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OVERVIEW OF IIASA'S RESEARCH ACTIVITIES

INTRODUCTION

The International Institute for Applied Systems Analysis (IIASA) is a multi-national, independent organization devoted to interdisciplinary, policy-oriented research focusing on selected aspects of environmental, economic, technological and social issues in the context of global change. IIASA's research is organized around fields of policy importance rather than academic disciplines and serves as a neutral forum for sustained investigation and discussion of global and international issues.

Societies and decision-makers everywhere are being confronted with unprecedented change – to the societies themselves, to their economies, to the environment. In order for national and international policies to be effective in dealing with global change, decision- and policymakers must understand the complex problems associated with them. And equally importantly, they must recognize the interrelationships among the problems. This is precisely the mission of IIASA – to provide science-based insight into complex global problems.

IIASA investigators combine methods and models from the natural and social sciences in analyses that provide policy insight on global change issues. Since 2000, the Institute's research is carried out within three core themes: **Environment and Natural Resources**; **Population and Society**, and **Energy and Technology**.[1] In addition to scientifically-sound, policy relevant findings, the Institute has made significant contributions to the methodologies of assessment and decision support, as well as to the development and refinement over three decades of global databases and analytical models.

Within the themes are **programs**, which define the major research areas in which IIASA does it work. These are relatively stable designations and comprise mostly the research areas for which IIASA is well-known, energy, forestry, population, technology, air pollution, land-use, risk, etc. To explore promising new avenues of research and/or to act as a clearinghouse for activities phasing out, IIASA also has a category called **special projects**. Further, to underscore the complexity of some of the research issues being studied, some activities are being investigated by or **cross-cut** several programs.

Finally, since IIASA must operate on the leading edge of research, it also has a responsibility to train a new generation of scholars. Thus, IIASA is committed to involving young scholars who are in the early stages of their careers in the methods and findings of IIASA's research and to introduce them to the international dimensions of its issues. This responsibility is reflected in various programs offered to young scholars.

Unless otherwise indicated, the duration of the research programs and other activities described briefly below, covers the period 2006-2010. For more detailed information, each can be accessed from the list on the left-hand side of IIASA's home page http://www.iiasa.ac.at. Alternatively, e-mail inf@iiasa.ac.at or the named contact.

[1] As described in *IIASA Enters the Twenty-First Century,* Long-Term Plan Prepared by the IIASA Council, November 1999.

ENVIRONMENT AND NATURAL RESOURCES THEME

Atmospheric Pollution and Economic Development (APD) Program

Contact: Markus Amann, Program Leader (E-mail: amann@iiasa.ac.at)

The economic burden associated with the control of pollution is often considered to be an impediment to economic development. This is a critical issue for development policy, and concerns about inequitable distributions of such burdens across economic sectors and countries turn out as serious obstacles for reaching environmental agreements at the national and international levels. Recent scientific work indicates potentially important economic and environmental synergies between air pollution control and the mitigation of greenhouse gases at different temporal and spatial scales. A systematic assessment of such synergies and their interactions with economic development could thus point the way towards effective and viable approaches for protecting the local and global atmosphere.

The APD Program aims to employ IIASA's expertise in applied interdisciplinary research to develop innovative modeling tools to identify strategies to protect the local, regional and global atmosphere while imposing least burden on economic development. IIASA's work will bring together the geo-physical and economic aspects of pollution control into one assessment framework and implement it – together with a network of collaborators – for practical policy analyses in different regions of the world. Through a systems perspective, IIASA's research will highlight potential synergies and trade-offs from the interactions between different type of pollution, emission control measures and economic mechanisms, which have received only little attention in conventional disciplinary approaches. In particular, the program will focus on the recently identified linkages between air pollution control and greenhouse gas mitigation and their relation to economic development.

Projects will explore geo-physical linkages between air pollution and greenhouse gases connected to tropospheric ozone and aerosols, it will implement approaches for health impact assessment of air pollution in developing countries and estimate emission control costs for air pollutants and greenhouse gases for Asia. Methodologies will be developed to capture policy-relevant interactions between pollution control and economic development and to identify cost-effective pollution control strategies that put least burden on the economic development to help provide impartial advice for the local, regional and global policy processes in the coming decade that will address the protection of the atmosphere.

Evolution and Ecology (EEP) Program

Contact: Ulf Dieckmann, Program Leader (E-mail: dieckmann@iiasa.ac.at)

Evolution is the architect and custodian of all biological diversity. Insights about the dynamics of adaptation are thus indispensable for understanding the past, present, and future of Earth's ecosystems. If human interventions directed at responsible conservation and sustainable exploitation are to be successful, they must account for the evolutionary dimensions of anthropogenic environmental change.

Responding to this increasingly recognized need, the EEP Program analyzes and forecasts how evolutionary dynamics shape ecological populations and communities. Specific challenges addressed range from assessing and managing human-induced evolutionary changes in exploited fish stocks, to fostering cooperation in groups of unrelated agents, to understanding and forecasting the impact of environmental disturbances on the structure and functioning of food webs. Together with its network of international collaborators, the program is driving the development and application of adaptive dynamics theory, a framework recognized by many as the most versatile tool currently available for linking ecological and evolutionary consequences of environmental change.

Based on a two-pronged approach through applied and methodological research, the program establishes bridges between fundamental and policy-oriented, theoretical and empirical, biological and mathematical, and analytical and numerical approaches to the systems analysis of ecological and evolutionary change.

This approach is being investigated through four individual interrelated research projects: (1) Adaptive Dynamics Theory, which offers versatile methods for addressing the eco-evolutionary implications of environmental change; (2) Evolutionary Fisheries Management, which is developing the foundations of applied evolutionary fisheries science by devising suitable case studies and models and by advising policymakers and resource managers as to how undesired fisheries-induced evolution can be avoided or reversed; (3) Evolution of Cooperation, which aims to deliver comprehensive insights into measures and settings that can be expected to prevent selfish behavior from jeopardizing shared interests within groups of individuals; and (4) Evolving Biodiversity, which is opening up new ground in biodiversity sciences by investigating the evolutionary determinants of ecosystem structure and functioning, and furthering the scientific understanding of the evolutionary responses of entire food webs to environmental disturbances including harvesting.

Forestry (FOR) Program

Contact: Anatoly Shvidenko, Acting Program Leader (E-mail: shvidenk@iiasa.ac.at)

The key challenge of sustainability is to keep the interaction between society and economy and its natural environment continuously functioning, as well as guaranteeing a positive societal and economic development. In this regard there are major uncertainties associated with respect to future greenhouse gases (GHG) fluxes and associated climate change impacts. One uncertainty is linked to the development of human societies, world population, life styles, fossil energy consumption and implemented climate policies. Another uncertainty is the exchange of GHGs between the atmosphere, terrestrial ecosystems, hydrosphere and lithosphere. Estimates of the terrestrial carbon balance at the global level vary as much as by a factor of two. Hence, only when the size of the terrestrial carbon-sources and sinks, and the processes that generate them are understood, can we accurately begin to forecast the future evolution of atmospheric CO2.

In an effort to meet this challenge, the long-term goal of the FOR Program is to address and gain insights into the question of how to manage the forest sector in its interaction with global environmental and non-environmental sectors to harmonize geo- and biospheric functions and at the same time, enable the forest sector to positively contribute to socioeconomic development. This scope is obviously very broad, hence the program concentrates its efforts on three major areas: the first being on greenhouse gas cycling and terrestrial ecosystems, where, through several related projects, the objective is to gain a better understanding of the exchange of greenhouse gas (GHG) fluxes between the terrestrial ecosystems and the atmosphere at various spatial scales.

The second area focuses on the global impacts of forest sector development in emerging economies, notably China and India, to gain a better understanding of such issues as (a) how much wood can the emerging economies forest centers of China and India supply on a sustainable basis? (b) what will the future consumption of forest products in China and India be? and (c) what are the global impacts of the development of the forest sectors in China and India?

Finally, the third FOR research area focuses on the international governance of forests by using a systems analysis approach to evaluate and identify ways and means to improve the relevance and effectiveness of international agreements related to forests.

Land-Use Change and Agriculture (LUC) Program

Contact: Günther Fischer, Program Leader (E-mail: fisher@iiasa.ac.at)

The LUC Program's goal is to support policy-makers in developing rational, science-based and realistic national, regional and global strategies that achieve long-term sustainability and environmental stewardship of land and water resource management for the production of food, feed and bio-energy, while promoting rural development.

LUC focuses on agro-ecosystem services with special attention to: food security and rural livelihoods; sustainable use of soil and water resources; impacts of climate change and variability; and effective climate change mitigation and adaptation strategies. The LUC Program builds on extensive expertise and established close interactions with relevant international organizations, ensuring that deliverables are of high policy relevance. In this context LUC provides sound scientific knowledge for planning sustainable expansion of agricultural production to achieve food security and information for national and international policymakers in addressing emerging problems of land competition for food production, bio-energy use, and threats to biodiversity.

Land use and water resources are central to global environmental change. In many countries, judicious and robust land use strategies are required for adaptation to climate change and projected anthropogenic pressures. In addition, land management and land-use changes affect emissions and the sequestration potential of the major greenhouse gases. Future decisions concerning land use and adaptation therefore must also consider interactions and synergies with GHG mitigation.

Three areas of research are identified, covering key issues of importance to understanding the interactions between society, land use, agriculture and climate over the coming decades. First, the project *Food and Agriculture to 2100* provides a common thread for the program's global research encompassing topics such as climate change and food security, water and agriculture, and land competition for food and bio-energy production. The second area analyzes sub-sets of these issues in selected regional case studies, in greater detail and typically over a time horizon of 30 years, currently in Europe and Asia. The third area of LUC's research focuses on developing new methodologies to estimate and employ spatially detailed data to facilitate better integration of socioeconomic and bio-physical analyses.

POPULATION AND SOCIETY THEME

Processes of International Negotiation Network (PIN) Program

Contact: Ariel Macaspac Penetrante, PIN Secretariat (E-mail: pin@iiasa.ac.at)

Negotiation is the unique means of finding a peaceful, cooperative solution to a shared problem or conflict. While technical, and even optimal, solutions may be available, they need to enter into the social, political and psychological decision process in order to emerge as an adopted outcome. The process itself involves conflict, which means that the ways in which conflict is and can be resolved need to be understood in order to resolve the problem at issue. Thus, those involved in the analysis and practice of negotiations regarding major international issues, such as security, resource distribution, the environment and welfare, need to improve the "negotiable" dimension of their relations not only to extend the scope of possible solutions, but also to find new ones.

Guided by a Steering Committee, with a coordinating secretariat at IIASA, the PIN Program conducts and organizes research on a broad spectrum of topics related to the processes of international negotiation. Its objectives include disseminating new knowledge about negotiation as widely as possible, developing new networks of scholars and practitioners interested in the subject, and generally furthering the improved study

and practice of negotiation internationally. This is done through annual research workshops, the program's semi-annual newsletter (PINPoints), numerous publications, participation at various worldwide conferences on negotiation, networking (5000 members) and road shows at inviting institutions. By way of its various activities, the program aims to enhance the scientific, theoretical and practical applications required to enhance the negotiation and decision support process through well-targeted research and effective communication that crosses the boundaries between social and natural science as well as between theory and practice.

The program also seeks to complement the solutions of substance developed in other IIASA programs with a better understanding of the processes by which they can be enacted. Furthermore, an important part of the program's output is the development of new technologies for decision support in the international context. One of the major challenges for the upcoming years will be the annual Caspian Sea Dialog Session (staring May 2006 in Istanbul). The PIN group has been invited to act as facilitator among scientists and practitioners from the five littoral states. Especially in the beginning, representatives of other IIASA programs will be involved to share their expertise and introduce individual panel discussions. Other topics of ongoing interest for the PIN members are Climate Change, Conflict Resolution and Terrorism.

Population and Climate Change (PCC) Program

Contact: Brian O'Neill, Program Leader (E-mail: oneill@iiasa.ac.at)

Responses to climate change involve a wide range of choices, including the appropriate mix of mitigation (e.g., emissions reduction) and adaptation measures, when mitigation strategies should be implemented, and how to harmonize climate policies with broader development goals. Policy responses are further complicated by a number of scientific issues, including the anticipation that impacts will be distributed unevenly across geographic regions, sectors, and particular sub-populations; the long timescales involved in climate and energy systems; and pervasive uncertainty in socioeconomic as well as climate systems. Climate change research benefits from disciplinary work in a wide range of areas, but given the disparate aspects of the problem, there is also a strong need for integrative studies.

The objective of the PCC Program is to improve integrated assessments of the climate change issue and develop new analyses within three areas: the influence of demographic change on emissions, the role of uncertainty and learning, and medium-term response strategies. Work in these three areas is closely related and complementary: a better understanding of demographic factors will improve future scenarios of energy use, land use and emissions; research on uncertainty will develop new ways to account for the range of possible outcomes and responses; and medium-term policy strategies aim to keep open a range of long-term options for climate change targets while uncertainties are reduced.

The program involves disciplinary research in both the natural and social sciences, but its main aim is effective integration in support of policy-relevant analysis. It adopts a range of methodological approaches, including historical analysis, national case studies, decision analysis, and global integrated assessment modeling. Results are expected to be relevant to national and international climate change policy, to the scientific integrated assessment community, and to related disciplinary research areas in demography, economics, and climate science.

The PCC Program came to an end in 2009.

Risk and Vulnerability (RAV) Program

Contact: Joanne Linnerooth-Bayer, Program Leader (E-mail: bayer@iiasa.ac.at)

Global trends in population, urbanization, land and water use, mobility, trade and climate (among others) are imposing stresses and risks on societies and their environments worldwide; yet the impacts differentially affect people – their livelihoods, health, institutions and ecosystems. Research addressing risk and vulnerability is motivated by the differential needs of people and their environments, and also by the emergence of these concerns on international, national and local policy agendas.

The long-term aim of the RAV Program is to conduct conceptual and applied analyses that contribute to decreasing risk and vulnerability of societies and ecosystems, and promoting their adaptation and resilience, to stresses imposed or aggravated by global-change phenomena. The research will be relevant mainly, but not exclusively, to developing countries. By addressing the social, economic and ecological system, and considering multiple stresses and system resilience, vulnerability as a research-organizing concept is more complex than risk. Addressing this complexity is the fundamental challenge of this research program. The specific goals of the program are fourfold: to advance the conceptual and methodological development of risk and vulnerability research; to carry out selected risk and vulnerability assessments; to carry out integrative stakeholder-led case studies; and to develop interactive tools that can provide training on vulnerability and adaptation.

Specifically, the program is focusing on two main areas: the first is reducing risk and vulnerability from extreme climate-related events through pro-active risk prevention and transfer systems in Europe, Asia and Africa. RAV scientists are working closely with country stakeholders and financial donor institutions to further this agenda. The second focus is promoting ecological and socio-economic resilience of river-basin systems in Europe and Asia, again applying stakeholder-driven research. To support this research, RAV scientists are developing and applying a multi-perspective policy approach that takes account of conflicting views of the problems and their solutions.

The program builds on the methodologies, activities and experience gained from the previous IIASA Risk, Modeling and Society (RMS) Program. It integrates across several other IIASA programs and links closely with the risk and vulnerability/resilience research communities.

World Population (POP) Program

Contact: Wolfgang Lutz, Program Leader (E-mail: lutz@iiasa.ac.at)

Population trends are crucial determinants of economic, social and environmental change. However, because populations tend to change relatively slowly, demography is often taken for granted and its impact under-appreciated. Rather like some slow geological process that is imperceptible in the short-run, demographic change often has an ineluctable force and ends up changing the whole landscape. Assessing the implications of this ineluctable transformation of population structures is a fundamental task for population science.

The underlying purpose of the demographic research carried out within the POP Program is to understand the determinants and consequences of future population trends. The main thrust of the program's work falls under three interrelated areas: population forecasting, the nature of change in population characteristics and human capital, and the interaction of population and environment.

Research within the forecasting theme focuses on the demographic dynamics of global population aging, addressing the uncertainty of future trends in old age mortality and the resulting structure of the elderly populations around the world. Work on the demography of human capital formation applies IIASA's multi-state projection methods to forecast

populations by level of education around the world. The same method is being used to reconstruct educational attainment by age and sex for all countries. This unique new data set is being used to study the returns to education around the world. The POP Program will also remain active in contributing to global population-environment discussions.

ENERGY AND TECHNOLOGY THEME

Dynamic Systems (DYN) Program

Contact: Arkady Kryazhimskiy, Program Leader (E-mail: kryazhim@iiasa.ac.at)

All IIASA programs use methodologies to carry out their research. In many cases, but certainly not in all, these methodologies include mathematical and statistical tools. In many instances, IIASA programs develop and exploit disciplinary methodology; often, such methodology includes modeling methods and tools that can be either standard (general-purpose) or discipline-specific. Second, many IIASA programs develop models for which established modeling methods or standard modeling tools are not fully adequate or non-applicable.

The DYN Program develops methods for the analysis of the dynamic systems arising in IIASA's studies, with systems methods being the general area of research. The program follows a "demand-driven" approach implying strong collaboration with IIASA's applied research programs. Three broad areas of research are covered: (1) methodology development; (2) the analysis of technology and energy development; and (3) the analysis of environmental dynamics. The first area focuses on theoretical generalizations of methods arising from applied research and includes identifying subjects for new collaboration with IIASA's applied groups. In the second area, DYN analyzes the processes of economic growth and explores innovators' behaviors in an uncertain market environment, while the third area aims at developing methods for the assessment of uncertainty in the dynamics of environmental systems.

Eight projects and one networking activity, the Network on Environmental Applications that brings together experts in environmental sciences and applied mathematicians from different countries, address specific problems in these areas.

Energy (ENE) Program

Contact: Keywan Riahi, Acting Program Leader (E-mail: riahi@iiasa.ac.at)

Energy services are a fundamental human need and are thus indispensable for human well-being. Inadequate access to safe, clean and affordable energy is closely linked to a range of social concerns, including reduced economic and social opportunities contributing to poverty, poor health, and reduced educational attainment, particularly for women. Nevertheless, humankind faces many important energy challenges that go beyond questions of "energy poverty" alone. These can be characterized as challenges resulting from either "too little" to "too much": too little access to modern energy services for the poor, too little investment in energy RD&D and infrastructure, and too little cheap and accessible crude oil; too much energy-related pollutant emissions, too much market volatility and risk to supply arising from too much dependence on relatively few geological deposits vulnerable to geopolitical threats. All of these energy challenges and many more need to be addressed simultaneously, in all likelihood requiring a fundamental transition throughout the world's energy systems. This transition is likely to take the better part of the 21st century.

The overall objective of IIASA's new Energy Program, initiated in March 2006, is to better understand the nature of alternative future energy transitions, their implications for human well-being and the environment and how they might be shaped and directed by current and future decision makers. Decisions made today and in the near future are

sowing the seeds that will determine which of the range of alternative energy development paths are followed over the century, which paths are promoted and which hindered. Given the interactions between energy and almost all economic and social activities, it is imperative to better understand the long-term implications of alternative energy policies, investments and technological developments now.

The ENE Program will contribute to addressing the challenges confronting the global energy system by pursuing three main areas of research: (1) coordinating a Global Energy Assessment that will evaluate the social, economic, development, technological, environmental, security and other issues linked to energy to provide the technical and scientific basis needed to address the major energy challenges of tomorrow, related to: access to modern forms of energy; security of supply; local, regional and global environmental impacts; and securing sufficient investment; (2) developing new methods and modeling techniques for exploring alternative energy pathways, with a focus on the "next generation" of both systems-engineering and other modeling approaches; and (3) longer-term research, informed by (1) and (2), on energy investment requirements looking at the development, deployment and financing needs and opportunities associated with a range of energy technologies, systems and infrastructures in a more dynamic context.

Transitions to New Technologies (TNT) Program

Contact: Arnulf Grübler, Acting Program Leader (E-mail: gruebler@iiasa.ac.at)

Historically, the development and diffusion of new technologies has been a main driving force of productivity improvements and hence economic growth and development. Technology is consequently also one of the main drivers of global change and also a central element of strategies aimed at reducing global change impacts. It is increasingly recognized that alternative pathways of technology development can amplify or lessen the impact of human activities on planetary systems, most notably climate change. Research and development of improved technology and its diffusion is consequently increasingly recognized to be at the core of long-term development and environment policies.

The long-term goal of the TNT Program is to better understand and describe the diffusion of new technologies in time and space, their economic and social implications as well as their possible environmental impacts. The strategic goal from a disciplinary perspective is to develop models that operationalize concepts of innovation and diffusion dynamics including those that were pioneered at IIASA. This would further and deepen a unique scientific niche in which the Institute has already received wide recognition. The strategic goal from an interdisciplinary perspective is to improve the representation of technological change in environmental policies and instruments, particularly in the area of climate change.

To meet these goals TNT's research focuses on three interrelated project areas that are complemented by a variety of scientific networking activities (1) technology policy and inducement instruments; (2) technology for development and climate protection; and (3) methodology and modeling. The particular contribution of TNT research will be to improve both the empirical understanding and theoretical modeling of technological change and by so doing help to bracket possible dynamics of technological diffusion and to quantify associated uncertainties in long-term scenarios. Empirical case studies will encompass a variety of different technologies and diffusion environments and include an explicit treatment of spatial heterogeneity as an integral component of modeling and scenario studies

SPECIAL PROJECTS

The category of Special Projects allows IIASA to explore promising new avenues of research on a smaller scale and/or to act as a clearinghouse for activities phasing out.

Health and Global Change (HGC)

Contact: Landis MacKellar, Leader (E-mail: mckellar@iiasa.ac.at)

Health is a growing global concern, as is dramatically evidenced by the threats of Severe Acute Respiratory Syndrome (SARS), bio-terrorism, and pandemic influenza. Receiving the most attention is the resurgence of infectious disease. At the 2006 summit meeting of the major industrialized countries (G8), infectious diseases, including HIV/AIDS, pandemic influenza, and newly emergent infections, are expected to be prominent on the agenda.

Launched at the beginning of 2006 for an initial two years, the HGC project will explore certain aspects of health and global change, focusing on pandemic influenza. Topics to be addressed include:

- international governance issues in epidemiological surveillance and control;
- response strategies such as vaccination;
- socio-economic impacts; and
- demographic aspects of influenza.

Integrated Modeling Environment (IME)

Contact: Marek Makowski, Leader (E-mail: marek@iiasa.ac.at)

The strategic goal of the IME Project is to build capacity to meet IIASA's growing needs for integrated modeling support where commonly known methodology and/or general-purpose modeling tools are inadequate. The long-term aim is to strengthen IIASA's in-house capabilities and competitive advantage in modeling complex problems.
Launched at the beginning of 2006 for an initial three years, the strategic goal is decomposed into the following objectives: (1) to integrate and extend modeling methods and tools developed to address individual demands into an advanced web-based modeling environment adapted specifically to the needs of IIASA's programs; (2) to develop methods and tools for policy analyses to cope with inherent endogenous uncertainties and risks with potential catastrophic consequences, proper representation of abrupt changes, spatial and temporal distributional heterogeneities, vulnerabilities, and robust solutions; and (3) to develop methodology and tools for integrated model analysis aimed at combining the capabilities of different methods (such as various types of simulation, optimization, multi-criteria model analysis, sensitivity analysis) with data mining technology.

CROSS-CUTTING ACTIVITIES

To underscore the complexity of some of the research issues being studied at IIASA, some activities are being investigated by and/or **cross-cut** several programs.

Greenhouse Gas Initiative (GGI)

Contact: Anthony Patt, Scientific Co-ordinator (E-mail: patt@iiasa.ac.at)

The current scientific understanding of the climate change issues is that substantial impacts on natural and human systems are anticipated to emerge over decades or centuries, while effective response strategies need to be initiated in the shorter term and sustained over decades or more. Thus, climate change dictates a long time horizon and a global perspective that needs to be effectively linked to near term strategies at the local, national and regional levels. As such, the climate change challenge is indeed unique in the history of humankind and that of science; we need to confront uncertain impacts on a planetary scale that might take centuries to fully unfold with policy frameworks and institutions that are predominantly local, regional or national, and whose time frames for decision making are much shorter, typically represented by the business and electoral systems.

The GGI is an inter-program collaborative research effort involving seven IIASA Programs aimed at addressing questions critical to advance scientific understanding and inform policy processes related to the challenge of climate change. The Initiative takes as its context the ultimate goal of the UN Framework Convention on Climate Change to stabilize atmospheric concentrations of greenhouse gases in order to avoid dangerous impacts. The overall research objective is to bridge temporal and spatial scales of the climate change challenge, from shorter-term national and place-specific policies and measures directed at mitigating and adapting to climate change, to the longer-term global objective of stabilizing atmospheric concentrations of greenhouse gases.

Recent activities have been focused on the development of long-term, global scenarios; the assessment of near- to medium-term mitigation and adaptation opportunities for specific countries; and the development of an integrated modeling framework to analyze international policy approaches. Such analysis encompasses multiple gases and sectors (energy, agriculture, forestry). Current research activities include modeling exercise to assess the co-benefits of integrated nitrogen management with greenhouse gas mitigation and adaptation to climate change; furthermore to evaluate the robustness of adaptation options and strategies for extreme climate risks and the involvement of adaptation in integrated climate-change modeling.

Methodology Forum (MF)

Contact: Detlof von Winterfeldt (E-mail: detlof@iiasa.ac.at)

To facilitate cross-program sharing of experiences and problems in methodological issues, IIASA established the Methodology Forum. Regular presentations with open discussions aim to increase cooperation between IIASA''s applied research programs and those with a focus on methodology.

There are two seminar series: the first focuses on concrete problems while the second is aimed at presenting the activities of each program. As part of the Forum, scientists from IIASA programs and projects discuss methods they judge to be of importance for the scientists in other programs. Visitors and scholars from outside IIASA are also invited to present methodological issues at the Forum.

Water Research

Contact: Detlof von Winterfeldt (E-mail: detlof@iiasa.ac.at)

Many people, IIASA researchers included, agree that water is one of the highest priority issues on the international sustainable development agenda. However, from a first cursory glance at IIASA''s list of research programs it may appear that IIASA has no water-related research and many have asked why. Until the mid-1990s IIASA studied various water issues in dedicated stand-alone water projects. At that time, the IIASA Council also wanted to pursue other research topics, such as population aging and the consequences for social security, pension and health care. This meant that IIASA''s limited resources had to be refocused on these topics and the then water program was phased out to accommodate them.

However, this has not meant that the topic of water is being ignored by IIASA; in fact the opposite it true. Building on past research, water is an essential aspect of several of IIASA's current programs. In this respect, by addressing water (and other driving issues of global change) within its programs, IIASA is genuinely and distinctively unique in the manner in which it conducts its interdisciplinary research. Currently, six research programs include water issues in their work: Dynamic Systems, Forestry, Land Use Change and Agriculture, Processes of International Negotiation, Risk and Vulnerability, and World Population.