IAI STRATEGIC PLAN

WHAT IS GLOBAL CHANGE?

Processes and cycles of the Earth system are undergoing continuous change, both natural and human-induced. These changes may be of global dimensions, such as ocean acidification or greenhouse gas contents of the atmosphere. Global change may also occur at smaller scales in ways that cumulatively are of global import, such as landuse change or urbanization. Global change affects processes and resources vital to the condition of human beings and other species, and its impacts are predicted to be long-term, widespread, and severe. All countries of the Americas are exposed to global environmental change. Even where regional environmental change is favorable in the short term, these regions are likely to suffer in the long term because their own economic and social conditions will be affected by the disruptive consequences elsewhere. This interconnectedness determines the scale of the science and stakeholder "communities" and of political and management interventions that are needed to address global change. Research on global issues requires cooperation among research institutions, states and regions, and that national and global efforts be supplemented by regional cooperation among states.

Global environmental change is one of the greatest challenges that humanity faces today. The reports of the Intergovernmental Panel on Climate Change and similar assessments (Millennium Assessment and International Assessment of Agricultural Science and Technology for Development) outline how global environmental change affects mankind and challenges the environment, food production and human well-being. Policy and decision makers are in need of accurate information and sound analyses concerning global environmental change, but current knowledge is incomplete, and the limited integration between science and social solutions means that forecasting and planning for the economic and social effects of these changes is not as effective as it should be. Public knowledge and understanding of global environmental change raises expectations that scientific effort will translate into informed action. Consequently political pressure is increasing for the translation of research results into informed decisions.

WHY THE IAI WAS FOUNDED

The founding of the Inter-American Institute by representatives of the States of the Americas in Montevideo, Uruguay, in 1992, reflected both the vision of the scientific community and the political will of the States of the region. The Institute seeks to achieve the best possible international coordination of natural and social scientific and economic research on the extent, causes, and consequences of global change in the Americas, with the objective of significantly expanding the frontiers of knowledge and serving as an effective interface between the research and policy processes.

MISSION, CORE VALUES, VISION

Mission

The mission of IAI is to develop the capacity of understanding the integrated impact of past, present and future global change on regional and continental environments in the Americas and to promote collaborative, well-informed actions at all levels.

Core Values

The IAI pursues the principles of scientific excellence, international and interdisciplinary cooperation, and full and open exchange of scientific information relevant to global environmental change.

Vision

The IAI was envisaged as an intergovernmental instrument by which scientists and decision makers from all sectors of society throughout the Americas may jointly address the critical issues and contribute to solutions for the challenges associated with global change in the region.

GOALS

Knowledge for Regional Needs

Throughout the last decade, research sponsored by the IAI and others has shown that global change is occurring faster and in more complex patterns than predicted: sensitive regions such as high mountains are changing faster than anticipated under climate warming; extensive land cover changes are affecting climate and regional hydrology; impacts that were forecast to follow from climate change are now occurring such as the expansion of vector-borne diseases and the melting of glaciers with resulting changes in river flows. These changes and their effects are resulting in environmental risks and social exposures to those risks, which in turn translate into vulnerabilities for which societies' response capacity is severely limited in many regions. These vulnerabilities decrease the sustainability of the economic and social development of the IAI's member States.

Concern about global change has increased among the traditional stakeholders and has emerged among new ones, increasing the need for broad and early involvement of all stakeholders in the planning, implementation, and interpretation of global environmental change research. Networking is therefore a central goal of the IAI's science management.

What IAI scientists say:

"The pilot data obtained during the IAI activities **led to a decade-long project and collaboration** funded by National Geographic, the U.S. National Science Foundation, the U.S. Geological Survey, and the Chilean Government."

The IAI guides the allocation of research funds and internal resources to the tasks of understanding global environmental change phenomena. Proposals are thematically based on the IAI Science Agenda and their scientific excellence is assessed through a merit-based peer review system. Priority-setting is based on input from a broad cross-section of the science community in member countries, from the IAI Conference of the

Parties, its committees including the scientific advisory committee, and from interactions with other international programs and conventions. The formulation of research needs by member countries and through syntheses of science programs provides an opportunity to formulate project themes, which can be used in a top-down approach to calls for proposals. At the same time, the IAI will promote a bottom-up approach of open calls in order to harness the creativity of the Continents' science communities. The balance between these approaches will be defined based on regional needs and consultations, to develop science that addresses issues of Vulnerability, Adaptation, and Mitigation.

In addition to scientific excellence, the allocation of funds and management of programs promotes equitable access to research facilities and to the results of the scientific work, whether as data or fully synthesized analyses of multiple projects. The Directorate plays an active role in developing science syntheses aimed towards the support of informed policy. Projects are expected to provide knowledge for informed decision making exploring both the challenges and benefits of environmental change through the adaptation to opportunities, such as favorable climate changes or improved resource management.

National and Regional Networks

The IAI creates opportunities for its researchers, its projects, and for its Parties to make connections and create networks that serve to enhance the science and its application to policy and decision-making. While networking is often opportunity-driven, the IAI will enhance mechanisms to capture such networking opportunities, through thematic inter-sectoral capacity building and through increased involvement of its policy bodies. The IAI strengthens the regional relevance of the IAI research portfolio by focusing its science on the topics of exposure, risk, vulnerability, and adaptation to global environmental change and develops new mechanisms to foster collaborations among scientists of the region, such as initiating "across-project" synthesis activities involving both scientists and stakeholders. The IAI encourages new projects that study the feedbacks between humans and global and regional environmental changes. As a result, IAI is well positioned

to address emerging cross-cutting themes such as ecosystems services and the links between risk, vulnerability and adaptation.

What IAI scientists say:

"On the cover (of a special volume of Continental Shelf Research) you will see an Argentine ship, a Brazilian vessel and an Uruguayan Air Force plane, which were used to carry out observations in jurisdictional waters of the three countries. The airborne observations with the Uruguayan aircraft was done by U.S. Navy scientists using a sensor developed at the (Argentinean) Naval Research Lab. That's something that never happened before, and resulted in the most relevant data set for the region. The most important is that **the good will among the three countries' navies has been continued and we have today several activities being conducted cooperatively**."

Adaptive management

The success of IAI in developing a coherent, effective program has been achieved to a large extent through the ingenuity of researchers and project managers who found ways to cooperate and conduct their work at institutions with different *modus operandi* in different countries. All successful projects proved capable of adjustment to fit specific project and science objectives. All of this was achieved while maintaining financial and management controls that have stood up to international scrutiny. The interdisciplinary and international efforts by scientists in these programs were characterized by a marked expansion of comprehension of the scientific issues and their societal and natural contexts. This management mode will be continued in future programs to foster both creativity and accountability.

What IAI scientists say:

"The IAI first allowed closer regional collaborations and exchange of students. Initially the IAI linked individual scientist with common interest in their specific fields. Presently the links are formal, institutional and multidisciplinary. As a result of IAI funding regional oceanography in this part of the world has made more progress in the last 10 years than in the previous 50 years. This impact is now expanding our network including more countries. Consequently, **almost everything in my research is new as a result of interacting with the IAI**."

The rate of discovery and of change is so fast that strategic plans must provide for mechanisms to assimilate new information and adjust management flexibly. Programs are therefore not fixed from the start but permit for reviews and project cycles. Interaction with the users of scientific information is expected beginning at project formulation, and continuing throughout the execution of the project. Regular assessments and cyclic project management can result in complementary research topics being combined at any time during the research contract. Regular workshops and assessments keep interaction among all participants active and current. Project cycles and flexible, adaptive management require innovative approaches to science governance. Mutual respect and collaboration across disciplines, countries and culture contribute to knowledge generation applicable in different settings and to equity in science institutions across the continent.

What IAI scientists say:

"IAI is helping us to shape our community **more like a network than the pyramid typically was**."

Translate Science into usable language

A fundamental task of the IAI science community is to *translate its results.* This translation has to occur between different scientific specializations, between scientists and students, and between scientists and stakeholders the media, and the general public. The IAI is exploring ways to assure the use of context-appropriate media, themes and terms that make the communications of the scientific results *understandable, useful, and timely*. While communication of science needs translation, its end-users also require accountability and transparency of the underlying knowledge and data. The IAI implements information technology in its project monitoring, reporting and in internationally compatible meta data generation that provides access to and thereby traceability of the knowledge generated in its programs.

The efficiency of translation of science to the decision-making process must be further developed. This will require an early and ongoing dialogue between scientists and decision makers in the development of projects, programs and networks.

What IAI scientists say:

"Our joint project has significantly strengthened U.S.-Mexico scientific collaboration on climate and water resources.... **enhanced scientist-decision maker, two-way communication has lead to improved application** of climate and water diagnostic products as well as more relevant and targeted content of these products."

Develop Dialogue

The IAI has been successful in building capacity, in enhancing cooperation between the social and natural sciences, in networking across regions and political boundaries, and in including practitioners and decision-makers in these processes. Some success has been achieved in areas where decision makers have been part of projects, have interacted with researchers during the project period and have participated in syntheses. These instances are still too few and IAI must now build on these successes and further develop regional capacity and efficient networks for more effective decision-making.

There is a need for resilient networks not only in research, but also in its applications such as public health and infrastructure development, assessments, management and policy. While the networks within different institutions and in different sectors of society may have to be initially developed in parallel, they should eventually interact and form networks *across* these categories. The IAI will develop such cross-sectoral networks and interactions where feasible. The IAI will strengthen existing partnerships and develop new partnerships with agencies, organizations and corporations, identifying common goals in research and its applications that can focus such collaborations. To share knowledge, policy advice and "best practices" across networks, IAI will identify and link to policy structures: conventions, countries, states & provinces, and municipalities. To direct the interplay of expectations of scientists, managers, and policy-

makers, the IAI is developing capacity-building programs and fora for continuing dialogue that can feed back into the planning and monitoring of its science programs.

Natural-Social Science Dialogue

Global environmental change science requires innovation and must continue to attract excellent natural and social scientists. It also requires the understanding and acceptance that progress comes from joint action and sharing of expertise between the natural and social sciences. Such collaboration can be achieved through mutual trust while simultaneously maintaining highest disciplinary standards.

What IAI scientists say:

"The sponsorship of IAI to fund our team bringing together atmospheric scientists and oceanographers to approach this complex topic, has been crucial to the results described. The program has opened our eyes to a multidisciplinary approach involving the **human dimensions that I had never contemplated in my previous research**."

The complexity of global change, its human causes and resulting vulnerabilities make interdisciplinarity a necessary condition of global change research. While the international global change programs were established within disciplinary fields such as biogeochemistry, climatology or human dimensions, the IAI's development of regional problem-oriented and policy relevant science requires innovative integration across disciplines that will be further consolidated in future programs. Modes of interaction must be further developed and rewarded by funding and career evaluations. This requires innovative science governance, which the IAI will further explore with its institutional stakeholders and funding partners. Scientists need to be motivated and provided with incentives for activities beyond pure disciplinary research, while at the same time institutions must be induced to engage in integrated, cross-disciplinary work and support their scientists in innovative policy-oriented approaches to knowledge generation while maintaining and assuring science excellence. The IAI in its programs will therefore continue to engage in capacity building for individuals and institutions and will expand these efforts further, building on past successes.

What IAI scientists say:

"I <now> select research opportunities in which the potential for **Excellent and Relevant Science outcomes converge**. Before it was Excellence first and Relevance was a more serendipitous byproduct."

Science-Policy dialogue - "needs-driven" science

Responding to the demands for GEC research moves emphasis away from curiosity-driven towards needs-driven science. Improving participation of IAI member states in IAI functions and engaging states in the Americas that are not currently part of IAI will be important to identify such needs and may substantially contribute to societal understanding of GEC and GEC science. When funding research, the IAI insists that all participants (social and natural scientists and managers and decision makers) are involved in all aspects of the research planning and research progress. This does not exclude basic science, since fundamental understanding of Earth systems is a necessary foundation for successful adaptation and mitigation efforts.

What IAI scientists say:

"I have connected with many excellent professionals and institutions in South America, many of which I did not know existed before interacting with IAI. Our team has made a **strong commitment to incorporate stakeholders and decision makers** from the very beginning of research projects. We also include socially disadvantaged groups for study and eventual delivery of climate forecast products to reduce potential losses. ... The teams we created thanks to IAI are strong in individual fields (meteorology, agricultural engineering, ecology, anthropology, computer science, plant pathology), and strong team workers as interdisciplinarians."

Education and Capacity Building

Global environmental change science requires scientists and university or institutional administrators to appreciate the necessary interaction and cooperation. The IAI's capacity building activities will continue to promote cross-disciplinary interactions while maintaining high disciplinary standards. The challenge of interdisciplinarity is to achieve

broad understanding without dilution of the science foundations. The IAI's capacity building therefore aims at Capstone Activities linked to its research programs and to management and decision-making practice. The IAI is giving priority to training institutes where young scientists and potential decision-makers train and work together on global environmental change problems. Consultations and program reviews allow comprehension and interaction with decision-makers to expand.

What IAI scientists say:

"Engaging the best young talents ... has been difficult with rigid student funding provided by our national systems. Now **with IAI we have enough flexibility to hire the best students** from whatever country and background they come."

EQUITY

Under global change, the state of the environment is a consequence not only of local historical choices, but also of the historical choices of many other nations, *and of the choices those nations make today*. In addition, today's choices will affect the well-being of *future generations* which depends on actions that we separately or jointly take today: global environmental change raises both intra- and inter-generational equity issues.

What IAI scientists say:

"We are confronted with **a global problem, historically fueled by a few rich nations with an increasing and worrying participation by developing countries**, the hope is the better we anticipate the changes to come and the higher awareness of the international community and their citizens the higher our chances to adapt to and mitigate, our ignorance and inaction lead us to an inevitable disaster. In addition to greenhouse gas emission and climate change, global change includes a wide array of processes of global significance such as land-use change, biodiversity loss or urbanization that require varying approaches for mitigation and adaptation."

The effects of global environmental change are felt most severely in developing countries because they have the least capacity to adapt. Global environmental change and poverty are related through the issue of vulnerability: impacts from both the

environmental change itself and from policies adopted for mitigation or adaptation are often more strongly felt amongst the poor. This emphasizes the need for an integration of objectives between global change response strategies and sustainable development priorities, and for a better articulation of GEC science with broader development issues including development and equity.

Poverty is also associated with limited participation in the social discourse that governs the agendas and decisions made in mitigation and adaptation strategies. Effective participation in this decision making to spread the burden of reducing societal risk requires a concerted effort of information and education among all affected socioeconomic sectors, classes and institutions, and participation and engagement at local national and regional levels.

Planning resource use and conservation is closely related to equity: as long as the American continent contains significant populations living in poverty, development remains a priority. Development considerations also apply to the need of changing the production and consumption patterns in the industrialized regions for making them more sustainable. It is a critical task for science to furnish the knowledge that permits such development without undermining the ecosystem services and resource foundations upon which future well-being depends.

ETHICS

The importance of and public concern over global change requires science to be results-oriented and timely in the provision of advice. While global change scientists are motivated by the relevance of their work to decision making, a clear distinction must be made between the translation of science results for informed decision making and various levels of advocacy.

The dialogue with the policy sector requires that science be policy-relevant, but its results cannot be prescriptive. Application is guided by a dialogue between science and society and its institutions. In addition to promoting relevant, responsive, excellent science, and in order to assure that policy and decision-making are guided and informed

by a dialogue with science, the IAI through its political and country representations will champion evidence-based policy. Under the urgency of global environmental change, science results have frequently been examined not only by traditional peer review but also in the public eye. This puts particularly high demands on the ethical and responsible conduct of science, linking good science with societies' urgent concerns. The IAI will pursue incentives and capacity building in order to assure such high standards of conduct.

The international nature of global change research requires that funding agencies, scientists and institutions strive for equity in access to tools and information. The IAI's networks are designed to promote such equity, and capacity building efforts aim at "leveling the playing field" across the continent.

EXTERNAL REVIEW

Responsiveness to regional needs, excellent and relevant science output, and adaptive management to provide needs-driven science all require regular dialogue with stakeholders and review of the science and outreach achievements. In 2007, an External Review Committee convened by the American Association for the Advancement of Science found that the Institute had largely proven its worth and had notable achievements: *"The IAI's current research program is ... producing high-quality science ... the Institute's greatest regional contribution has been in successfully building scientific capacity throughout the Americas. … Strong science can and should underpin national and regional policies and support the region's contribution to the global change research agenda. The coupling of natural and social sciences and dialogue with decision makers are critical to these efforts".* This same review also renewed a challenge to the IAI: *"the Institute has further potential to provide valuable guidance to decision makers at all levels, from high-level government agencies ... to local resource managers and operational agents."* Future efforts will benefit from such assessments to facilitate an evolving strategy and implementation plan.