roles within the Government of Karnataka before transitioning to policy research and innovation leadership.

Sagnik Dey, Head and Vipula and Mahesh Chaturvedi Chair Professor in Policy Studies at the Centre for Atmospheric Sciences, IIT Delhi, India. IIASA collaborates with him to advance air quality management in the Indo-Gangetic Plain, with a particular focus on designing and implementing Clean Air Plans for the Indian states within the IGP region.

Navroz Dubash, Professor of Public and International Affairs and the High Meadows Environmental Institute at Princeton University, US, former Professor at the Centre for Policy Research, India. He is a prominent collaborator of IIASA.

Amit Garg, Research Chair Professor in Environmental, Social and Corporate Governance (ESG), Indian Institute of Management Ahmedabad, National Investment and Infrastructure Fund Limited (NIIF). IIASA has ongoing collaborations with him with a focus on exploring net-zero emission scenarios for India and its subnational regions without compromising on the developmental goals.

Ranjan Kumar Ghosh, Associate Professor at the Indian Institute of Management Ahmedabad (IIMA). He is a member of the FABLE India Team.

Ritu Mathur, Senior Fellow and Director at The Energy and Resources Institute (TERI), where she leads work on climate and energy policy. Her current focus spans the macroeconomic implications of green and resilient transitions, climate finance, and the role of energy policies and measures in accelerating green transition pathways at national, regional, and sub-national levels.

Jaideep Mazumdar, Permanent Representative of the Republic of India to the United Nations and other international organizations in Vienna. In 2023 he **visited** IIASA to meet with IIASA Director General, who provided an overview of the institute's current research agenda and main priorities, as well as the institute's scientific input to support the Indian G20 Presidency.

Sunita Narain, Director-General of the Center for Science and Environment in New Delhi. She worked with IIASA on the Gulbenkian Think Tank on Water and the Future of Humanity. In 2025, she visited IIASA to give a guest lecture on the topic of "Climate Action in the Age of Greenlash**".**

Jyoti Parikh, Executive Director of Integrated Research and Action for Development (IRADe). She collaborated with IIASA in the areas of energy and development since she was an IIASA research scholar in the 1970s and is a prominent supporter of the institute's Young Scientists Summer Program.

Kirit Parikh, Former Member of India's Planning Commission (IRADe); Founder Director of Indira Gandhi Institute of Development Research (IGIDR). He is an IIASA honorary scholar, a long time IIASA collaborator, and prominent supporter of the IIASA Young Scientists Summer Program.

Amit R K, Professor at the Indian Institute of Technology. He is actively collaborating with IIASA to develop a model describing the game-theoretic interactions of vaccine developers and manufacturers.

Ambuj Sagar, Vipula and Mahesh Chaturvedi Professor and the founding Head of the School of Public Policy at the Indian Institute of Technology (IIT) Delhi. He is a prominent collaborator of IIASA.

Nandita Sakia, Professor of Public Health and Mortality Studies at the International Institute for Population Sciences (IIPS), Mumbai. She is a prominent collaborator of IIASA.

Upasna Sharma, Associate Professor, Indian Institute of Technology (IIT) Delhi. She is a prominent collaborator of IIASA.

Vartika Singh, Senior Research Analyst in the Natural Resources and Resilience Unit and Senior Research Officer at the Indian Institute of Management Ahmedabad (IIMA). She is a member of the FABLE India Team.

Leena Srivastava, Independent Non-executive Director at Shell, member of the UN Technical Advisory Group on SDG 7, a Scientific Advisory Board Member of the European Forum Alpbach, and an advisory Board Member of NAMTECH, an Indian technical education institute. In the past, she was the Chair of IIASA Evaluation Committee on Energy and Technology and IIASA Deputy Director General for Science.

Simi Thambi, Climate Economist, The FAIRR Initiative. Previously, she held several positions at NITI Aayog and the Ministry of Environment, Forest and Climate Change, as well as UNDP and UNEP. She is a prominent collaborator of IIASA.

9. Outlook for the Future of Partnerships between IIASA and India

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

- **Developing new IIASA applied systems analysis models for the Indian context:** India is actively utilizing several IIASA modeling tools, including the **India Energy Model**, based on IIASA's **MESSAGEix** framework, as well as the **GAINS South Asia** and **GAINS-IGP** models, to support energy planning and air quality management at national, regional, and sub-national levels. There is a possibility to develop new bespoke versions of other IIASA global models to further enable researchers and policymakers assess complex global problems and their impact on India in a holistic and integrated way.
- **Conducting international assessments in areas of mutual strategic interest:** India was a significant contributor to **IIASA Global Energy Assessment** which brought together over 500 specialists to transform the way society thinks about, uses, and delivers energy. The new IIASA Strategy will empower its members to collectively initiate new large-scale interdisciplinary projects of high relevance to the regions where its members are located.
- **Forging new partnerships between IIASA and Indian institutions to win grants from international research funders:** IIASA high-quality research and international research network makes it highly competitive in its applications for international research funds. About half of IIASA funding comes from additional funds through contracts, grants, and donations. IIASA and India actively collaborate as part of Horizon Europe projects, such as the **NEWPATHWAYS** project or the **LINKS4SKILLS** project. There is significant potential to scale up these efforts and secure grants from other international research funders to conduct research in areas of mutual interest, such as artificial intelligence, climate change, environmental protection and conservation, pollution, and health.
- **Fostering multilateral collaborations:** IIASA's new initiative, the Science Diplomacy Center, is specifically designed to help IIASA member countries enhance international cooperation on global policy challenges by bridging the gap between researchers, policymakers, and stakeholders through evidence-based decision-making. As India prepares to assume the BRICS presidency in 2026, it can leverage IIASA's existing collaborations with BRICS members to strengthen its scientific and policy partnerships. As IIASA expands its focus on critical global challenges of high relevance to the BRICS, such as resilient and equitable health systems, climate change, AI governance, and multilateralism, India's involvement would further enhance its role in shaping international research and policy discussions. In addition, IIASA provides access to a wide network of partners in Asia and sub-Saharan Africa, which can help India foster collaborations in those regions.
- **Academic training opportunities for young Indian scientists:** Further collaborations can help enhance participation by young Indian postdoctoral students in IIASA capacity development programs. By combining advanced analytical training with access to IIASA's global networks and real-world policy processes, these opportunities prepare young Indian researchers to become leaders in addressing complex sustainability challenges at both the national and international level. There is also a significant potential to scale up training opportunities organized by IIASA within India by expanding to other focus areas, for example, in 2010-2014 IIASA conducted a series of workshops in India with a focus on demographic computations and multistate population projections.

Annex 1.

Selected IIASA projects with Indian funders and partners (arranged by end date).

TITLE	FUNDER	PARTNERS IN INDIA	DATES
RE-CONNECT: Modeling, projecting and tracking emissions reduction pathways	▪ European Commission, DG Climate Action	▪ Indian Institute of Management Ahmedabad (IIMA); ▪ The Energy and Resources Institute (TERI)	06-OCT-2023 to 31-DEC-2027
ELEVATE: Enabling National Action by overcoming barriers and leveraging policy entry points	▪ European Commission, European Climate, Infrastructure and Environment Executive Agency	▪ The Energy and Resources Institute (TERI)	01-SEP-2022 to 31-AUG-2026
COMMITTED: Enhanced sharing of good practices on greenhouse gas emissions modeling between EU and Asian countries	▪ European Commission, DG Climate Action	▪ Indian Institute of Management Ahmedabad (IIMA); ▪ The Energy and Resources Institute (TERI)	01-JAN-2023 to 30-JUN-2026
EDITS: Energy Demand changes Induced by Technological and Social innovations	▪ Ministry of Economy, Trade, and Industry (METI), Japan.	▪ Center for Study of Science, Technology and Policy (CSTEP); ▪ Climate Analytics India	01-JUL-2024 to 30-JUN-2026
CAP-1 India: Clean Air Project India	▪ Swiss confederation, The Federal Department of Foreign Affairs	▪ The Energy and Resources Institute (TERI)	01-NOV-2019 to 31-MAY-2024
COMFORT: Our common future ocean – quantifying coupled cycles of carbon, oxygen, and nutrients for determining and achieving safe operating spaces with respect to tipping points	▪ European Commission, Executive Agency for Small and Medium-sized Enterprises	▪ Nansen Environmental Research Centre	01-SEP-2019 to 31-AUG-2023
ENGAGE: Exploring National and Global Actions to reduce Greenhouse gas Emissions	▪ European Commission, DG Executive Agency for Small and Medium-sized Enterprises	▪ Indian Institute of Management Ahmedabad (IIMA); ▪ The Energy and Resources Institute (TERI)	01-SEP-2019 to 31-AUG-2023
NRCP: Developing an integrated model for analyzing linkages between India's water, land and energy policies and the Sustainable Development Goals	▪ Ministry of Environment, Forest and Climate Change of India	▪ The Celestial Earth	01-JUL-2019 to 31-DEC-2022
WFaS_scaleWAYS: Scaling out resilient water and agricultural systems	▪ Austrian Development Agency (ADA)	▪ The Energy and Resources Institute (TERI)	07-JAN-2019 to 30-NOV-2022
PATHWAYS: Strategic decision-making in climate risk management: designing local adaptation pathways	▪ Austrian Climate Research Program	▪ Indian Institute of Management Ahmedabad (IIMA)	01-NOV-2019 to 31-MAR-2022
TCE-IHISET: Integrated High Impact Innovation in Sustainable Energy Technology- Energy System Analysis	▪ Asian Development Bank	▪ The Celestial Earth	30-SEP-2019 to 29-MAR-2021
COMMIT: Improve modelling capacity to support low emission development strategies	▪ European Commission, DG Climate Action	▪ The Energy and Resources Institute (TERI)	01-MAY-2018 to 30-NOV-2020

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