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The First Ten Years of IAI:

Observing, Measuring, Understanding and Documenting Changes in the Environment of the Americas

FOREWORD

In 2003 IAI released a 10th Anniversary book entitled “Responding to the Challenge of Global Change in the Americas: A decade of Achievement”. The book reports on the initial steps that led to the establishment of the IAI, its institutional and scientific development, the scientific results of the Institute’s research programs and also a reflection of the future and the challenges ahead.

This document intent to summarize, in a chronological order, the different activities, initiatives and developments undertaken by the IAI during its first decade of existence. The content was extracted from the Anniversary book, from documents placed on the IAI Web site and from hard copy documents. It can be retrieved or expanded through a consultation to these sources.

By choosing a chronological layout we expect to help the reader in reviewing the accomplishments and progress of the IAI programs and activities from 1992 to 2002 as well as in retrieving specific issues or subjects of particular interest.

Finally we would like to thank Dr. Raquel Paviotti Corcuera and to Ms. Claudia C. Fernandes for their efforts in compiling, reviewing, and editing the information presented in this document, and to INPE (Instituto Nacional de Pesquisas Espaciais) for the printing.

Gustavo V. Necco
IAI Executive Director
June 2004

CONTENTS

1. BACKGROUND

The Inter-American Institute for Global Change Research (IAI) was created in response to the challenge of global environmental changes in the Americas (North, Central and South America and the Caribbean).

The IAI was established by an agreement signed at Montevideo, Uruguay, on 13 **May 1992** by representatives of 11 Countries: ***Argentina, Bolivia, Brazil, Chile, Costa Rica, Dominican Republic, Mexico, Panama, Peru, Uruguay, and the United States of America.***

1.1. IAI Mission

IAI's Mission is to develop the capacity to understand the integrated impact of present and future global changes on regional and continental environments in the Americas and to promote collaborative research and informed action at all levels.

Implicit in the mission statement are the founding principles of the IAI:

- Scientific excellence.
- Relevance to regionally-defined global change issues.
- Contribution to capacity building.
- Multinational and multidisciplinary collaboration.
- Promotion of improved data and information exchange.
- Policy relevance and usefulness to decision makers.

An important aspect of the mission of IAI is the development of networks of scientists and scientific institutions that work collaboratively on global change issues of regional importance. Effectively addressing these regional global change issues requires the development of an active scientific network that crosses international boundaries.

1.2. IAI Structure

The IAI has Four Permanent Organs and a Multinational Network of Research Institutions.

Conference of the Parties (CoP): the CoP is the Institute's policymaking organ, it meets annually to establish, review, and update the Institute's policies and procedures and evaluate its work. At the present 19 member nations integrate the IAI. In addition to the 11 countries mentioned above the following 8 nations are also IAI members: ***Canada, Colombia, Cuba, Ecuador, Guatemala, Jamaica, Paraguay, and Venezuela.***

The Executive Council (EC): is composed of nine members, each of whom is elected by the CoP for a two-year term. The EC has two mandates: (1) to develop policy recommendations for submission to and approval by the CoP; and (2) to ensure that policies adopted by the CoP are implemented by the Directorate.

The Scientific Advisory Committee (SAC): is the Institute's main scientific advisory body. It has ten members elected by the CoP for three-year terms. The SAC makes recommendations to the CoP regarding the Science Agenda, long-term plans, the Institute's annual program, and science programs to fund. In addition, it assesses the scientific results of the Institute's funded research.

The Directorate (DIR): is the institute's primary administrative organ and is presently

composed of a Director, Scientific Officer, Financial and Administrative Officer, Training, Communications and Outreach Officer, Information Technology Manager, Collaborative Research Network Project Manager, and support staff.

The United States National Science Foundation (NSF) hosted the IAI Secretariat from September 1994 until September 1996. In March 1996, the IAI became fully operational at its office located on the campus of the Brazilian National Institute for Space Research (*Instituto Nacional de Pesquisas Espaciais* - INPE) in São José dos Campos, São Paulo, Brazil.

2. THE INITIAL SCIENCE AGENDA (1993 – 1994)

2.1. The Initial Science Agenda

The Initial Science Agenda began with 7 themes:

- Tropical Ecosystems and Biogeochemical Cycles.
- Impacts of Climate Change on Biodiversity.
- El Niño-Southern Oscillation (ENSO) and Interannual Climate Variability.
- Ocean/Atmosphere/Land Interactions in the Inter-Tropical Americas.
- Comparative Studies of Oceanic, Coastal, and Estuarine Processes in the Temperate Zones.
- Comparative Studies of Temperate Terrestrial Ecosystems.
- High Latitude Processes.

In addition to providing information relevant to the region's environmental priorities, the IAI's Science Agenda is designed to expand in-country expertise for the effective implementation of international agreements and protocols. The Science Agenda is also consistent with international global change research programs, and serves as a vehicle through which the region can contribute to these efforts. These programs include the International Human Dimension Program (IHDP), the International Geosphere-Biosphere Program (IGBP), the World Climate Research Program (WCRP), and the International Program of Biodiversity Science (DIVERSITAS). The Science Agenda for the IAI is also consistent with the interests of other regional global research networks, such as the Asia Pacific Network for Global Change Research (APN), the European Network for Research in Global Change (ENRICH), and the Global Change System for Analysis, Research, and Training (START).

2.2. Workshops

Scientific Workshops covering the 7 themes of the Agenda were held. The objective of these workshops were to bring together scientists from throughout the Americas to discuss these seven themes and to identify for each the major scientific issues and priorities, key research questions, and recommendations about the role of IAI in investigating these themes. Over 800 scientists attended these workshops and the outcomes were summarized in the following set of comprehensive reports:

- Comparative Studies of Oceanic Coastal and Estuarine Processes in the Temperate Zone, August 2-6, 1993, Montevideo, Uruguay.
- High Latitude Processes, December 15-17, 1993, Buenos Aires, Argentina.
- Ocean/Land/Atmosphere Interactions in the Inter-Tropical Americas, February 7-10, 1994, Panama City, Panama.
- Tropical Ecosystems and Biogeochemical Cycles, April 4-7, 1994, São José dos Campos, Brazil.
- ENSO and Interannual Climate Variability, July 12-15, 1994, Lima, Peru.
- The Comparative Study of Temperate Terrestrial Ecosystems, July 26-29, 1994, Durham, N.C., U.S.A.
- The Study of the Impacts of Climate Change on Biodiversity, August 9-12, 1994, Guadalajara, Mexico.

3. GETTING READY FOR THE OPERATIONAL PHASE (1995)

3.1. Firsts Meetings

The first meeting of the CoP took place on September 1994 (Mexico City). Brazil, was chosen as Headquarter for IAI Directorate.

The first meeting of the SAC (Scientific Advisory Committee) took place in Washington, DC., USA, January 9-10, 1995. The SAC discussed questions related to: the mechanisms to continue the scientific development of the Institute, cooperative activities and future workshops, relations between the IAI and other global change research networks, networking and data policy, start-up grant program and the development of the science agenda.

The first meeting of the EC (Executive Council) took place in Washington, DC., USA, January 11-13, 1995. Several technical and organizational reports were presented, a committee for the selection of a IAI Director was established, an EC Working Group on Data Policy was formed. Matters related to staff and financial policies were discussed. See Appendix I for the list of IAI institutional meetings.

3.2. IAI- Global Environmental Facility (GEF) Project

From 1995 to 1998, the IAI conducted an important capacity building project funded by GEF and executed by the World Meteorological Organization (WMO). The project pursued the following objectives:

- to expand and improve the scientific and technical human resources capabilities relevant to global change issues in IAI member countries;
- to establish a reasonable and uniform data processing capability in each member country and to develop a data exchange system in the Americas; and
- to develop standardized methodologies for the collection and processing of basic data relevant to global change research.

In addition to the United Nations Development Program/GEF contribution of $3 million (U.S.$), the government of Brazil significantly supported this project by donating software, including Geographic Information and Image Processing System (SPRING) and Meteorological Software System (METVIEW), to all countries participating in the project. The U.S. NSF also supported project activities with a total of $350k.

Basic training offered by the program:

- 250 students from 130 institutions trained for two weeks in Geographical Information System (GIS) techniques, through courses offered in each of the project's member countries;
- 11 students from eight countries trained for two months in intensive GIS techniques in GIS SPRING software at INPE in Brazil;
- 27 students from 14 countries trained for two weeks in the METVIEW software; and
- 13 short-term fellowships of up to six months in duration to study IAI Science Agenda themes in several universities and/or research institutions of IAI member countries.

3.3. First Workshop on Global Change Research

The first workshop on Global Change Research in the Americas took place from 28 to 30 of August 1995 in Belen, Brazil. Over 200 participants attended. The main outcomes were the recommendations to begin IAI operational phase:

- to foster inter – Latin American Collaborations;
- to integrate social scientists into IAI research activities;
- to fund interdisciplinary proposals shall be a criterion;
- to maintain a policy of free and open access to all data generated through IAI programs; and
- to hold open science meetings and workshops with involvement of students in all activities.

3.4. Start-up Grants (SG) Program begins

The SG program (1995-97) was designed specifically to encourage investigators to begin collaboration on proposals for long-term research to serve as the core for the IAI research network developed around the science agenda themes. The main objective was to allow researchers to come together to write proposals for long-term IAI programs. This program, funded by the National Science Foundation (NSF) on behalf of the IAI, granted 37 awards and held 50 meetings, investing a total of US $ 1.7 million. See Appendix II for the list of Projects funded under the Start-up Grant Program.

4. STARTING THE MAJOR SCIENCE PROGRAMS (1996 -1997)

4.1. Inauguration of the IAI Directorate Headquarters

Brazilian Congress ratifies the IAI-Host Country Agreement, allowing IAI to function in Brazil (Sao Jose dos Campos, 1996) as an internationally recognized organization, able to conduct financial and legal business with special privileges and immunities. The IAI is one of the first international organizations to locate its headquarters in Brazil.

4.2. Initial Science Program Round I (ISP I)

The first research grants through the IAI-ISP awards were made in 1996 (ISP I). Eleven annual grants were awarded in Round I. Similar programs were implemented later, ISP II in 1997 and ISP III in 1998. (Additional information will be given in chapter 5).

4.3. SAC Restructured the Science Agenda into 4 Broad Themes (1997)

Flexibility is the most important element of the Science Agenda. The agreement establishing the IAI stated that the Science Agenda should be dynamic and should evolve to incorporate new scientific priorities, to address changes in the needs of the region's countries, and to address changes in the ability of the scientific community to carry out research that contributes to the solution of specific problems.

With that in mind, the SAC periodically discusses the validity of the Science Agenda and proposes changes, if considered necessary. A mayor reorganization was made in 1997 when the IAI Scientific Advisory Committee restructured the Science Agenda into a new framework of four broad themes.

I - Understanding Climate Variability in the Americas

The focus is to document climate variability and its links to changes in the natural systems and societal impacts. The goals are to understand the ocean-land-atmosphere interactions and the key processes that cause climatic variability on time scales from seasons to decades. Research topics include:

- ENSO and Interannual Climate Variability.
- Ocean/Land/Atmosphere Interactions.
- Hydrology and Water Resources.

II - Comparative Studies of Ecosystem, Biodiversity, Land Use and Cover, and Water Resources in the Americas

The IAI encourages comparative analysis of natural and anthropogenic systems from the tropical, to temperate and cold latitude, including terrestrial, coastal and oceanic environments. Research topics include:

- Tropical Ecosystems and Biogeochemical Cycles.
- Impacts of Climate Change on Biodiversity.
- Comparative Studies of Oceanic, Coastal and Estuarine Processes.
- Comparative Studies of Terrestrial Ecosystems.
- Changes in Land Use, Land Cover and in Hydrology and Water Resources.

III - Changes in the Composition of the Atmosphere, Oceans and Fresh Waters

The focus of this theme is to document and understand processes that modify the chemical composition of the atmosphere, inland waters and oceans in a manner that affects productivity and human welfare. Research topics include:

- High Latitude Processes (Ozone).
- Biogeochemical Cycles.
- Comparative Studies of Regional Air and Water Pollution.

IV – Integrated Assessment, Human Dimensions and Applications

The IAI seeks projects that integrate natural and social science themes that include a human dimension component and/or focus on the application research to policy.

4.4. Initial Science Program Round II (ISP II)

A total of 12 grants were awarded in 1997 for the second round of the ISP (Additional information will be given in chapter 5).

5. THE HARVEST BEGINS (1998)

5.1. Initial Science Program Round III

The last round of ISPs began in 1998**.** The total investment in the ISPs was about US$ 4 million for the three rounds (ISP I, ISP II, ISP III) covering the years 1996 to 2001. A total of 39 grants were awarded of up to 3 years. See Appendix II for the list of Projects funded under ISPs.

Research projects ranged from efforts to monitor the effects of cold waves on Brazil's coffee-growing regions, to an ice-core study of the Antarctic Peninsula, to the development of a South American network for the measurement of ultraviolet radiation.

The ISPs were designed to support the IAI science agenda by: promoting multinational collaboration in the global change science, building scientific capacity and providing useful information for policy and decision makers.

5.1.1. Main output of ISPs

Student support: at least 137 students were involved in the ISPs, most of them producing master thesis.

Publications: over 150 publications in journals, book chapters, symposia or reports have been published and over 234 presentations on ISPs related research have been made at some 130 different scientific meetings.

5.1.2. Main outcome of ISPs

Training and education: over 400 scientists participated in workshops or short courses.

Networks: 8 of the 14 projects of the Collaborative Research Network Program (CRN) that would be created later in 1998 originated in or were greatly strengthened by support from ISPs.

Social and policy implications: some examples of the IAI outcome in the sense of social and policy implications are the work of Robert Howarth on the Nitrogen Cycle showing the pollution of coastal waters, the work of Mario Bidegain on how ENSO could affect agriculture and water management, the work of Osvaldo Sala on modeling possible scenarios of biodiversity for the year 2100 considering hypothetic variations in land use, climate, N deposition, biotic exchange and atmospheric CO_2 and the work of James Jones project based on end-users (people who could use the information to manage crops, set policies and make other decisions) that shows the economic impact that ENSO caused on the agriculture of there regions.

5.2. IAI Scientific Forum Arlington

The first IAI Scientific Forum was held in Arlington, Virginia, USA on the 3 June 1998. A distinguished group of scientists from the Americas actively involved in IAI activities were requested to make presentations. The main issues of the Scientific Agenda were reported. It was a suitable time to gather scientific policy authorities; decision makers and scientists involved in IAI sponsored activities as a demonstration of the advance in the research on global change subjects.

5.3. Revised Scientific Agenda approved

The fifth CoP (Arlington, Virginia, 4-5 June, 1998) approves the Revised Scientific Agenda with the following themes:

- Understanding Climate Variability in the Americas (Theme I).
- Comparative Studies of Ecosystem, Biodiversity, Land Use and Cover, and Water Resources in the Americas (Theme II).
- Changes in the Composition of the Atmosphere, Oceans and Fresh Waters (Theme III).
- Integrated Assessment, Human Dimensions and Applications (Theme IV).

6. SHARPING THE OBJECTIVES AND CONSOLIDATING THE IAI SCIENCE NETWORKS (1999)

6.1. Scientific Forum, Ottawa, Canada

The main recommendations at the Ottawa Forum (1999) were to:

- increase contributions from the human dimension research community, since most of the issues involve social, economic and political aspects;
- continue linking science to policy;
- invest further to increase the number of IAI member countries and engage their science communities;
- strongly consider integrated assessments of global change, in the same way the Intergovernmental Panel on Climate Change (IPCC) handles climate change; and
- take advantage of the fact that IAI is a relatively young and successful organization, unencumbered by the kind of bureaucracy that seems to accompany most international bodies.

6.2. First IAI Summer Institute: "Interactions between Seasonal-to-Interannual Climate Variability and Human Systems"

The first Summer Institute, was held July 11 to 30, 1999, at the University of Miami (UM) in Florida, USA. At this first Summer Institute, links between climate variability associated mainly with the ENSO phenomenon and important socioeconomic sectors (agriculture, management of water resources) were explored. This IAI-UM joint venture, which was supported by the NSF for the period 1999–2001, was organized to provide three successive Summer Institutes to cover regionally relevant, global environmental change themes. Summer Institutes were designed to strengthen collaboration among scientists of earth sciences and social scientists. Attendance was 20 scientists from 12 member countries.

6.3. Collaborative Research Network Program (CRN) Created

The Collaborative Research Network Program (CRN) began; this was a five-year program (1999-2003) with an investment of about US$ 10 million for 14 grants. The CRN program is the direct outgrowth, and in many ways, the culmination of the IAI programs (SG and ISPs) in the sense that through these CRNs it was possible to reach some of the main objectives of the IAI including:

- to improve understanding of regional global-change phenomena;
- to produce information for policy- and decision makers;
- to expand scientific capacity in the region; and
- to implement international global change research networks.

6.4. CRNs and the Science Agenda

Most of the CRN projects address more than one of the four IAI Science Agenda themes; this is an intrinsic quality inherent to IAI projects. In the text that follows the CRNs will be briefly described placing them into the science agenda by the main subject that each CRN addresses.

Seven of the projects have strong components in two subjects: climate variability and human dimensions. Three of them (listed under theme I: *a.*, *b.* and *c*.) are concerned specifically with the near-term climate variability of target regions within the Americas. A fourth project (listed under theme III: *a.*) is exploring the linkage between surface temperature changes in the Atlantic and climate variability in the Americas. A fifth project, (listed under theme I *d.*) is piecing together a 500-year picture of climate variability in the Americas on the basis of the tree-ring record. Finally, two projects (listed under theme VI: *b*. and *c*.), which are examining in detail the implications of ENSO-related climate variability on disaster management and human health.

Theme I - Understanding Climate Variability in the Americas

The CRNs funded under this theme are listed below:

a. Multi-Objective Study of Climate Variability for Impact Mitigation in the Trade Convergence Climate Complex Region.
b. Development of a Collaborative Research Network for the Study of Regional Climate Variability and Changes, their Prediction and Impact in the MERCOSUR Area.
c. Climate Variability and its Impacts in the Mexican, Central American, and Caribbean Region.
d. The Assessment of Present, Past, and Future Climate Variability in the Americas from Treeline Environments.

As said above three of these projects (*a.*, *b.* and *c*.) are concerned specifically with the near-term climate variability of target regions within the Americas and the last one project (*d.*), uses tree-ring records to understand past climate variability in the Americas.

Theme II - Comparative Studies of Ecosystem, Biodiversity, Land Use and Cover, and Water Resources in the Americas

The CRNs under this theme include studies that compare global change phenomena in many diverse environments, both coastal and terrestrial. Four studies are advancing our knowledge of various global changes in terrestrial ecosystems, including those brought about by changes in land use. The subjects are:

a. Biogeochemical Cycles under Land Use Change in the Semiarid Americas.
b. The Role of Biodiversity and Climate in the Functioning of Ecosystems: A Comparative Study of Grasslands, Savannas, and Forests.
c. Effects on Vegetation in High Mountain and Tropical Savannah Ecosystems.
d. Andean Amazon Rivers Analysis and Monitoring (AARAM) Project.

Project *a*., addresses the fundamental problem of measuring sustainability and ecosystem resilience in semiarid regions. In project *b.*, explicit connections between ecosystem health and biodiversity are examined. Project *c*., is about building a functional cooperative scientific network to study the global effects of changes in vegetation in high mountain and tropical savannah ecosystems. Project *d*., is about developing a quantitative understanding of the effects of land use and climate variability on Andean Amazon river systems.

Theme III - Changes in the Composition of the Atmosphere, Oceans and Fresh Waters

The projects under theme III deal with issues related to documenting and understanding processes that modify the chemical composition of the atmosphere, inland waters, and oceans in a manner that affects productivity and human welfare. The CRNs funded under this theme are listed below:

a. South Atlantic Climate Changes (SACC): An International Consortium for the Study of Global and Climate Changes in the Western South Atlantic.
b. Enhanced Ultraviolet-B Radiation in Natural Ecosystems as an Added Perturbation due to Ozone Depletion.
c. An Eastern Pacific Consortium for Research on Global Change in Coastal and Oceanic Regions (EPCOR).

Project *a.*, studies continental shelf impacts, seasonal climate, and South Atlantic sea surface temperature variability and their effects on South American climate. Project *b*., is developing a research network for assessing the ecological impact of increased ultraviolet-B radiation to South American ecosystems. Project *c.*, employs several teams of scientists working to understand the implications of global change for the coastal resources of the Eastern Pacific.

Theme IV - Integrated Assessment, Human Dimensions and Applications

The human dimension element is an essential component of global-change research. Most of the CRN projects include this component, but—as mentioned earlier—three of them are especially strong in this regard. They are:

a. Cattle Ranching, Land Use, and Deforestation in Brazil, Peru, and Ecuador.
b. ENSO Disaster Risk Management in Latin America: A Proposal for the Consolidation of a Regional Network for Comparative Research, Information, and Training from a Social Perspective.
c. Diagnostics and Prediction of Climate Variability and Human Health Impacts in the Tropical Americas.

Project *a.*, focuses on understanding the social factors behind modifications in land use and land cover. These modifications are now recognized as major drivers of global change, especially in the Amazon. Project *b*., is forming a team of social and natural scientists in an effort to improve the management of ENSO-related disasters in the South American countries; Project *c*., looks into the close linkages between human health and climate variability in impoverished communities in South America.

Detailed information about each CRN is given in Appendix III.

At the time of the approval of the projects (1999), the 14 CRNs involved more than 170 co-investigators and scientists (the number grows each year) and about 150 participating institutions in 16 countries. The networks are designed to enable in-depth investigation of a wide range of pressing topics concerning global environmental change; and they are highly multidisciplinary, including natural and social sciences. These networks are generating significant, high-quality scientific information that can be used by stakeholders and policy- and decision makers to mitigate and prevent harmful environmental changes

and their impact on our societies. The world's foremost global change experts in the Americas are leading the development of the networks.

7. COMPLEMENTING THE MAIN PROGRAMS (2000-2001)

7.1. Program to Expand Scientific Capacity in the Americas (PESCA)

The IAI launch the PESCA special program with the objective of increasing the participation of investigators from those IAI member countries that had little involvement until that time in ISPs and CRNs IAI projects. PESCA supported eleven small scientific projects, each of about one year to 18 months duration, with grants ranging from $15,000 to $30,000 (U.S.$). The linkage with established IAI programs involving institutions of at least three member countries enabled PESCA-supported scientists from under-represented countries to work collaboratively within a wider science community. The list of projects funded by this program is displayed in the Appendix III.

7.2. Second IAI Summer Institute: "Environmental and Social Implications of Land – Use and Land-Cover Change in the Americas"

The Second Summer Institute was held in Miami, Florida, USA, from July 16 to 4 August 2000. This Institute explored the dynamics and interactions of land-use and land-cover change, both as major inputs to and as consequences of global environmental change. Attendance was 18 scientists from 11 member countries.

7.3. Data Information System (DIS) Presented to the Community

To organize and group the large number of information produced by IAI projects and to make it available to the scientific community, the IAI together with INPE (Brazil's National Institute for Space Research), NSF (U.S. National Science Foundation) and WMO (World Meteorological Organization) presented in 1996 the IAI-DIS project. In general terms, the main objective of this project was to develop an Internet based system that would contribute to the dissemination of scientific information generated by the IAI partner organizations throughout the Americas, as well as allows researchers worldwide to obtain actual information generated by the different projects supported by the IAI. Furthermore, an additional important purpose of the system was to connect science and policy agencies or institutions from several countries in the region and contribute to the standardization of data collection, their integration and the dissemination of state of the art information related to global environmental change.

From 1997-1999, the IAI-DIS project was developed by CIESIN (Center for International Earth and Science Information Network) at Columbia University, USA. In July 1999, the system was installed at the IAI Directorate in Brazil, and in January 2000, it was officially presented to the scientific community. The system continues to be operational and running at http://disbr1.iai.int. At the moment DIS is far from being an exhaustive source of documentation for the IAI present programs. IAI is presently making efforts to review and update the structure of the IAI-DIS for better serving the scientific community.

7.4. Third Summer Institute: "Integrated Management of Water Resources in the Americas: Challenges and Emerging Issues"

The third Summer Institute, was held in Miami, Florida, USA, from 15 July to 3 August, 2001. This Institute explored the multiple dimensions of use and management of water, such as (1) how the supply of water is affected by changes in climate, changes in land use/cover, and the health of aquatic systems; (2) how demand for water is affected by population growth and urbanization; (3) the role played by issues of governance (regulatory and institutional);

(4) how conflicts over water might be resolved (community participation, reconciliation of multiple objectives, use of trans-jurisdictional and transnational resources); and (5) how new challenges in water resources management might be met (new techniques, development of common language, and interdisciplinary approaches). Attendance was 22 scientists from 14 member countries.

7.5. International Community Research Open Meeting on the Human Dimensions of the Environmental Global Changes

This meeting, held in Rio de Janeiro, Brazil, (2001) was the first of its kind to be held in the Southern Hemisphere, co-hosted and co-organized by IAI in partnership with IHDP (International Human Dimensions of Global Change Program).

8. STARTING A NEW CYCLE OF RESEARCH PROJECTS (2002)

8.1. Small Grants Program I (SGP I)

In 2002, IAI launched the SGP, a one-year effort to support small research/capacity building/planning activities that will facilitate the development of larger science programs and research networks in the future. SGP also provides an opportunity to assemble scientists and decision makers in activities aimed at the integration of scientific knowledge to be applied in decision making on global environmental problems of regional relevance. IAI trusts that this limited funding (a total of $385k US) will provide a catalyst for the development of new research activities for the 16 projects awarded (out of 38 proposals submitted). See Appendix IV for the list of projects funded under this program. The SGP I will be finalized by October 2004.

8.2. Small Grants Program II (SGP II)

In June 2003, SGP II was launched. The SAC finally recommended a list of 22 proposals for funding, totaling US$ 612,701. See Appendix IV for the list of projects supported under this program. Projects started to operate in February/March 2004.

APPENDIX I: INSTITUTIONAL MEETINGS OF IAI

Meetings of the Conference of the Parties (1994-2003)

Conference of the Parties (CoP)		
CoP – I - (EC Chair elected: Federico Garcia Brum, Uruguay…94-96)	12-14/09/94	Mexico City, Mexico
CoP – II	26/04/95	Rio de Janeiro, Brazil
CoP – III - (EC Chair elected: Robert W. Corell, USA... 96-98)	18-20/09/96	Havana, Cuba
CoP – IV	12-13/06/97	Buenos Aires, Argentina
CoP – V - (EC Chair elected: Carlos Ereño, Argentina…98-00)	04-05/06/98	Arlington, USA
CoP – VI	17-18/06/99	Ottawa, Canada
CoP – VII - (EC Chair elected: Antônio Mac Dowell, Brazil…00-02)	27-28/07/00	Merida, Mexico
CoP – VIII	19-20/07/01	Panama City, Panama
CoP – IX - (EC Chair reelected: Antônio Mac Dowell, Brazil…02-04)	27-28/06/02	S. J. Campos, Brazil
CoP – X	03-05/06/03	Boulder, USA

Meetings of the Executive Council (1995-2003)

Executive Council (EC)		
EC-I	11-13/01/95	Washington D.C., USA
EC-II	24-25/04/95	Rio de Janeiro, Brazil
EC-III	28/02/96-01/03/96	S. J. Campos, Brazil
EC-IV	16-17/09/96	Havana, Cuba
EC-V	09-11/06/97	Buenos Aires, Argentina
EC-VI	19-20/11/97	Panama City, Panama
EC-VII	04-05/06/98	Arlington, USA
EC-VIII	23-24/11/98	Montevideo, Uruguay
EC-IX	14-15/06/99	Ottawa, Canada
EC-X	02-03/12/99	Caracas, Venezuela
EC-XI	25-26/07/00	Merida, Mexico
EC-XII	04-05/12/00	San José, Costa Rica
EC-XIII	17-18/07/01	Panama City, Panama
EC-XIV	26-27/11/01	Havana, Cuba
EC-XV	25-26/06/02	S. J. Campos, Brazil
EC-XVI	02-03/12/02	Panama City, Panama
EC-XVII	02-03/06/03	Boulder, USA
EC-XVIII	04-05/12/03	San José, Costa Rica

Obs.: The EC Chairs are elected by the EC after the CoP meetings. The new EC, elected by the CoP, meet after the CoP meeting to elect its Chair.

Meetings of the Advisory Committee (1995-2003)

Scientific Advisory Committee (SAC)		
SAC-I - (Chair: Rubén Lara, Mexico)	09-10/01/95	Washington D.C., USA
SAC-II	22-23/04/95	S. J. Campos, Brazil
SAC-III	05/10/95	Montevideo, Uruguay
SAC-IV	17/01/96	Washington D.C., USA
SAC-V	06-07/05/96	Ensenada, Mexico
SAC-VI	08-09/08/96	S. J. Campos, Brazil
SAC-VII	08-09/05/97	Ottawa, Canada
SAC-VIII - (Chair: John W. B. Stewart, Canada)	09-10/10/97	Miami, USA
SAC-IX	14-16/04/98	Santiago, Chile
SAC-X	26-27/10/98	Miami, USA
SAC-XI	19-20/04/99	Lima, Peru
SAC-XII	18-19/11/99	Tucson-AZ, USA
SAC-XIII	10-11/05/00	Miami, USA
SAC-XIV	27-28/11/00	Arlington, USA
SAC-XV	23-24/05/01	S. J. Campos, Brazil
SAC-XVI - (Chair: Luiz Bevilacqua, Brazil)	05/10/01	Rio de Janeiro, Brazil
SAC-XVII	23-24/05/02	City of Mexico, Mexico
SAC-XVIII - (Chair: Walter Fernandez, Costa Rica)	29-30/01/03	Mendoza, Argentina
SAC-XIX	03-05/11/03	Santo Domingo, Dominican Republic
SAC-XX	01-02/04/04	Ottawa, Canada

APENDIX II: INITIAL PROJECTS DESCRIPTION

Projects funded under the Start-up Grant Programs

Title of Project	Principal Investigator	Participating Countries	Funding in US $
Cooperative Pelagic Ecosystem Studies Between The Chilean And Hawaiian Ocean Time-Series: Initial Phase.	M. R . Abbott	**USA**, Chile	**44,262**
Development of an IAI Research Center on Red Tides and Harmful Algal Blooms.	D. M. Anderson	**USA**, Mexico, Chile, Uruguay	**39,297**
IAI Project in Southern Chile: Austral Chilean Coast and Inland Sea: ACCIS.	L. P. Atkinson	**USA**, Chile, Canada	**50,000**
Comparative Studies on Oceanic and Coastal Processes in Temperate Zones of the Eastern Pacific.	T. Baumgartner	**USA**, Canada, Mexico, Peru, Chile	**50,000**
Climate Variability in Southeastern South America and Applications.	M. Berlato	**Brazil**, Argentina, Uruguay, Paraguay	**49,150**
Dendrochronological Studies in Tropical South America with Special Emphasis on Bolivian Forests.	J. Boninsegna	**Argentina**, Bolivia, Brazil	**47,135**
Climate Variability in the Americas from High Elevation Ice Cores.	R. Bradley	**USA**, Canada, Peru, Ecuador, Bolivia, Brazil, Chile, Argentina	**49,937**
Landscape Fragmentation Effects on Faunal Biodiversity in the Americas.	G. Bradshaw	**Chile**, Brazil, Argentina	**47,425**
Nunavut Environment Assessment Transect: Impacts of Population Growth and Global Change in High Arctic Settings.	E. Burden	**Canada**, Argentina, Chile, USA	**50,000**
Global Change in the Southwestern Atlantic from the Coast to the Adjacent Deep Basins.	E. Campos	**Brazil**, USA, Argentina	**49,840**
Application of Remote Sensing to Microbial Ecology and Global Change.	R. Colwell	**USA**, Ecuador, Chile, Mexico, Peru	**42,930**
The Effects of UV Radiation on Various Ecosystems at Different Latitudes.	S. Demers	**Canada**, Mexico, USA, Argentina, Chile	**100,000**
Human Dimensions of Sustainable Forest Management in the Americas.	M. Dore	**Canada**, Brazil, Costa Rica	**49,200**
Climate Variability and Impact Assessment in the Trade Convergence Climate Complex (TC3).	D. Enfield	**USA**, Panama, Ecuador, Colombia, Costa Rica	**49,994**
Response of Water Resources and Ecosystems to Climate Variability and Change.	K. Georgakakos	**USA**, Brazil	**45,830**
Experimental and Time Series Approaches to Global Change Research in the Americas: a Proposal for Coordination and Action.	R. E. Hecky	**Canada**, USA, Brazil, Chile	**50,000**
The Impact of Solar UV Radiation on Aquatic and Terrestrial Resources in Patagonia Argentina-Chile.	O. Holm-Hansen	**USA**, Argentina, Chile	**49,925**
Earth System Science and Global Change Education in Support of the IAI.	D. Johnson	**USA**, Argentina, Brazil, Canada, Chile, Costa Rica, Mexico	**49,872**

Biological Invaders: their Increasing Role as Disrupters of Earth System Processes.	M. T. Kalin-Arroyo	**Chile**, USA, Argentina, Mexico	**49,912**
Design of a Scientific Research Plan for Conducting Comparative Studies of the Physical and Biological Environments of the Upwelling Temperate Areas: Towards a Regime Governing Mechanism.	D. Lluch-Belda	**Mexico**, Australia, Brazil, Chile, Japan, Peru, South Africa, USA	**50,000**
The Assessment of Present, Past and Future Climate Variability in the Americas from Treeline Environments.	B. Luckman	**Canada**, Argentina, Bolivia, Chile, USA	**49,500**
A Training and Education Center on Radar Remote Sensing Science and Technology.	A. Mabres	**Peru**, USA, Germany	**47,255**
Organization of a Regional Center for Climate Studies in Mexico, the USA, Central America and the Caribbean as part of the IAI.	V. Magaña	**Mexico**, Costa Rica, Cuba, Panama, USA	**49,020**
Global Change Effects in the Southwestern Atlantic.	R. Matano	**USA**, Brazil, Argentina, Mexico, Uruguay	**43,530**
Hydroclimatology and Dynamics of the Rio de la Plata System and the Patos-Mirim Complex and their Influence on the Fluxes and Productivity of the Adjacent Shelf Waters.	G. J. Nagy	**Uruguay**, USA, Brazil, Argentina	**49,524**
First Implementation Meeting of the Large-Scale Biosphere-Atmosphere Experiment in Amazonia (LBA).	C. Nobre	**Brazil**, Peru, Bolivia	**50,000**
A Regional Virtual Research Center on Interannual Climate Variability and ENSO in Southern South America.	M. Núñez	**Argentina**, Brazil, USA	**44,770**
Integrated Study of Temperate Coast Estuaries.	G. M. Perillo	**Argentina**, Brazil, Canada, USA, Chile	**50,000**
Andean Amazon Rivers Analysis and Monitoring Project (AARAM).	J. E. Richey	**USA**, Brazil, Peru, Bolivia, Colombia, Ecuador	**48,675**
Comparative Studies of Small Pelagic Fish and Climate Change (SPACC) in the Americas.	B. Rothschild	**USA**, Mexico	**50,000**
Global Assessment in Temperate Agricultural Systems of America.	C. O. Scoppa	**Argentina**, USA, Brazil, Canada, Paraguay, Uruguay	**49,989**
Land-Use Changes and Water Quality Conservation in the Temperate Forests of the Americas.	D. Soto	**Chile**, Argentina, Canada, Mexico, USA	**49,520**
Biogeochemical Consequences of Land-Use Change in the Amazon Basin.	P. A. Steudler	**USA**, Brazil	**50,000**
A Research and Training Network for Plant-Soil Interactions in the Semi-Arid Tropics.	H. Tiessen	**Canada,** Brazi**l**, Venezuela, Bolivia, Mexico	**47,780**
Fire and Global Change in Temperate Ecosystems of Western North and South America.	T. T. Veblen	**USA**, Argentina, Canada, Chile	**49,930**
Potential Use of Biological Proxy Data as Climatic Change Impact Indicators in South American Ecosystems.	C. Villagrán	**Argentina**, Brazil, Chile, USA	**49,875**

Projects funded under the Initial Science Program, Phase I – ISP I

Title of Project	Principal Investigator	Participating Countries	Funding in US $
Request for Partial Support for a SCOPE Workshop on a Comparative Analysis of Nitrogen Cycling in the Americas.	Robert W. Howarth	**USA**	**49,000**
The Last four Centuries of the California Current: Calibration and Interpretation from Laminated Sediments, Tree-Rings and Historical Records of Southern Alta California and Baja California.	Juan Carlos Herguera	**Mexico**, USA	**217,560**
Rainfall Studies in the Amazon Basin and Central South America.	Henry Diaz	**USA**, Brazil, Argentina	**72,592**
Hydrological Budgets for Amazonia.	T.N. Krishnamurti	**USA**, Brazil	**124,189**
Vegetation History from Fossil Rodent Middens in Mid-Latitude American Deserts.	Julio L. Betancourt	**USA**	**206,419**
A South American Modeling Center for Global Change Related Oceanic, Coastal and Estuarine Processes.	Edmo Campos	**Brazil,** USA, Argentina	**97,140**
Initial Climate Research within the Trade Convergence Climate Complex.	David Enfield	**USA**, Costa Rica, Panama, Colombia, Ecuador, Chile	**127,700**
Environment and the Climate of the Antartic Peninsula and the Southern part of South America.	Alberto José Aristarain	**Argentina**, Canada, Brazil, France	**75,000**
Comparative Studies in North and South America Along an Aridity Gradient: A Methodological Approach to Upscaling the Functional Role of Diversity within Plant Communities.	Alejandro Castellanos	**Mexico**, Argentina, USA	**75,000**
Biogeochemical Determinants of Land Cover Change and Land Use in Savanna – Cultivation – Grazing Systems.	Holm Tiessen	**Canada**, Brazil, Mexico, Venezuela	**125,985**
Exchange through the Yucatan Strait and its Importance for Climate Change Studies.	Antoine Badan- Dangon	**Mexico**	**69,000**

Projects funded under Initial Science Program, Phase II - ISP II

Title of Project	Principal Investigator	Participating Countries	Funding in US $
The Impact of Climate Change on Nearshore Marine Biodiversity in the Gulf of California.	Michael Foster	**USA**, Mexico	**50,000**
Support for Short Course: Instrumentation and Measurement Methodologies in Atmospheric Chemistry Research.	Eugene W. Bierly	**USA**	**26,000**
Desertification and Ecosystem Processes: Overgrazing, Grass Transpiration, and Soil-Water Balance.	James F. Reynolds	**USA**, Argentina	**85,000**
Global Change Effects on Biodiversity and Functioning: Manipulation of a Keystone.	Osvaldo Sala	**Argentina**, USA	**90,000**
Climate Variability and Agriculture in Argentina and Uruguay: Assessment of ENSO Effects and Perspectives for Use of Climate Forecasts.	Mario Bidegain	**Uruguay**, Argentina, USA	**70,000**
Links Between Coastal Productivity, Benthic Communities, and Biogeography: Boundaries in Chile and California.	Sergio A. Navarrete	**Chile**, USA	**94,114**
The Effect of UV-B Radiation on Salt-Marsh Vegetation Along a Latitudinal Gradient.	Evamaria W. Koch	**USA**, Brazil, Argentina	**94,989**
Coastal Upwelling Along the Western Americas: Past, Present, and Future.	Alexander VanGeen	**USA**	**117,000**
Precipitation in Southeastern South America: Influence of Sea Surface Temperatures and Predictability.	Gabriel Pisciottano	**Uruguay**, Brazil, Argentina	**90,000**
Diagnosing, Monitoring and Predicting Cold Waves (Friagens) in the Coffee Growing Areas of Southeastern Brazil.	José Marengo	**Brazil**, USA, Peru, Argentina	**67,000**
Biophysical Coupling in the Pelagic Ecosystem of the Southern California Current.	Timothy Baumgartner	**Mexico**, USA	**100,000**
A South American Network for the Measurement of Ultraviolet Radiation.	Maria Vernet	**USA**, Argentina, Chile	**115,000**

Projects funded under the Initial Science Program, Phase III - ISP III

Title of Project	Principal Investigator	Participating Countries	Funding in US $
Training and Education in the Context of the LBA Experiment.	Carlos A. Nobre	Brazil, Peru, USA, Venezuela	**100,000**
Effects of Species and Functional Diversity on Ecosystem Function: a Comparison Between Artic Tundra and a Temperate Grasslands/Shrubland System.	Sandra M. Diaz	**Argentina**, USA, Venezuela	**116,000**
The Impact of Accelerated Sea Level Rise on Nutrient Cycling and Productivity in Karst and Deltaic Ecosystems in the Gulf of Mexico and Caribbean Area: Ecological and Socio-Economic Implications.	John W. Day Jr.	**USA**, Mexico, Venezuela	**116,000**
Benefits of Incorporating ENSO Forecasts into Reservoir Operation and Hydroelectric Power Distribution.	Peter Waylen	**USA**, Colombia, Costa Rica, Panama	**117,000**
UNAM-UCR-NCAR Tutorial on Regional Weather and Climate Modeling for Latin America.	Thomas Warner	**USA**, Costa Rica, Mexico	**27,000**
Applications of Multiple Lead-Time Climate Predictions in the Region of Central America and the Caribbean.	Henry F. Diaz	**USA**, Costa Rica, Mexico	**81,000**
Variations in Spatial and Temporal Precipitation Patterns in the Trade Convergence Region.	Maria Donoso	**Panama**, Costa Rica, Colombia, Cuba, Ecuador, Mexico, USA	**103,000**
Estimation of ENSO Effects on Sugar Cane Yelds in Several Latin-American Countries.	Angel Utset	**Cuba**, Mexico, Venezuela	**35,000**
Global Change Effects on Biogeochemical and Hydrological Determinants of Structure and Function in Cerrado Ecosystems.	Augusto Franco	**Brazil**, Argentina, USA	**116,200**
Relationships Between the Antarctic Vortex Dynamics, Chemistry, Ozone Depletion and Southern Midlatitude Stratosphere and Upper Troposphere.	Pablo O. Canziani	**Argentina**, Uruguay, USA	**117,000**
A Regional Assessment of Landuse Impact on Ecosystem Function and Structure in Temperate Areas of North and South America.	José M. Paruelo	**Argentina**, Brazil, Uruguay, USA	**116,200**
Spawning Habitat of Small, Pelagic Fish in Relation to ENSO and Global Change.	David M. Checkley	**USA**, Chile, Peru, Mexico	**117,000**
An International Study on the Health Effects of ENSO in the Americas.	Ulisses Confalonieri	**Brazil**, Argentina, USA	**87,300**
Earth System and Global Change Education Workshops: Building IAI Capacity with a Science and Education Network.	Donald R. Johnson	**USA**, Mexico, Brazil, Costa Rica, Canada, Argentina, Uruguay	**117,000**
Comparative Assessment of Agricultural Uses of ENSO-Based Climate Forecasts in Argentina, Mexico and Costa Rica.	James Jones	**USA**, Argentina, Costa Rica, Mexico	**117,000**
Natural and Anthropogenic Control on the Hydrology and Biogeochemistry of a Meso-Scale Andean Amazon River Catchment: Integrating Andean Systems into Basinwide Investigation.	Carlos Llerena	**Peru**, Brazil, Bolivia, Colombia, Ecuador, USA, Germany	**117,000**

APPENDIX III: CRN AND THE SCIENCE AGENDA

PROJECTS SUPPORTED UNDER THEME I

UNDERSTANDING CLIMATE VARIABILITY

The names of the PI and the participating countries for each project are shown in the table included in this appendix.

a. Multi-Objective Study of Climate Variability for Impact Mitigation in the trade Convergence Climate Complex

This regional network examines climate variability with participants from Ecuador, Colombia, Chile, Venezuela, Panama, Costa Rica, Mexico, the USA and Canada. A broad range of physical and social scientists from these nine countries are conducting applied science research based on the concept that the TC3 region is linked by climatic processes and impacts of climate variability that are similar in nature.

Interactions between sea surface temperatures in the Atlantic and Pacific oceans and the atmospheric convergence of trade winds from the north and south result in precipitation anomalies in the region. This network studies the details of these relationships and correlations and developing useful ways to forecast the resulting climatic fluctuations and their human dimension impacts on social and economic activities such as fishing and aquaculture and human health risks.

Scientific results include a description of the region's climate for the period 1961–1990 based on a large-scale data set; a description of interseasonal signals in the region; data regarding the climatic effects of ENSO and non-ENSO components of Sea Surface Temperature (SST) variability in the eastern equatorial Pacific; and a description of precipitation anomalies in Central America.

***NOTE**: Due to discrepancies between the scientists and the trustee, regarding the project administration, which could not be resolved even through the IAI Directorate, the PI and all Co-PIs resigned by April 2003. This led to the cancellation of the project*

b. The Development of a Collaborative Research Network for the Study of Regional Climate Variability and Changes, their Prediction and Impact, in the MERCOSUR Area

This CRN was developed to promote research into the causes of climate variability in the MERCOSUR region of South America. Scientists from the MERCOSUR countries (Argentina, Brazil, Paraguay, and Uruguay) are leading the effort, with scientists from the U.S. also participating. The purpose of the CRN is to support an environment conducive to collaborative research. This is being accomplished by sponsoring scientific visits to each of the participating institutions, holding regular meetings where results are disseminated and discussed, and by encouraging the free exchange of data.

Problems involving climate variability and the human response to that variability are quite complex and it is clearly impossible for one group to address even a single one of them effectively. At present, however, there are many barriers to effective collaboration, including the physical separation between groups, a lack of communication between disciplines, an historical resistance to the open exchange of data, and language barriers. By providing an environment conducive to collaboration, these barriers are reduced and the pace of research accelerates more rapidly. This should result in developing better predictive capability and an understanding of how to make best use of those predictions, ultimately resulting in benefits to the region's population.

The project was designed through a series of meetings and workshops involving the participating institutions. Three themes have been identified as the priority:

1) physical and dynamical processes related to climate variability in southeast South America;

2) tropical-extra tropical interactions related to circulation and precipitation variability over southeast South America; and

3) impacts of climate variability on sectors of social and economic importance in the MERCOSUR region.

Specific objectives include:

- improved understanding of the role of large-scale sea surface temperature variations in determining climate variability in southeast South America;
- study of the tropical-extra tropical interaction related to the circulation and precipitation variability over the MERCOSUR area; and
- study of the impacts of climate variability on sectors of social and economic importance in the MERCOSUR region.

The network will make a significant contribution to capacity building in the region by training Ph.D. students who will contribute to the development of policy in areas of climate variability and change, and climate prediction.

c. Climate Variability and its Impacts in Mexico, Central America and the Caribbean Region

This project involves monitoring of atmospheric and oceanographic variables that affect summer rains in Brazil, Colombia, Mexico, Costa Rica, the USA, Cuba, and Jamaica. More than 40 scientists, 20 students, and 10 technicians from these different countries collaborated in monitoring in the northeastern Pacific and the Caribbean. The monitoring data are processed and analyzed. Concurrently, the impacts of climate variability on socioeconomic sectors are examined in some of the countries: agriculture in Mexico; generation of hydropower in Costa Rica; and water resources in Mexico and the USA.

Changes in water availability on intra-seasonal time scales are of major concern because of their impacts on agriculture, hydropower generation, and the environment. Accurate climate predictions are in great demand in various socioeconomic sectors since the cost of extreme climate conditions can be on the order of hundreds of millions of dollars. Therefore, the main objective of this project is to improve our understanding of the elements that control regional climate variability in Mexico, Central America and the Caribbean in order to provide more accurate and adequate climate predictions to fulfill some of the needs of particular socioeconomic sectors.

The region of interest is unique because of its complex topography and the fact that it is surrounded by two oceanic “warm pools,” one in the Caribbean Sea, and one in the Gulf of Mexico. The former exhibits intense convective activity, while precipitation is meager in the latter, considering its tropical character. Therefore, air-sea interaction processes play a major role in modulating climate fluctuations. This project includes the development of high-resolution (in space and time) meteorological, oceanographic and hydrological databases. Empirical and dynamic atmosphere and ocean models are being used to enhance our understanding of regional climate variability and its impacts.

Study results are planed to be delivered to various users, along with some potential adaptation measures, and the team will evaluate the use of this information. An economic cost-benefit analysis will be performed to quantify the impact of proposed adaptation measures using crop models. By including graduate students in all aspects of the project, we are helping to develop professionals who will maintain this activity in the future.

d. Assessment of Present, Past and Future Climate Variability in the Americas form Treeline Environments

This CRN combines two CRN pre-proposals; one led by Canada and one by Argentina, and is being carried out by scientists from both countries as well as from Mexico, Peru, Bolivia, Chile and the U.S. The initial research phase included analyses of new and existing tree ring data, as well as studies of the Pacific Decadal Oscillation, believed to be the most significant influence on decadal (large-scale) climate variability in western North America, and also thought to be linked with Southern Hemisphere variability via the central Pacific.

This project attempts to narrow the "latitudinal gap" between the presently available tree-ring chronology networks by 1) expanding existing chronology networks equator wards for the those species known to have annual rings; and 2) by exploring the potential of many new species to yield annual ring series. Expanding scientific capacity, training and exchanges are also major goals of the project. New laboratories have been established for basic dendrochronological work in Durango, Mexico; La Paz, Bolivia; and Piura, Peru. All are serving regions with little or no prior expertise in tree ring studies.

This project is also generating related data sets (e.g., drought and flow frequencies; estimates of timber production) that may be usefully applied to impact assessment or scenario development for environments undergoing significant climate change. Although human dimension was not a primary focus of the initial phase, the centennial data from Mexico shows a period of severe drought in the 16th century that can be linked with outbreaks of hemorrhagic fever that killed several million native people in central Mexico following the Spanish colonization.

Cocoliztli is now thought to be an indigenous hemorrhagic fever, possibly transmitted by rodent hosts and aggravated by drought conditions. It is hypothesized that drought periods can concentrate and spread infection among the residual rodent population. When the drought ends, the infected rodent population may invade farms and homes to spread the disease agent. Humans infected with *cocoliztli* often died painfully in as little as three-four days. Similar climatic conditions were observed during the Hantavirus outbreaks in the southwestern U.S. in 1993, but *cocoliztli* probably was not a Hantavirus and the true disease agent remains unknown. Nevertheless, the 16th century epidemics do seem to have occurred during one of the worst Mexican droughts in the past 500 years and the epidemics in 1545-48 and 1576-78 each reduced the population of the Mexican Highlands by about 50 percent. Population recovery was slow and numbers remained well below their 16th century levels until the 20th century.

PROJECTS SUPPORTED UNDER THEME II
COMPARATIVE STUDIES OF ECOSYSTEMS, BIODIVERSITY, LAND USE, AND WATER RESOURCES

The names of the PI and the participating countries for each project are shown in the table included in this appendix.

a. A Biogeochemical Cycles Under Land Use Change in the Semi-Arid Americas

Scientists from Canada, Argentina, Brazil, Venezuela, and Mexico are investigating how land use affects the carbon, nitrogen and phosphorus cycles in semiarid regions. Researchers are also exploring land management options that will aid sustainability of land use in these regions. This CRN addresses the fundamental problem of measuring sustainability and ecosystem resilience in semiarid regions whose natural characteristic is a high climatic and (consequently) biotic variability in which few ecosystem attributes are "sustained." It examines these systems under land use change in the context of the principal drivers: economic and demographic changes, climatic instability and land degradation.

The focus on land use in semiarid regions has provided a complex set of objectives: to apply good, reliable science that can deliver the results needed by the agricultural communities in an environmentally fragile and climatically unstable semiarid environment; to address the socio-economic context of this science; to address the institutional and human resource needs of the partner institutions; and to fulfill the educational mandate of the participating institutions. Semiarid lands are highly susceptible to environmental change and degradation because minor shifts in temperature, rainfall, or rainfall distribution can seriously curtail plant production and survival, and endanger often already marginal agricultural societies. The risk of drought and the poverty of the majority of producers limit investment in soil quality and fertility of semiarid lands. The low investment potential in semiarid regions also means that natural fertility management with shifting cultivation or pasture-arable rotations are vital components of sustainable agriculture.

This CRN links levels from farm to global concerns, from farmer experience and experimentation to rigorous scientific inquiry, from participatory learning at community level to Ph.D. and post-doctoral programs. The issue of sustainability has brought together educators from universities, non governmental organizations (NGOs), and rural communities, particularly in northeast Brazil and in the Yucatan, because of the common realization that a strong human resource is essential if land management is to improve and be prepared for future climatic challenges. Investigators from the network have contributed substantially to the government farm guide for northeast Brazil. The group received a large Brazilian grant for research on family agriculture. The Mexican group received a mandate from the Mexican government to lead a nationwide program on cover crops

b. Role of Biodiversity and Climate in the Functioning of Ecosystems

Scientists in this research network from Argentina, Uruguay, Chile, Venezuela, Mexico, and the U.S. have found that land-use changes will be the most important driver of changes in the biodiversity of natural ecosystems in this century. These scientists predict that some ecosystems will be more susceptible to change than others, and that grasslands, tropical forests and Mediterranean ecosystems will be the most susceptible. Two key global change issues for the region are the individual effects of changes in climate and biodiversity and their interactions. Simultaneous research approaches include synthesizing a wealth of existing data, field observations, remote sensing, stable isotopes, manipulative field and controlled-environment experiments, and modeling exercises.

This project takes advantage of the broad variance in climate, natural biodiversity and land use, and the striking climatic similarities between North and South America. Similar gradients of precipitation and temperature exist in the North and the South, but contrasting biotic conditions are determined by a different evolutionary history and current patterns of human utilization. This project will identify and establish biodiversity gradients on both continents and assess the effects of biodiversity on carbon, nitrogen and water cycling. A subset of these sites in South America will be used for manipulative experiments on biodiversity and nitrogen cycling, while greenhouse studies will be conducted to explore these interactions in a controlled environment. Finally, simulation modeling will complement experiments and aid in the interpretation of results.

Results from this project will be extremely relevant for the development of global change policy. Most countries have committed themselves to the development of national strategies for the conservation and sustainable use of biodiversity and national carbon budgets as signatories of the Biodiversity and Climate conventions. At the same time, these governments face enormous internal pressures for economic development. People have a desire to preserve biodiversity and take advantage of the services provided by natural ecosystems, but simultaneously want the products of agroecosystems and their associated cash crops. Specific quantitative answers about the value of biodiversity in ecosystem functioning and the potential effects associated with its loss due to global change would provide vital information needed to balance the needs of conservation and development. This project will make a major contribution to this effort. In addition, the network will make a significant contribution to capacity building in the region by training seven Ph.D. students who will contribute to the development of policy in issues of biodiversity conservation and sustainable land-use management.

c. Effects of Global Change on Vegetation in High Mountain and Tropical Savannah Ecosystems

Fourteen scientists and 27 graduate students from Colombia, Argentina and Brazil are studying how changes in temperature, humidity, fire, and land use are modifying these ecosystems. This project had no framework in place from a previous program, so the early focus has been mainly on building a functional cooperative scientific network to study the global effects of changes in tropical ecosystems in South America. The project includes four well-established research groups from Latin American institutions in developing a comparative and cooperative program of investigations in two South American ecosystems: high mountain and seasonal savannah.

The general approach consists of comparative studies of functional and structural properties of the vegetation along environmental and land-use gradients at different temporal and spatial scales. Simultaneously, a more detailed study of dominant plant species examines reproduction and colonization potentials. The combination of vegetation responses along environmental gradients in terms of biodiversity, water resources and soils, and the species' capabilities will allow researchers to model possible responses to global environmental changes. Beyond descriptive results, this modeling approach allows integration and prediction. Some important data are already emerging concerning the effects of fire in tropical savannas. Researchers are finding that nutrient cycling is significantly altered by fire: as biomass is reduced and nutrients are volatilized, the ecosystem becomes impoverished.

The magnitude of global changes and their impacts upon ecosystems are intimately related to the regional patterns of circulation of water and carbon. To design strategies for the sustainable management of these ecosystems, it is essential to know the nature of their responses to change, the extent to which these responses affect the patterns of circulation and the consequences to environmental services and the social and economic values they represent. It is relevant that the ecosystems under consideration are currently experiencing a rapid transformation into pasture and croplands with consequent changes in the cycling of water and carbon. Scientific knowledge on these issues is still scarce.

This project will help to strengthen the scientific capabilities of the participant institutions and contribute in the training of young scientists and professionals who will be part of the decision making processes in their respective countries. The results will also be instrumental for designing public policies to protect these ecosystems at a continental level.

d. Andean Amazon Rivers Analysis and Monitoring (AARAM)

Scientists from Brazil, Bolivia, Ecuador, Peru, Colombia, and Canada are conducting this project whose aim is to develop a quantitative understanding of the effects of land use and climate variability on Andean Amazon river systems. Research activities are carried out simultaneously in four pilot catchments representative of the heterogeneity of climate, natural ecosystems and land uses in the Andean Amazon region. These catchments are distributed among Bolivia (Alto Beni), Peru (Pachitea), Ecuador (Napo), and Colombia (Caquetá). Detailed temporal fluxes of water (daily), sediments (daily/weekly), and solutes (monthly) are determined at five reference stations in each pilot catchment. Findings from these combined field and laboratory activities are integrated into a quantitative basin model equipped with a special user interface designed to make it a useful management tool for decision makers and land/water managers of the region.

Launched in 1996 through the support of the Start-up Grants Program, AARAM has become the most extensive and dynamic collaborative research initiative addressing the impact of global change phenomena on the quantity and quality of surface water resources in the Andean Amazon region. The project is built on a foundation of scientific excellence and capacity building within a regionally defined research framework of multinational and multidisciplinary collaboration, promotion of standardized data collection, and policy relevance. Issues include:

- *Rivers and Water Supply*: rivers serve most of the water needs of the Andean Amazon's native and colonial inhabitants. When last examined in the early 1980s, only 20 percent of inhabitants in the Peruvian Amazon had water service. Given the increased immigration of homesteaders into the region during the past 20 years, this percentage is likely to be equivalent or less today. River water is generally consumed with no form of treatment.
- *Rivers and Food*: rivers supply fish, shrimp, and a variety of aquatic plants that are central to the diet of communities in the Andean Amazon. Rivers and their floodplains and riparian forests provide important habitat for a large number of terrestrial animals that are hunted. Few studies have quantified the dependence of the Andean Amazon diet on rivers, but at least one study conducted in the Peruvian Amazon found that fish account for 62 percent of animal protein consumed by rural inhabitants.
- *Rivers and Health*: In 1991, Peru, Ecuador and Colombia registered the largest number of cholera cases in all the Americas. River water is a leading vector by which diseases are spread. Pathogens linked to cholera, amebic dysentery and similar conditions are transmitted in human waste and arrive in the river through poor waste disposal. General lack of treatment, including routine boiling of river water prior to drinking, only exacerbates the problem. Rivers and their floodplains also provide habitat to insect vectors like mosquitoes. Mosquito-borne diseases such as malaria, dengue fever and yellow fever continue to plague the region. In 1990 alone, 71,670 cases of malaria were reported in Ecuador.
- *Rivers and Commerce*: the steep gradients of Andean Amazon rivers make them enormous potential sources of hydroelectric power for industry and households. Rivers are also prime avenues of transport in the Andean Amazon, much of which remains roadless.
- *Rivers, Biodiversity and Ecosystems*: Colombia, Ecuador and Peru rank among the ten most biodiverse countries on Earth. Explanations for the region's biological richness have been linked to its climatic and fluvio-geomorphological diversity. In particular, the extreme spatial and temporal heterogeneity of the large floodplains of the lowland Andean Amazon rivers is hypothesized to have generated ideal conditions for the diversification of species. Overall, the Andean Amazon region contains a magnificent collection of interconnected aquatic ecosystems.

PROJECTS SUPPORTED UNDER THEME III: CHANGES IN THE COMPOSITION OF THE ATMOSPHERE, OCEANS, AND FRESHWATER

The names of the PI and the participating countries for each project are shown in the table included in this appendix.

a. South Atlantic Climate Change (SACC) Consortium for the Study of Global and Climate Change in the Western South Atlantic

The SACC Consortium is a CRN program created to investigate how climate variability and other global changes affect southwestern Atlantic ecosystems – terrestrial, oceanic and atmospheric. Researchers from Argentina, Brazil, Uruguay, and the U.S. have produced a wealth of findings relating to issues such as: the impacts on the continental shelf of Rio de la Plata discharges and of the Brazil-Malvinas confluence; seasonal-to-multi-decadal climate variability; and South Atlantic SST variability and its effects on the climate of South America.

The consortium involves physical oceanographers, meteorologists and climatologists from several North and South American institutions. A substantial part of the research efforts focus on understanding the role of shelf SST variations on the regional climate. Research activities include a continued effort to construct a high-quality regional database of hydrographic and satellite data, and to investigate links between the hydrological cycle and other climate features over the continent, and changes in the Atlantic Ocean circulation and the associated SST anomalies.

Identifying the economic and societal consequences of SST-mediated climate variability entails exploring the multitude of snowballing effects of SST and circulation changes on the hydrologic cycle and on marine and terrestrial ecosystems. As in the case of El Niño (which was discovered because of its strong influence on conditions important to the livelihood of Peruvian fishermen), circulation-change signals being investigated by the SACC are likely to be amplified in the fisheries and public health domains. This often highly nonlinear amplification mechanism is expected to become part of the SACC research agenda.

The SACC-CRN has identified some significant consequences of climate change. Large-scale decadal fluctuations in small pelagic fish stocks have been observed that appear to be related to global climate change, but the links and dynamics are poorly understood. In some stocks, such as shrimp, a strong year-to-year variability has been observed, but the reasons for this are unclear. The key question is how do individual stocks respond to common physical forcing in remote marine ecosystems? The principal link between fish population dynamics and physical forcing is through primary and secondary production in marine ecosystems. Therefore, it is important to understand ocean processes in the reproductive sites of major stocks in the southwestern Atlantic.

The southwestern Atlantic Ocean, particularly the region of the Brazil-Malvinas Confluence Zone, supports important local and multinational fisheries. According to the UN Food and Agricultural Organization reports, some 2,029,000 metric tons of fish were taken from this region in 1990. Certain fish types, such as the Argentine hake, are clearly overexploited. In Latin America the use of fish as a food source increased from below 7 kg/person/year in 1970 to about 9 kg/person/year in 1990. Squid landings for Latin America increased from 1300 tons in 1970 to 734,356 tons in 1990; for Brazil, Uruguay, and Argentina, they went from about 700,000 tons in 1970 to 1,238,000 tons in 1990. Other countries exploiting the area are Poland, Japan, Russia, Taiwan, Korea, and Spain.

Scientific capacity building through the SACC-CRN has taken place on several levels. Students and young scientists were recruited to study numerical modeling and to compile and analyze historical data. Short courses and seminars for students led by invited specialists in various fields from different countries have been offered each year. Computer hardware was acquired and distributed primarily among participating South American institutions for research efforts. Fellowships and extended visits have been provided for South American students and young scientists to U.S. institutions.

b. Enhanced Ultraviolet Radiation (UVR) in Natural Ecosystems as an Added Perturbation Due to Ozone Depletion

This network of researchers in the Americas consists of 25 investigators from 18 institutions in the USA, Canada, Argentina, Chile and Brazil. Six of these institutions in four countries act as nodes between 11 additional institutions. Capacity building includes the participation of 22 students. Major activities have sought to assess the effects of UVR on (1) coastal marine ecosystems of different latitudes (Canada, Brazil, Antarctica); (2) the reproduction and physiological development of UV-B-sensitive salt-marsh plants in tropical, subtropical, and temperate regions; and (3) lake ecosystems—specifically, how UVR transmission in the water column may be limited by dissolved organic carbon. Ground-level UVR is also being monitored. These activities will lead to modeling of both the ecological effects of UVR on natural populations, and the socioeconomic impacts of UVR on human populations at high latitudes.

Emissions of anthropogenic chlorofluorocarbons cause depletion of the stratospheric ozone in the region, resulting in an increased transmission of UVR through the atmosphere. The effects, while greatest in polar latitudes, are also observed in mid-latitudes, and the problem will increase before it is projected to begin improving around year 2050. UVR effects on organisms are mostly deleterious due to damage to DNA and cellular proteins that are involved in biochemical processes, affecting growth and reproduction.

The three primary objectives are: (1) to make scientific advances on a regional scale; (2) to integrate local and national efforts into a cohesive but flexible body; and (3) to make scientific results available

to the affected public. The general hypothesis that the response of organisms and systems to UVR varies along gradients will be tested. The approach includes three levels of activity: data collection, ecosystem modeling and socioeconomic studies.

Socioeconomic impacts will be estimated for Ushuaia, Argentina during workshops with participation from all elements of the community (businesses, policy makers, health officials, scientists, etc.). Expected results include scientific advances, ecosystem models and a system model including economic and social impacts. A book on UVR effect on ecosystems in North and South America will be published. The proposed research is relevant as it addresses UVR climatology and its effects on a regional level, focusing research on representative communities and ecosystems.

c. Eastern Pacific Consortium for Research on Global Change in Coastal and Oceanic Regions (EPCOR)

EPCOR is a collaborative network comprised of research and education centers in Chile, Peru, Ecuador, Colombia, Costa Rica, Mexico, Brazil, Jamaica, the U.S., and Canada. The scientific goals of the EPCOR network are to clarify the role of the eastern Pacific boundary regions in climate variability and global change, and to anticipate the consequences of these forces on the regional oceanic and coastal ecosystems and the societies interacting with these systems. The proposed research is broadly organized on the basis of inter-hemispheric comparative studies of the principal coastal and oceanic ecosystems in the 1) sub-polar regions of poleward flow (and the associated systems of fjords inland seas), the 2) Humboldt and California Current systems, and 3) the study of the interaction of the Eastern Tropical Pacific with the extra-tropics in regulating large-scale Pacific climate and regional ecosystem response. Research plans address all four of the principal themes of the IAI Science Agenda and most of the issues falling within these themes.

The eastern boundary regions of the Pacific Ocean are particularly important to the Science Agenda for their role in modulating the nature and effects of global change in the Americas. This disproportionate influence magnifies the importance of understanding how these systems are coupled to the global carbon cycle and the global heat budget. The elevated biological productivity of the eastern boundary regions have also made them targets for heavy exploitation, with increasing pressure from a growing human population along the coast and industrialized harvesting of the fisheries. These activities have perturbed the structure of the coastal and oceanic ecosystems to an extent that they are now particularly vulnerable to the combined effects of natural climate variability and greenhouse warming.

An overarching goal of EPCOR is to develop a sustained capacity for collaborative research applied to policy development and informed decision-making within and among member nations. The network is designed to take advantage of the potential synergy from presently uncoupled programs through implementation of a broadly interdisciplinary approach to define and understand the global change issues important to the coastal and oceanic regions of the eastern Pacific. The network is developing the necessary organization and mechanisms for linkage and communication among individual national programs and existing networks to provide orientation and focus on common objectives both scientific and applied. EPCOR is intended to serve as a platform to build a long-term inter-American research effort with a productive lifetime extending significantly beyond the immediate five years of current IAI funding.

PROJECTS SUPPORTED UNDER THEME IV
INTEGRATED ASSESSMENT, HUMAN DIMENSIONS AND APPLICATIONS

The names of the PI and the participating countries for each project are shown in the table included in this appendix.

a. Cattle Ranching, Land Use and Deforestation in Brazil, Peru and Ecuador

This project is providing a comprehensive understanding of the drivers behind the rapid expansion of cattle ranching, and the extensive use of unsustainable pasture management practices that are major determinants of deforestation and environmental degradation in rural South America. Researchers from Brazil, Peru, Ecuador, and the U.S. are analyzing and comparing variables among the three regions to determine how different socioeconomic and policy environments produce different outcomes.

The objective of this four-year study is to create an interdisciplinary network of researchers to carry out a comparative study of ranching activities in Brazil, Peru and Ecuador. In-depth interviews with key informants are being used to analyze land use and pasture management decisions made by small, medium and large establishments, and to identify the marketing chains that link the production of cattle to consumption of beef in each context. This comprehensive analysis of the overall architecture of the cattle sector adds to the scholarly understanding of the factors that drive environmentally significant land use decisions, and generates information required to formulate viable policies to encourage alternative forms of land use, and to promote sustainable pasture management.

Thus far, the project's major achievements are:

- the development, via interviews, of a database that is shedding light on the processes by which farmers and ranchers make land-use decisions;
- new information on the social, economic, and environmental factors that influence these decisions; and
- the application of social science methods to agricultural and animal sciences.

b. ENSO Disaster Risk Management in Latin America

This CRN consists of a very large multinational group from Peru, Colombia, Chile, Brazil, Ecuador, Argentina, Costa Rica, Mexico, and the U.S. studying disaster risk management in these countries from a social perspective. Currently, social data needed for application of the Disaster Inventory computer program known as "DESINVENTAR" are being assembled, from which risk statistics at regional and local levels can be derived. Students involved in this project receive important training in gathering data from a wide geographic region and its application for comparative analysis.

The five-year program was proposed to the IAI CRN program by The Network for Social Studies on Disaster Prevention in Latin America (LA RED), Latin America's leading source of social science research, information and training on disaster risk and management. LA RED coordinates the multidisciplinary team of researchers representing institutions from seven IAI member nations.

The project plays a significant role in dealing with global change issues in the Americas by filling a major gap in scientific understanding regarding disaster risks associated with ENSO events in the region and the relationships between risk accumulation and unsustainable development models and practices. It also increases understanding of the organizational systems, structures and approaches used to manage ENSO disaster risk. Given the political and economic significance of ENSO events and their impacts in the region, various components of the program enhance ENSO scientific understanding and forecasting capabilities, providing more relevant, effective and efficient disaster risk management.

Program components:

- develop a regional network on ENSO disaster risk management in Latin America, building relations and improving communication between ENSO natural scientists, social scientists and disaster risk researchers, managers and decision makers, and maximizing the use of existing capabilities and networking mechanisms;

- produce new scientific information on the evolution of the hazard, vulnerability and risk patterns associated with ENSO disaster risks in Latin America, and on the social, economic, territorial and political processes underlying those risks;

- influence policy formulation and decision making at national and international levels by developing interactive information systems and publications which maximize the dissemination of information on ENSO disaster risks and their management; and

- contribute to increased technical, professional and research capabilities for ENSO disaster risk management at national and local levels by developing training and educational materials and coordinating them with ongoing training and higher education programs in the region.

c. Diagnostics and Prediction of Climate Variability and Human Health Impacts in the Tropical Americas

This CRN has already produced some results via its network of collaborators from Brazil, Venezuela, Colombia, Mexico, the USA, and Jamaica: climatic and epidemiological data on dengue fever and malaria have been gathered, which will be standardized for incorporation into the IAI-DIS (IAI Data Information System). In addition, a model of malaria transmission based on climatic, entomological and epidemiological factors is being developed by the Colombian co-PIs for the period November 1997 – February 2001, during which Colombia was strongly affected by both El Niño and La Niña.

Projects Funded under the Cooperative Research Network Program - CRN

Title of Project	Principal Investigator	Participating Countries	Funding in US $
Theme I			
Multi-Objective Study of Climate Variability for Impact Mitigation in the Trade Convergence Climate Complex Region. **See Note on page 30**	**Pilar Cornejo**	**Ecuador**, Panama, Canada, Chile, USA, Venezuela, Mexico, Colombia, Costa Rica	**Approved 804,600 Transferred 323,400**
Development of a Collaborative Research Network for the Study of Regional Climate Variability and Changes, their Prediction and Impact in the MERCOSUR Area.	**Mario Nuñez**	**Argentina**, Brazil, Paraguay, Uruguay, USA	**819,180**
Climate Variability and its Impacts in the Mexican, Central American, and Caribbean Region.	**Victor Magaña**	**Mexico**, USA, Costa Rica, Brazil, Colombia	**293,300**
The Assessment of Present, Past, and Future Climate Variability in the Americas from Treeline Environments**.**	**Brian Luckman**	**Canada**, Argentina, Chile, Bolivia, USA, Mexico	**820,000**
Theme II			
Biogeochemical Cycles under Land Use Change in the Semiarid Americas.	**Holm Tiessen**	**Canada**, Argentina, Brazil, Mexico, Venezuela	**818,000**
The Role of Biodiversity and Climate in the Functioning of Ecosystems: A Comparative Study of Grasslands, Savannas, and Forests**.**	**Osvaldo Sala**	**Argentina**, Chile, Mexico, USA, Uruguay, Venezuela	**819,826**
Effects of Global Change on Vegetation in High Mountain and Tropical Savannah Ecosystems.	**Juan Silva**	**Venezuela**, Colombia, Brazil, Argentina	**552,000**
Andean Amazon Rivers Analysis and Monitoring (AARAM) Project.	**Michael McClain**	**USA**, Peru, Brazil, Bolivia, Colombia, Ecuador	**788,830**
Theme III			
South Atlantic Climate Changes (SACC): An International Consortium for the Study of Global and Climate Changes in the Western South Atlantic.	**Edmo Campos**	**Brazil**, Argentina, Uruguay, USA	**819,000**
Enhanced Ultraviolet-B Radiation in Natural Ecosystems as an Added Perturbation due to Ozone Depletion.	**Maria Vernet**	**USA**, Argentina, Brazil, Canada, Chile	**820,000**
An Eastern Pacific Consortium for Research on Global Change in Coastal and Oceanic Regions.	**Timothy Baumgartner**	**Mexico**, Canada, USA, Costa Rica, Peru, Chile, Colombia, Ecuador	**820,000**

Theme IV			
Cattle Ranching, Land Use and Deforestation in Brazil, Peru, and Ecuador.	**Charles Wood**	**USA**, Brazil, Ecuador, Peru, Canada	**658,284**
ENSO Disaster Risk Management in Latin America: A Proposal for the Consolidation of a Regional Network for Comparative Research, Information, and Training from a Social Perspective.	**Eduardo Franco**	**Peru**, Argentina, Brazil, Colombia, Costa Rica, Ecuador, Mexico, USA	**808,920**
Diagnostics and Prediction of Climate Variability and Human Health Impacts in the Tropical Americas.	**Ulisses Confalonieri**	**Brazil**, USA, Colombia, Mexico, Jamaica, Venezuela	**799,498**

Projects Funded under the Program to Expand Scientific Capacity in the Americas - PESCA

Title of PESCA Project	CRN & ISP PI linked to PESCA	Country of the CRN & ISP PI	PESCA Co-PIs	Country (ies) of the PESCA Co-PI	Funding in US $
Analyzing and Understanding Climate Variability in the Caribbean Islands.	Victor Magaña	Mexico	Anthony Chen, Michael Taylor	Jamaica	22,000
Predicting ENSO Effects on Sugar Cane Yields Using a Weather-Generator and Mechanistic Crop Modeling.	Angel Utset	Cuba	Pedro Cisneros, A. Amarakoon	Ecuador, Jamaica	24,600
Impact of Forestry on Uruguayan Grasslands: Changes in Land Use Patterns and Ecosystem Functioning.	José Paruelo	Argentina	Gabriela Eguren, Claudia Rodriguez, Beatriz Costa, Alice Altesor	Uruguay	25,900
Downscaling Activities and their Applications of Studies of Climate Variability and Change in South America.	Carlos Nobre	Brazil	Lelys Bravo de Guenni, Bruno Sansó	Venezuela	15,000
An Inventory of Disasters in Chile, ENSO and Non-ENSO Related: a La Red-Chile Project.	Eduardo Franco	Peru	Alejandro León	Chile	30,000
The Climate Change Effect on the Vegetation Diversity in the Continentals Insular Ecosystems.	Juan Silva	Venezuela	Ricardo Herrera-Peraza	Cuba	28,000
When Oceans Conspire: Examining the Effect of Concurrent SST Anomalies in the Tropical Atlantic and Pacific on Caribbean Rainfall.	Pilar Cornejo de Grunauer	Ecuador	Michael Taylor, Anthony Chen	Jamaica	25,000
Characterization of Stratospheric and Upper Tropospheric Aerosols Over Central and South America.	Pablo O. Canziani	Argentina	Juan Carlos Antuña	Cuba	29,923
Dendrocronological Studies of El Niño Events and Other Climatic Variations.	Brian Luckman	Canada	Rodolfo Rodriguez, Antonio Mabres, Ronald Woodman	Peru	26,600
Mercury in Andean Amazon River Catchments – MAARC Project.	Michael McClain	USA	Oscar Betancourt, Marc Lucotte	Ecuador, Canada	30,000
High Resolution of Numerical Model Application in the Simulation of the Atmosphere Circulation at Regional and Local Scales in the Caribbean Areas.	Victor Magaña	Mexico	Ida Mitrani Arenal	Cuba	16,500

APPENDIX IV: A NEW CYCLE

Projects Funded under the Small Grants Program – SGP I

Title of the Project / Category	PI / Country	Other Countries Participating	Funding in US $
SGP-003 - Biophysical Modeling of the Northern Humboldt Current System. Category: Workshop	Avijit Gangopadhyay USA	USA, Chile and Peru	10,000
SGP-004 - Climate and Land Use Controls on Ecosystem Functioning: Understanding Processes and Developing Tools for a Sustainable Use of Temperate Ecosystems. Category: Research	Esteban Jobbagy ARGENTINA	Argentina, Uruguay and USA	29,820
SGP-005 - Connecting Satellites to the Human and Ecological Dimensions: Sustaining Tropical Forests for the Future. Category: Research	Arturo Sanchez CANADA	Canada, Costa Rica and Mexico	28,360
SGP-007 - Carbon Sequestration Monitoring in Rubber-Tree Plantations. Category: Research	Claudia Wagner-Riddle CANADA	Canada, Brazil and USA	29,980
SGP-008 - Dendroecology as a Tool for Assessing Past Land-Use in Arid Zones: Wood Structure Modifications and Associated Hydraulic Changes on a Patagonian Shrub Caused by Site Grazing. Category: Research	Roberto J. Fernandez ARGENTINA	Argentina, Chile and USA	29,900
SGP-014 - The Development of an Inter-American Network for the Characterization of Atmospheric Chemistry and a Sustainable Future. Category: Workshop	Jose L. Moran Lopez MEXICO	Mexico, Brazil and USA	9,992
SGP-015 - Adapting to Market Shocks and Climatic Variability in Mesoamerica: the Coffee in Mexico, Guatemala, and Honduras. Category: Research	Edwin Castellanos GUATEMALA	Guatemala, Mexico, USA	29,990
SGP-016 - An Inter-American Comparison of the Genetic Erosion of Key Species in Overgrazed Semiarid Rangelands. Category: Research	J.T. Arrdondo Moreno MEXICO	Mexico, USA and Argentina	29,958
SGP-020 - College in Modelling Soil-Water-Atmosphere-Systems. Category: Workshop	Maria Elena Ruiz CUBA	Latin America	10,000
SGP-023 - The Human Dimensions of Biodiversity Conservation and Sustainable Use of Marine Resources: an Integrated Assessment of Lessons from Three Co-Management Initiatives in the Americas. Category: Technical	Marcela Vasquez-Leon USA	USA, Brazil and Mexico	15,000
SGP-024 - Inter-Hemispheric Comparative Studies of ENSO Effects in Kelp Populations: Inhibition and Facilitation Mechanisms Determining Restoration After Massive Mortality Events. Category: Research	Enrique Martinez CHILE	Chile, Mexico and USA	30,000
SGP-027 - Soil Moisture Variability in the Rio de La Plata Basin: Assessments of the Impact of its Variability and Forecast Applications for End Users. Category: Workshop	Ricardo Romero URUGUAY	Uruguay, Argentina, Brazil, and USA	10,000
SGP-030 – Dendrochronology Records and Impact on Rural Populations of the North coast of Peru related to “El Niño”. Category: Research	Rodolfo Rodríguez PERU	Peru, Canada, Chile and USA	30,000
SGP-031 - Modeling How Land Use Change Affects the Nutrient Budget in the Guayas Watershed: Ecological and Economic Implications. Category: Research	Charles Hall USA	USA, Chile, Ecuador and The Netherlands	30,000
SGP-035 - Promoting Public Health Assessment in Energy and Environmental Planning. Category: Research	Luis Cifuentes CHILE	Chile, Argentina, Brazil and USA	30,000

SGP-037 – Development of Complex Indicators for the Evaluation Modeling and Forecasting of Climate Change and Variability on Human Health. Category: Research	Paulo L. Ortiz Bulto CUBA	Cuba, Bolivia and Brazil	30,000

Second Round of the IAI Projects Funded under the Small Grants Program – SGP II

Title of the Project	PI	PI Country	Other Countries	Cat.*
The Impact of Global Changes on Sea Grasses along the Americas	Evamaria Koch	USA	Mexico, Brazil	Res
Inter-American Nitrogen Network	Robert W. Howarth	USA	Argentina, Brazil, Canada, Chile, Mexico, Venezuela	WS
Airborne Transport of Aerosols into the South Atlantic Ocean Assessment of Sources, Horizontal Fluxes, Iron Fertilizing Potential and Impact on Climate.	Diego Gaiero	Argentina	Brazil, USA	Res
The Effects of Increasing Urbanization and Agricultural Intensification on Land Cover and Carbon Budgets in Subtropical America.	Ricardo Grau	Argentina	Dominican Republic, USA	Res
Understanding the Ecological, Biophysical and Human Dimensions of Tropical Dry Forests: A Regional Workshop.	Arturo Sanchez Azofeifa	Canada	Costa Rica, Cuba, Mexico, Panama, USA, Venezuela	TR
Coastal Ecosystems of the South American Region (CESAR): An Integrated Satellite Data Management and Distribution System.	Osvaldo Ulba	Chile	Argentina, Brazil, Canada USA, Venezuela	Res
Can Cities Reduce Global Warming? Urban Development and the Carbon Cycle in Latin America.	Patricia Romero Lankao	Mexico	Argentina, Chile	WS
Assessing the Resilience and Dynamics of Coral Reef Populations: a Workshop for Targeted Research on Recruitment Dynamics of Mesoamerican Reef Species.	Peter F. Sale	Canada	Mexico, USA	WS
Food Web Structure in two Coastal Lagoons of the Southern Atlantic Ocean: a Comparative and Using Stable Isotopes Ratios.	Daniel Conde	Uruguay	Brazil, Chile	Res
Effects of Bamboo on the Diversity, Productivity, and Stability of Amazonian and Atlantic Forests.	N. Michele Holbrook	USA	Argentina, Brazil, Colombia, Peru	WS
Urban Mobile Emissions in South American Mega Cities (UMESAM).	Laura Gallardo Klenner	Chile	Argentina, Brazil, Colombia, Peru, USA	Res
Trends In the Hydrologic Cycle of the Plata Basin: Raising Awareness and New Tools for Water Management.	Vicente Ricardo Barros	Argentina	Brazil, Paraguay, USA, Uruguay	TR
Development of Climate-Sensitive Tree-Ring Chronologies of Araucaria Angustifolia in Southeastern South America.	Fidel A. Roig	Argentina	Brazil, Canada	Res
Persistent Toxic Substance fate along Latitudinal and Vertical Gradients in the Americas.	Frank Wania	Canada	Brazil, Chile, Costa Rica, USA	WS
Improving Climatic Risk Management for Dry Land Cropping in two Regions of South America – A Regional Workshop to Prepare a Research Proposal.	Agustin Gimenez	Uruguay	Argentina, Bolivia, Brazil, Paraguay	WS
Initiating an ARGO Program in the Colombian and Mexican Pacific.	Armando Trasviña	Mexico	Colombia, USA	Res
Paleo-Reconstruction of Population Dynamics of Anchovy Sardine Off the Peruvian / Northern Chilean Coast Related to Climate Shifts During the Last 200 Years.	Dimitri Gutierrez Aguilar	Peru	Chile, Mexico, USA	Res

Evaluation of Paleo-Hurricanes in the Intra-Americas Sea (IAS): A Reconstruction and Analysis Based on Proxy Records.	Jorge Sanches-Sesma	Mexico	Costa Rica, USA	Res
A Re-Analysis of Atlantic Basin Tropical Cyclone Database (with an Emphasis on Cuban and Mexican Land Falling Hurricanes) and an Update of the Estimation of Risk from Extreme Winds, Waves and Rainfall.	Christopher W. Landsea	USA	Costa Rica, Cuba, Mexico	Res
The Human Dimensions of Global Environmental Change in Urban Areas of Latin America. A Network Approach.	Roberto Sanchez	USA	Argentina, Brazil, Cuba, Mexico	WS
Environmental Changes in South America in the Last 10k Years: Atlantic and Pacific Controls and Biogeophysical Effects.	Pedro Silva Dias	Brazil	Argentina, Chile, Peru, Venezuela	TR
Land-Ocean Interactions in the Caribbean: Formulating a Research Agenda to Support Regional Integrated Watershed and Marine Ecosystem Management.	Michael McClain	USA	Costa Rica, Cuba, Dominican Republic, Guatemala, Jamaica, Mexico, Panama, Venezuela	WS

*Res = Research; WS = Workshop; TR = Technical Report

SUBJECT INDEX