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How to improve  
the  
**dialogue**  
between  
**science**  
and  
**society**  
THE CASE OF  
**Global Environmental Change**



The Inter-American Institute for Global Change Research

# The challenge of global environmental change

Global environmental change, which includes climate change, stratospheric ozone depletion, loss of biodiversity, changes in hydrological processes and the supply of freshwater, land degradation and stresses on food-producing systems significantly affects human health and well-being. Governments are recognizing that natural resources are not inexhaustible and that the environment can no longer provide a reliable base for development if we continue to operate in a 'business-as-usual' mode.

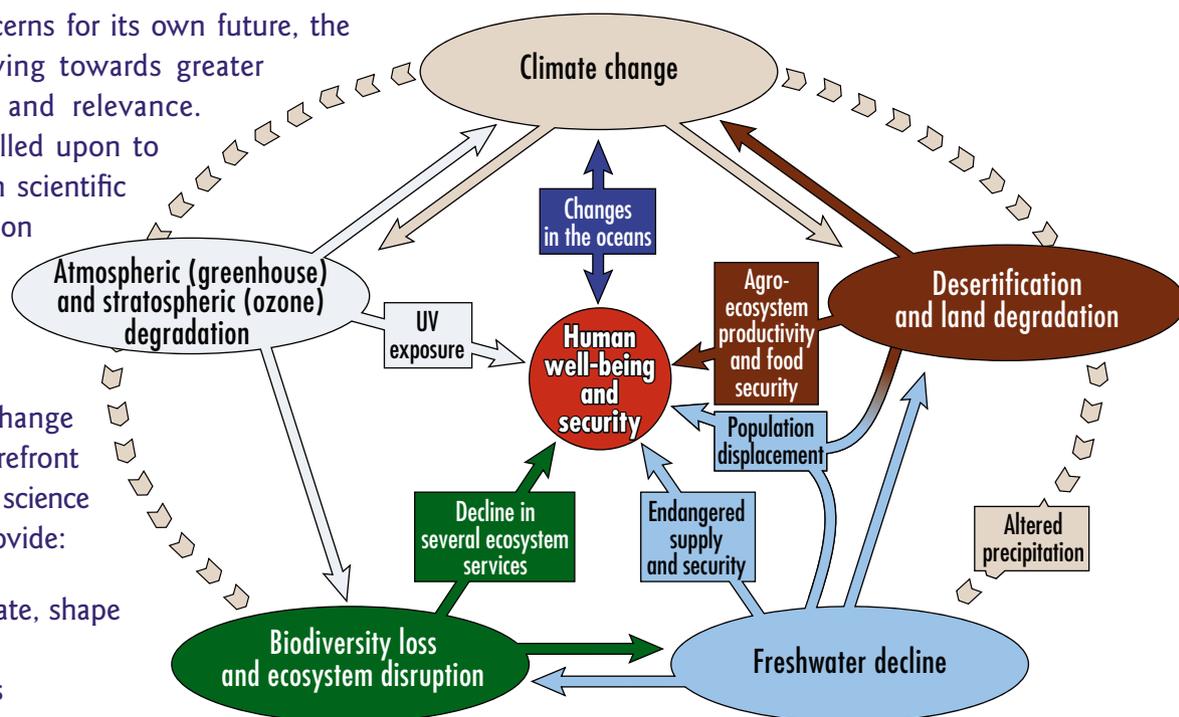
Driven by society's concerns for its own future, the role of science is evolving towards greater societal accountability and relevance. Policy is increasingly called upon to use knowledge based on scientific analyses and to take action to mitigate, regulate and adapt to global environmental change.

Global environmental change (GEC) science is at the forefront of the current evolution of science because it is asked to provide:

1. predictions on the rate, shape and extent of GEC,
2. support to decisions on mitigation options, and
3. guidance for adaptation to GEC.

Science, including GEC science, although responsive to policy, should be ahead of and guide society's demands and should not be driven only by public agendas.

It is critical to construct the dialogue between science, policy and society in order to provide educated and effective responses to GEC. An analysis and understanding of the science-policy interface is needed to guide this process.



Adapted from <http://www.who.int/globalchange> (courtesy of World Health Organization).

## The Inter-American Institute for Global Change Research (IAI)

is an intergovernmental organization in the Americas dedicated to GEC research and its socio-economic implications. The IAI fosters research beyond the scope of national programmes in order to increase the scientific capacity of the region and inform and advise policy.

It supports research through multinational collaborative research networks (CRNs), involving over 450 scientists in 19 countries of the Americas. This policy brief builds upon a range of forward-looking lessons that have emerged from the IAI-SCOPE analysis of GEC science-policy dialogue in the Americas.

# Science-Policy *dialogue*

## ACTORS

### The politicians

US President Herbert Hoover candidly recognized in his **1952** memoirs that a great silencer for the foolishness of an over-zealous decision-maker is to place him or her on "a research committee with a few persons who have a passion for truth... I can now disclose the secret that I created a dozen committees for that precise purpose".

## ACTORS

### The scientists

Francis M. Cornford, a Professor of Classics in Cambridge, wrote in **1908** in his *Microcosmographia Academica*: "You think (do you not?) that you have only to state a reasonable case, and people must listen to reason and act upon at once. It is just this conviction that makes you so unpleasant. There is little hope of dissuading you; but has it occurred to you that nothing is ever done until every one is convinced that it ought to be done, and has been convinced for so long that it is now time to do something else?" Against this unpleasant conviction, how does global change science move towards persuasion?

## INTERACTION

The first recorded environmental commission, a royal air pollution commission, was set-up in **1285** and deliberated for 21 years.

Its recommendation to ban coal burning in London was permanently implemented in **1956**, following the Great Smog of 1952.



## *Improving the interaction*

Attitudes and timing must change if rapid global change is to be addressed through an effective combination of scientific knowledge, public concern and political will.

# Moving towards policy-relevant science

Lessons learned from

## IAI-SCOPE Assessment of GEC Science-Policy Dialogue in the Americas

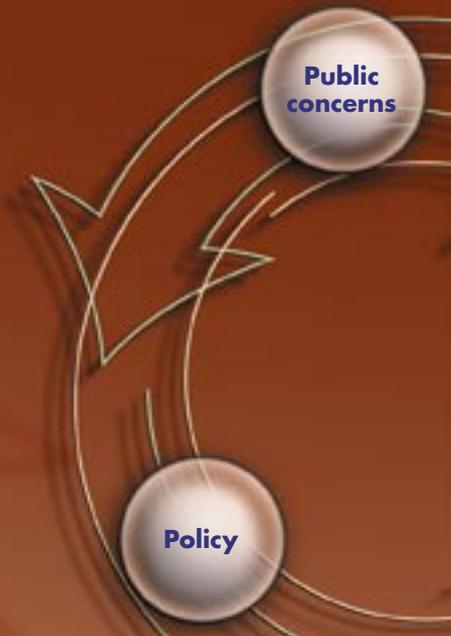
Ten years of the IAI research, cooperation and networking experience were analyzed by the Scientific Committee on Problems of the Environment (SCOPE) and the IAI with the aim to assess the GEC science-policy dialogue in the Americas. For the analysis, international experts on scientific and legal aspects of GEC, including representatives from government and industry, were invited to develop background chapters on the following aspects of the GEC science-policy interface:

- Interdisciplinarity (social/natural sciences)
- Societal vulnerability
- Communicating GEC science
- Institutions as initiators and users of GEC science
- International conventions as legal frameworks in which GEC science operates.

Investigators from IAI CRNs provided case studies on climate change, land use, ecosystem assessments, biodiversity and human well-being, focusing on the projects' potential or real links to policy and society.

At a workshop held in Ubatuba, Brazil in December 2005, four chapters of a report to be published by SCOPE and IAI were developed to integrate the background chapters and the case studies. The following overarching issues were addressed:

- Steering research towards policy relevance
- Stakeholders and GEC science
- Delivering GEC science to the policy process
- Communicating science to the media, decision-makers and the public.



## The Main Challenges to Policy and Development:

### Making Scientifically Informed Decisions

Effective policy response to GEC requires the integration of political with scientific and technical considerations.

**The reality of GEC obliges society** to question the concepts of development and economic growth. *Development of what? For whom? At what cost? At what pace and for how long?*

**Legitimacy of GEC policies** is founded on the need to harmonize development with the capacity of life-support systems to support present and future societies' needs. Thus legitimacy is founded on understanding and knowledge, and making decisions becomes a continuous learning process closely linked to science.

**Early engagement of scientists and policy-makers**, from the initial framing of the research questions, promotes this learning process by building trust in both the science and policy process.

**Changes in scientific or academic reward systems** and funding mechanisms are needed to encourage policy engagement and interdisciplinarity and catalyze science-policy interactions.

**Resource and land users** typically have time horizons well beyond the duration of research projects or legislative periods. 'Policy' should create an enabling environment that links these different time scales.

# ence for scientifically-informed policy

the IAI experience

The IAI analysis identified the following issues needed to construct a cycle of policy-relevant science to guide scientifically-informed policy:

**How social concerns** are incorporated into the agenda of public decisions based on knowledge generated by scientific research;

**How policies** are changed to effectively integrate scientific knowledge into concrete actions;

**How actual results** of policies change the scientific agenda by identifying knowledge gaps which call for further research.

Scientific knowledge

## The Main Challenges to Science:

### Achieving Societal and Policy Relevance

Societal and policy relevance of science is determined by attributes that should be learned through a dialogue between science, society and policy sectors.

**GEC science transformation** towards greater societal and policy relevance does not happen in a linear or planned process. Much of the current transformation takes place randomly as scientists and research institutions react to changes in science funding, societal attitudes and policies.

**Credibility, Practicality, Usefulness, Accessibility** and **Acceptability** are the main attributes of research that go beyond conventional measures of scientific quality and determine societal and policy relevance of GEC science.

**While scientific credibility** is based on peer-review, societal credibility is commonly based on trust. Developing trust depends on the policy process, on sharing scientific messages in understandable, non-ambiguous and unbiased terms and on responding to new needs as policy and society evolve.

**Integration** of scientific excellence, multinational and multi-disciplinary cooperation and capacity-building generates an environment in which policy relevance is developed.

**Policy relevance** is further promoted by the exposure of researchers to societal needs as they work across cultures and perceptions in international research.

### Achieving policy relevance of science

#### Establishing and maintaining credibility

- Building and maintaining trust and credibility between all partners is needed from the outset.
- Trust is fragile and when lost, recovery may be difficult.
- Long-term, stable and adequate science funding enhances credibility.
- Involving potential users is advantageous.

#### Ensuring acceptability

- Facilitating the understanding of uncertainty and/or dealing with natural variability.
- Mediating through actors with long-term involvement with policy-makers.
- Developing Decision Support Systems targeting immediate policy and operational use.
- Using pilot studies to demonstrate the usefulness of scientific knowledge.
- Publishing in high visibility journals.

#### Achieving practicality

- Continuing commitment, being flexible and able to respond quickly.
- Being open to possibilities beyond initial objectives to meet new needs as policy evolves.
- Recognizing social, political and economic contexts in research planning.
- Involving social scientists.

#### Demonstrating utility

- In influencing policy, 'good science' is not enough.
- The potential relevance of scientific output may not be immediately recognized by users.
- Fundamental research and monitoring can have long-term relevance for policy formulation.
- Basic research output is unlikely to fit the needs of the policy process.

#### Providing accessibility

- Communication with the user either directly or indirectly in understandable terms is critical.
- Developing a common language to communicate with users is a learning process.
- Using empirical observations as examples for explanation.
- Using appropriate and possibly novel formats to communicate science findings.

# Linking GEC SCIENCE to SOCIETY

**Understanding global environmental change** must be broad, multinational and multidisciplinary and must include the building of capacity to enhance future understanding.

**Evaluating GEC knowledge** needs continuous re-adjustments and dialogue to avoid mismatches between the mutual expectations of all concerned stakeholders. It requires diverse mechanisms for their engagement and often involvement of mediators such as non-governmental and intergovernmental organizations.

**Valuing scientific information** involves public perceptions and values, and discussion of global change themes such as risk and vulnerability, land use change, biodiversity, the environment and human well-being. This relies on advocacy, including by scientists. Yet, when scientists become advocates they must be careful not to sacrifice scientific credibility.

**Deciding and acting** translates knowledge and will into actions such as mitigation, regulation or adaptation. Reacting to new information and demanding new information closes the science-policy cycle, re-engaging science in the policy demands and societal concerns.

**Funding agencies** have a major role to play in this cycle by translating policy and placing research into a societal context.

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## Readings

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*Stern Review: the Economics of Climate Change*: [www.hm-treasury.gov.uk/independent\\_reviews/independent\\_reviews\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/independent_reviews_index.cfm)

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*Declaration on science and the use of scientific knowledge*: [http://www.unesco.org/science/wcs/eng/declaration\\_e.htm](http://www.unesco.org/science/wcs/eng/declaration_e.htm)  
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## Useful links

SCOPE-Scientific Committee on Problems of the Environment: <http://www.icsu-scope.org>  
UNESCO and Climate change: <http://ioc3.unesco.org/unesco-climate/index.html>  
Ethics of Science and Technology: [www.unesco.org/shs/est](http://www.unesco.org/shs/est)  
Biodiversity science and policy activities at UNESCO: <http://www.unesco.org/mab/biodiv/biodivSC.shtml>  
Inter-American Institute for Global Change Research, IAI: [www.iai.int](http://www.iai.int)  
Island Press: <http://www.islandpress.org>  
Asia-Pacific Network for Global Change Research, APN: [www.apn-gcr.org](http://www.apn-gcr.org)  
Earth System Science Partnership, ESSP: [www.essp.org](http://www.essp.org)  
DIVERSITAS: [www.diversitas-international.org](http://www.diversitas-international.org)  
International Geosphere-Biosphere Programme, IGBP: [www.igbp.kva.se](http://www.igbp.kva.se)  
International Human Dimensions Programme, IHDP: [www.ihdp.org](http://www.ihdp.org)  
World Climate Research Programme, WCRP: [www.wmo.int/web/wcrp](http://www.wmo.int/web/wcrp)