

The IAI Scientific Agenda

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THE IAI SCIENTIFIC AGENDA

The primary objective of the IAI is to encourage scientific research beyond the scope of national programs by advancing comparative and focused studies based on global change issues important to the region as a whole. Our mission is to develop the capacity of understanding the integrated impact of global change on regional and continental environments in the Americas and to promote collaborative research and informed action at all levels for the benefit of society and the environment. In its approach, the IAI pursues the principles of scientific excellence, international cooperation and the full and open exchange of scientific information relevant to Global Environmental Change (GEC). Our vision, therefore, is to encourage and support the joint collaboration of scientists, stakeholders, and decision makers of the Americas to address and communicate critical issues associated with GEC.

The term global change is used to refer to the interactions of biological, chemical, physical and social processes that regulate changes in the functioning of the Earth system, including the particular ways in which these changes are influenced by and impact on human activities

The Agreement establishing the IAI stated that the Scientific Agenda should be dynamic and should evolve to permanently incorporate new scientific priorities and to address changes based on the needs of the region's countries. At present, four broadly defined research foci have been identified by the IAI. These are:

I - Understanding Climate Change and Variability in the Americas

The focus of this theme is to monitor, document, understand the causes associated with climate variability and climate change in the Americas and their links to changes in natural systems and societal impacts with a view to provide better information for decision-making processes.

The goals are to understand the role of the ocean-land-atmosphere interactions in the climate system, to determine the key processes that cause climatic variability, from sub-seasonal to decadal time scales, and to apply the insight gained by these findings to improve weather and climate predictions and to reduce the uncertainties related to climate change projections and their impacts.

Topics included in this area:

- Tropical Atlantic Variability (TAV), El Niño-Southern Oscillation (ENSO) and other forms of low-frequency climate variability, such as decadal variations (Atlantic Multidecadal Oscillation (AMO), Pacific Decadal Oscillation (PDO)) .
- Short- and long-term ocean variability, including abrupt climate change, and its influence on climate and weather of the surrounding continents.
- Variability of the American Monsoon systems.
- Ocean/land/atmosphere interactions and hydrology, including atmospheric mesoscale processes.

- Global and regional changes in the water cycle.
- Aerosol impact on climate change and variability.
- Climate change at regional scales: regional forcing mechanisms, model intercomparisons (statistical and dynamical downscaling models), future scenarios, extreme events, impacts, vulnerability and adaptation.
- Environmental changes in the past.
- Development of the Americas component for a Global Observing System for climate.

AI Studies of Ecosystem, Biodiversity, Land Use and Cover, and Water Resources in the Americas

The IAI encourages comparative and integrated analyses of the effects of Global Environmental Change on natural and anthropogenic systems and processes among tropical, temperate and cold latitude systems. Sponsored work should increase our knowledge of the drivers and dynamics of variability, and the impacts of such variability on food security, biodiversity and the provision of ecological goods and services. Research is expected to include work in terrestrial, coastal and oceanic environments; and work that integrates across the land/sea interface will be promoted.

Topics included in this area:

- Impacts of global change on biodiversity, including species and genetic biodiversity--both of natural systems and agricultural systems.
- Comparative studies of resilience of ecosystems, key species, and important agricultural systems to global change.
- Comparative studies of changes in land use and/or coastal/marine/freshwater resource use.
- Prediction and documentation of estuarine changes due to changes in freshwater inflows as well as changes in watershed land use and cover.
- Climate and habitat change impacts on species across the Americas.

III - Understanding Global Change Modulations of the Composition of the Atmosphere, Oceans and Fresh Waters

The focus of this theme is on observing, 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. A multidisciplinary approach to this research area is expected.

Topics included in this area:

- Effects of air pollution and rain water quality on ecosystems.
- Impact of mega-cities on regional climate.
- Regional and global air pollution: Transport and impacts.
- High latitude processes and ozone depletion.
- Comparative studies of regional air and water pollution.
- Biogeochemical processes (including the carbon cycle) and ecosystem hydrology.
- Greenhouse gases, atmospheric and terrestrial processes, including the carbon cycle, and their impact on climate change.
- Coastal processes and water pollution.

IV - Understanding the Human Dimensions and Policy Implications of Global Change, Climate Variability and Land Use

The focus of this theme is to research the dynamic interaction of global change, climate variability and land use -- their impact on human health, welfare and activities which depend on the productivity, diversity and functioning of ecosystems, including regions particularly vulnerable to rapid

warming, such as cold regions. The emphasis of the research is on projects that address the complex interactions between natural and socio-economic systems through interdisciplinary approaches. The objective is to inform public policies that improve sustainability of natural and agricultural systems and ensure human welfare.

Topics included in the area:

- Health and environmental issues with emphasis on vector-borne diseases.
- Increased vulnerability of human settlements due to global change, climate variability, and land use.
- Sustainability of natural and human systems in rapid urbanizations.
- Changes in food systems; potential actions for increasing food security and nutrition.
- Global environmental and economic change and biodiversity; implications for conservation strategies.
- Effects of GEC, climate variability and land use on natural disaster occurrences, mitigation strategies, and policies that limit loss of life and property.
- Impact of GEC and climate variability on fisheries and fishers; strategies for limiting socio-economic impacts.
- Identification of factors that contribute to resilience of natural ecosystems; conservation strategies to promote resilience.
- Effects of GEC, climate variability and land use on water supply, freshwater flows, and security of water for human uses.
- Participatory environmental decision-making.