International Group of Funding Agencies for Global Change Research

Meeting Report No. 17

Holiday Inn Select
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Appendices

CD with Power Point Presentations and Various Documents

This Meeting Report includes a CD with additional information, such as the power point presentations given at the IGFA Annual Meeting 2005, an address list with members and associates and other information. The list of documents available on the CD can be found in Appendix 1.

ABBREVIATIONS

International Global Change Research Programmes and Regional Networks

WCRP World Climate Research Programme
IGBP International Geosphere-Biosphere Programme
DIVERSITAS International Program on Biodiversity Science
IHDP International Human Dimensions Programme on Global Environmental Change
ESSP Earth System Science Partnership (The cooperation between the above four programmes)
START Global Change System for Analysis, Research and Training
APN Asia-Pacific Network for Global Change Research
IAI Inter-American Institute for Global Change Research

Most Commonly Used Abbreviations for IGFA Organizations

EC European Commission
Formas The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
NERC Natural Environment Research Council (UK)
NRF National Research Foundation (South Africa)
NSF National Science Foundation (U.S.A.)
NWO The Netherlands Organization for Scientific Research
Rannis Icelandic Centre for Research
USCCSP United States Climate Change Science Program

Other Common Abbreviations

EOS Earth Observation Summit
ESF European Science Foundation
GEC Global Environmental Change
GCR Global Change Research
GEO Group on Earth Observations
GEOSS Global Earth Observing System of Systems
IOC International Oceanographic Commission
ICSU International Council for Science
IGOS-P Integrated Global Observing Strategy - Partners
IPO International Project Office
IPY International Polar Year
NEPAD New Partnership for Africa's Development
TWAS Third World Academy of Sciences
WMO World Meteorological Organization
WSSD World Summit on Sustainable Development, Johannesburg 2002

EXECUTIVE SUMMARY

The IGFA Annual Meeting 2005 took place at the Holiday Inn Select in Alexandria, Virginia, USA, 26-28 October. IGFA members from 18 different countries representing even more funding agencies contributed to the meeting. The International Council for Science (ICSU), the International Global Change Research Programmes, the Earth System Science Partnership (ESSP), the regional Global Change Research networks, the SysTem for Analysis Research and Training (START), and several invited speakers also contributed to the proceedings. The present report is a summary of the meeting and is accompanied by a compact disc that contains many of the presentations given at the meeting as well as other material.

Program Presentations and Regional Networks

Dawn Conway, Executive Director of the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) chaired the session on program and regional network presentations.

Presentations were given by Professor Thomas Rosswall, the Executive Director of ICSU, Dr. Valerie Detemmerman, Senior Scientific Officer at the Joint Planning Staff for WCRP, Dr. Kevin Noone, Executive Director of the IGBP, Dr. Oran Young, the incoming IHDP Steering Committee Chair, Dr. Anne Larigauderie, the executive director of DIVERSITAS, Mr. Martin Rice, the new ESSP coordinator, Mr. Hiroki Hashizume, the Director of the APN, Dr. Holm Thiessen, the Executive Director of the IAI, and Dr. Roland Fuchs, Director of the International START secretariat. Presenters described the recent activities of their organizations, important changes, large planning activities, and future plans.

The program reports, in addition to providing insights regarding the activities of the individual programs, also demonstrated an increased level of planning and coordination within and between all of the programs. Funding, particularly sustained funding, and increasing the number of donors to the programs was also discussed. A strong interest to improve and expand communication with the programs was expressed by the programs.

Symposium- Global Environmental Change Research and Development

Margaret Leinen of NSF chaired this session in which the connections between global environmental change research and development are connected to each other.

The invited speakers for this session were Dr. Robert Watson, World Bank, Mr. William (Bill) Breed, USAID Team Leader for Global Environmental Change, Dr. Marta Cehelsky, Inter-American Development Bank (IDB), Dr. Michael McClain, Florida International University, Dr. Neil Leary, START, and Dr. Renee van Kessel-Hagestejn, Netherlands Organization for Scientific Research (NWO).

Speakers in this session presented a broad range of perspectives ranging from donors to researchers. The session closed with a variety of options for IGFA's consideration of future action. Dr. Watson, Mr. Breed and Dr. Cehelsky presented a variety of donor perspectives on connections between global environmental change and development. Drs. McClain and Leary presented their experiences and perspectives from research. Dr van Kessel-Hagestejn provided a variety of possible paths forward for IGFA to consider in further discussions and cooperation with AID agencies.

Updates from Member Organizations

Hans de Boois of NWO chaired this session in which IGFA members reported on organizational and national funding

of global change research, connections with development agencies, and connections with policy.

IGFA member organizations reported that funding for global environmental change research was either stable or slightly increasing, though several members reported substantial increases. Several members noted new research programs related to sustainability science and sustainable development. Earth Observations as well as plans and preparations for the International Polar Year also figured prominently in member reports. Members reported that communication between agencies and ministries that fund global environmental change research and development agencies exists or is gaining new attention. Several also reported that global environmental change and development agencies have long-standing histories of communication as well as financial cooperation in specific areas. Many agencies reported that global environmental change is receiving increased, high-level attention in their country. Members reported on a range of approaches for engaging policy makers and decision makers from direct-engagement to producing policy-relevant science in the absence of direct communication.

Reports Session

Han de Boois of NWO chaired this session in which reports were given on priority activities of interest to IGFA

Mountain Research Initiative (MRI)

Drs. Raymond Bradley, MRI Science Advisory Board and Gregory Greenwood, MRI Executive Director presented the program to IGFA members. MRI is a joint IHDP and IGBP network that is funded by the Swiss National Science Foundation, though the program is global in scope. The goal of MRI is to study global change in the mountain regions of the world. The presentation described the MRI and reviewed the importance of mountain regions in global change research. The presentation also discussed key scientific questions regarding global change in mountain regions.

European Research Area (ERAnet) for Global Change Research/IGFA Europe

Hans de Boois described a proposal for a new European Research Area network designed to foster better collaboration between European countries on Earth System Science. Dr. de Boois updated IGFA members on the status of the proposal and explained the objectives of the proposed network.

Global Earth Observing System of Systems (GEOSS) and the Integrated Global Observing Strategy Partnership (IGOS-P)

Thomas Spence of the National Science Foundation gave a presentation that updated IGFA members on the status and plans of the Global Earth Observing Strategy Partnership (IGOS-P). The presentation also discussed a variety of different ways in which IGFA could remain engaged with both organizations.

International Polar Year (IPY)

Dr. Rosswall of ICSU, the co-sponsor with the World Meteorological Organization (WMO) responsible for planning and coordination of International Polar Year activities provided IGFA members with updated information on plans and preparations for the international polar year.

Africaness

Dr. Anthony Nyong of the University of Jos, Nigeria, reported to IGFA on the Africaness Workshop. The Workshop

was motivated by a number of factors. First, it is recognized that Africa lacks long-term, stable, intergovernmental support for global environmental change research and related capacity building. Dr. Nyong reported on the outcomes of the workshop and recent actions toward the establishment of an African Global Change Research Network.

IGFA, Global Change Research (GCR) and Research for Development (RFD) issues

The session began with an overview of the Krusenberg Workshop "*The Interface Between Global Change and Development-Oriented Research*" and its main conclusions. Ms Sara Farley of the World Bank and Rockerfeller Foundation gave a presentation entitled "*Global Change for Development*" that summarized a potential path forward for cooperation between global change and development agencies. The Krusenberg summary and the presentation motivated a lively discussion that ended in the decision by IGFA members to continue pursuit of cooperation with development agencies.

The Future Role of the IGFA with the Research Programs

Kirsten Broch Mathisen opened the session with a brief history of IGFA. When it was established in 1990, IGFA's primary goal was improved international coordination of funding for the WCRP and IGBP. Since that time, IGFA has focused on several major issues. The discussion eventually turned to a letter that Margaret Leinen sent to the Executive Directors of the International Global Change Research Programmes regarding their governance and management in the context of the funding environment prior to the meeting. The letter focused on cooperation and planning in the current fiscal environment with regard to international project offices (ipo's), Open Science Conferences (OSC's), and the regular review of the programs.

The session continued with a report from Dawn Conway, who presented the outcomes of the first brainstorming session, in which the Executive Directors of the programs, START, ICSU, and the IGFA Steering Committee and Staff Group participated. The brainstorming session was intended to address the issues raised in the Chair's letter.

A lively discussion continued around all of these issues that ultimately concluded in commitment to communicate and work together to address these mutually critical and complex issues.

Closed IGFA Member Session

In this abbreviated session, the primary business was the election of two Steering Committee members. IGFA members supported the nomination of Irene Gabriel of Austria and Andres-Flores Montalvo of Mexico to serve in those positions.

SESSION REPORTS

PROGRAM PRESENTATIONS AND REGIONAL NETWORKS

In this session, representatives from the International Council for Science, the international global change research programs (WCRP, IGBP, IHDP, DIVERSITAS, ESSP), and the regional global change research programs (START, IAI, APN) gave presentations (all presentations are available on the CD-Rom attached to this report) updating IGFA members on their programs, recent changes, important new initiatives, and future activities. Comments, questions, and general discussion followed the presentations.

Dawn Conway of the Canadian Foundation for Atmospheric Sciences chaired both sessions of the program presentations. In the first session, Professor Thomas Rosswall provided the report from the International Council for Science (ICSU), Dr. Valerie Detemmerman for the World Climate Research Programme (WCRP), Dr. Kevin Noone for the International Geosphere-Biosphere Programme (IGBP), Dr. Oran Young for the International Human Dimensions Programme (IHDP), and Dr. Anne Larigauderie for DIVERSITAS. In the second session Mr. Martin Rice gave the report for the Earth System Science Partnership (ESSP), Dr. Roland Fuchs for the SysTem for Analysis, Research, and Training (START), Dr. Holm Theissen for the Inter-American Institute for Global Change Research (IAI), and Mr. Hiroki Hashizume for the Asia-Pacific Network for Global Change Research (APN).

The International Council for Science (ICSU)

The Executive Director of ICSU (http://www.icsu.org/index.php), Professor Thomas Rosswall, opened his presentation entitled “ICSU Strategic Plan 2006-2011” with discussion of its background and the planning and development process of the plan. Based on a 1996 ICSU Assessment Panel recommendation, a resolution was taken to “initiate detailed planning of initiatives with wide interest and support from the ICSU community, with special emphasis on areas of societal importance, and to report to the 28th GA.” ICSU conducted extensive foresight analysis and Priority Area Assessments and produced numerous reports in order to develop its strategy, described in its 2005 Strategic Plan.

The Plan gives detailed information about the Vision and Mission of ICSU, international research collaboration, science for policy and the universality of science and includes an emphasis on strengthening links with funding agencies and review of all of the international global change research programs. Other international research collaboration items include:

- Strengthening involvement of social, health and engineering sciences
- Strengthening links research-monitoring-assessment-policy
- The International Polar Year 2007-2008
- Natural and Human-Induced Environmental Hazards and Disasters
- Millennium Ecosystem Assessment follow-up
- Science for Sustainable Development
- International Science Panel on Renewable Energy

Professor Rosswall indicated that international research coordination only requires approximately 0.5-1.0% of research budgets and that there are only a few funding agencies that are National members of ICSU. As a result, strengthened communication and cooperation between ICSU and national funding agencies is essential in order to ensure a match between planning and funding of international research.

Professor Rosswall ended his remarks by describing some of ICSU’s near-term goals. These include to involve funding agencies in the early planning of international programs, to encourage strengthening of IGFA, to work with

funding agencies in foresight studies, create a dialogue with funding agencies as well as bilateral and multi-lateral donors, Millennium Development Goals, the OECD ministerial statement, the UN Commission on Sustainable Development and a possible World Summit on Sustainable Development +5, and the Global Earth Observing System of Systems (GEOSS).

World Climate Research Programme (WCRP)

Dr. Valerie Detemmerman, Senior Scientific Officer at the Joint Planning Staff for WCRP (http://www.wmo.ch/web/wcrp/wcrp-home.html), began her remarks by noting that 2005 marks the 25th anniversary of the WCRP. She launched her presentation by providing a vision for the WCRP over the next 25 years: dynamic, integrative, and relevant in its scientific activities. She provided an update on the implementation of the Coordinated Observation and Prediction of the Earth System (COPES) strategy by describing several areas of emphasis in the near-term including: seasonal prediction, sea level, monsoons, climate and chemistry, and modeling. The four current core projects of the WCRP were described as well as other high priority activities including the seasonal prediction task force, a sea-level workshop, and WCRP Monsoon workshop.

The presentation detailed the WCRP's efforts in high-resolution Earth system modeling and seamless prediction. Also described were efforts to include WCRP priorities related to the Coordinated Observation Strategy in the GEO Work Plan, responding to the Global Climate Observing System (GCOS) IP, coordinate renalayses, global data set reprocessing, developing and maintaining strong links with the Coordinated Enhanced Observation Strategy (CEOS), and WCRP data management. The presentation ended with a discussion of resources for the WCRP that provided IGFA members with some perspective on its financial situation.

International Geosphere-Biosphere Programme (IGBP)

Dr. Kevin Noone, Executive Director of the IGBP (http://www.igbp.kva.se) gave a presentation that described the philosophical approach, the vision and goal of the IGBP and how it is implemented and integrated with other international efforts, described the various products of the IGBP, and its core projects.

The presentation began with a description of Earth Sciences and how, for practical purposes, our approach to understanding the Earth system has been to cut the Earth into very small pieces and further divide those pieces with studies from different disciplines. Over time, it has increasingly become clear that understanding of the Earth system and its application in such areas as sustainable development requires a systemic, integrative approach. IGBP, as it's vision and mission, an integrative approach that is aimed ultimately toward improving the sustainability of the Earth by studying the interactions between biological, physical and chemical processes and human systems. As an integral part of its approach, the IGBP coordinates and collaborates with other research and outreach programs in order to develop and disseminate the knowledge necessary to respond to global change.

Dr. Noone continued by describing the variety of products that have, and continue to be produced by the IGBP including synthesis papers, journal articles, books, science plans, annual reports, newsletters, the IGBP directory and others. Highlighted was the IGBP project and synthesis series and the newest science plans including several new science plans. He also briefly described the variety of services and products available on the web site by way of introducing and briefly describing the current suite of IGBP core and collaborative projects.

The Land-Use and Land Cover Change project reached its sunset date at the end of October 2005 and a "handover" to the Global Land Project took place at the IHDP Open Science Conference in mid-October. The Global Land Project has published its science plan and implementation strategy and interim Co-Chairs and a startup scientific steering committee has also been identified. The Land Ocean Interactions in the Coastal Zone II (LOICZ) project had its inaugural meeting in June of 2005 where its science plan and implementation strategy was distributed. The

International Global Atmospheric Chemistry (IGAC) project will hold a symposium “Atmospheric Chemistry at the Interfaces” in September of 2006 in South Africa. The GLOBEC and IMBER projects will merge in 2010.

International Human Dimensions Programme (IHDP)

Dr. Oran Young, the incoming IHDP (http://www.ihdp.uni-bonn.de/) Steering Committee Chair updated IGFA on the accomplishments, activities and plans of the IHDP. He began by noting the growth to maturity of the IHDP and recent accomplishments with a variety of core project syntheses underway, the success of the Open Science Conference, a strong and engaged steering committee, and the selection of a new Executive Director, Dr. Andreas Rechkemmer.

Dr Young continued by describing the many and growing responsibilities of the IHDP. These include the new core and collaborative projects: Urbanization and Global Environmental Change the Global Land Project (GLP), and LOICZ II. They also include IHDP contributions to and participation in the ESSP as well as development of crosscutting themes. New responsibilities also encompass a variety of capacity building workshops as well as maintaining and continuing to produce a suite of publications and outreach materials.
The comparative advantages of the IHDP’s approach were also described. With its focus on socio-ecological systems, the IHDP develops methods and models for understanding coupled systems and complexity. The approach inherently pools the contributions of multiple disciplines. The IHDP approach also has as it’s foundation, an emphasis on the interplay between the generation of knowledge and translation of knowledge into practical, policy-relevant information.

The presentation shifted to the current funding context. In 2005, the IHDP’s estimated expenditures were $1.9 million dollars, of which approximately $520,000 was administrative costs. The IHDP is currently funded by national contributions from nine countries, whereas the IGBP for example, is funded by 39. National contributions from Germany and the US constitute over 80% of the total funding for the program.

The presentation closed by describing a set of major issues for the IHDP in the coming years. First of those was the development of the Strategic Plan. The challenge of developing a strategic plan would include striking an appropriate balance between core projects, ESSP-related commitments, scientific meeting and networking, capacity building and publications and outreach. Another challenge would be responding to the suggestions of the External Review Committee. Another challenge for the IHDP is securing stable and more diverse funding.

DIVERSITAS

Dr. Anne Larigauderie, the executive director of DIVERSITAS (http://www.diversitas-international.org/) , presented the recent activities, milestones, and plans for the future. She began by describing the mission and goals of the programs. DIVERSITAS is an international program whose objective is the study of biodiversity science. The program is structured to address three fundamental questions: How does biodiversity support life on Earth? What are the impacts of biodiversity changes on ecosystems and humans? How can humans sustaibly use and conserve biodiversity? The program is designed to study biodiversity in an integrative fashion linking biological, ecological, and social science disciplines. Currently, the program has three core projects bioDiscovery that conducts basic biodiversity research, ecoServices that focuses on the impacts of biodiversity changes on ecosystem function and services, and bioSustainability that seeks to develop the science of biodiversity conservation and sustainable use. Next, Dr. Larigauderie described recent accomplishments coupling them with the development of the program and addressed issues related to funding.

The DIVERSITAS programme organized the scientific segment in the recent “Biodiversity: science and governance” conference that took place in Paris, France in January of 2005. This high-level conference had as its core objectives

to contribute to the advancement of global governance on biodiversity, and increase the involvement of scientists, with particular emphasis on those from developing countries, in international scientific programmes. The conference was well attended with other 2000 participants who were from 100 countries with wide representation from different sectors. The major recommendation resulting from this conference was the launch of an international multi-stakeholder consultative process for the study biodiversity science and policy. This recommendation suggests and IPCC-like process for the study and communication of biodiversity science.

The recommendation stated that a new mechanism was needed to provide independent, timely, policy and management relevant scientific information on biodiversity. The recommendation continued to state that all stakeholders must have a sense of ownership in the new mechanism to ensure their engagement and acceptance of findings. The mechanism's purpose would be to address biodiversity science broadly, including ecosystem goods and services. An international steering committee has been formed for the International Mechanism of Scientific Expertise on Biodiversity (IMOSEB) (http://www.imoseb.net/) and the group has held several events at relevant international meetings, including the COP-11, CBD-SBSTTA, and CBD-COP. The Steering Committee is expected to give its final recommendations for the new mechanism in 2006.

Dr. Larigauderie continued her presentation with discussion of the successful 1st DIVERSITAS Open Science Conference in November of 2005. The conference was well attended with 650 registered participants from 60 countries. The conference had as its primary goals to showcase biodiversity science, provide a forum for the DIVERSITAS National Committees to meet and interact, and build international capacity for biodiversity science. The conference themes were strengthening biodiversity science, supporting the science-policy interface, and integrated approaches to specific topics in biodiversity science.

Dr. Lariguaderie closed by briefly addressing issues related to funding for DIVERSITAS. She described the annual budget for 2005 and showed how that budget is generally allocated. She asked the group about strategies for improving and strengthening IGFA support for both DIVERSITAS and IHDP.

Earth System Science Partnership (ESSP)

Martin Rice, the new ESSP (http://www.essp.org/) coordinator gave a presentation about the ESSP that included an up of recent activities, described how the ESSP's activities link the development and global change communities, and gav preview of upcoming events. He first provided a description of the ESSP and its role in international science. The ESSF integrated study of the Earth System, changes to the System and the implications of those changes for global sustaina The ESSP is implemented through a series of core projects, regional activities and global environmental change open science conferences that build capacity and allow for the regular, international exchange of information. The activities a progress of the core projects was described next.

The Global Carbon Project (GCP) (www.globalcarbonproject.org) investigates the geographical patterns and temporal patterns of carbon sources and sinks. It also seeks greater understanding of the controls and feedback mechanisms, both natural and anthropogenic, that determine the dynamics of the carbon cycles on a variety of timescales. Finally, the project will look at the future dynamics of the carbon-climate system in an attempt to provide policy-relevant information regarding points of intervention and windows of opportunity for management of the system. One current area of focus is on drought and the carbon cycle. Current GCP research is investigating the increases in mid-latitude drought frequency and droughts in the Amazon as well as a number of other areas. So far, the GCP has produced several volumes, including a framework document, a document on land-use land cover change and the carbon cycle in the Asia-Pacific region, a synthesis document, and others.

The Global Water System Project (GWSP) (http://www.gwsp.org) investigates the relative magnitudes of changes in the global water system due to human activities and other environmental factors; study of the social and Earth

System feedbacks of human-driven change to the global water system; and, the extent to which the global water system is resilient and adaptable to global change. The GWSP is currently working on a number of efforts including a digital water atlas, co-operation with LOICZ, input to international activities such as NEESPI, a global study of environmental flows and others.

The Global Environmental Change and Food Systems (GECAFS) Project (http://www.gecafs.org) has as its mission "a food-secure future for those most vulnerable to environmental stress." The research of the GECAFS program focuses on a set of three questions: How will global environmental change affect the vulnerability of food systems in different regions; how can adapt food systems to cope with global environmental change and improve food security; and how will the various adaptation options feed back on environmental and socioeconomic conditions?

Mr Rice also described how the ESSP and its core projects are working with the START programme on regional networking, capacity building. With the START programme, the ESSP is also conducting interdisciplinary, integrated regional studies that assess the influence of regional processes on the Earth System and vice-versa. The Monsoon Asia Integrated Regional Study (MAIRS) project was provided as an example of such a study.

The ESSP and its core projects provide a robust framework for cooperation between global environmental change and research for development. GECAFS was provided as an example of such a framework because it studies a an issue central to the development agenda in the context of global environmental change. As a result, GECAFS has forged connections with a variety of science agencies, research for development agencies and development agencies alike. The ESSP and its core projects have a great deal to offer for both science and development because of the unique, integrative foci of the projects.

REGIONAL NETWORKS

Asia-Pacific Network for Global Change Research (APN)

Mr. Hiroki Hashizume, the Director of the APN (http://www.apn-gcr.org/en/indexe.html) secretariat gave a presentation that described the organization, provided an update on recent and upcoming activities and set the stage for the period 2005-2010. The APN's mission is to enable investigation of global change as it occurs in the Asia-Pacific region in order to: identify, explain and predict changes in the context of both natural and anthropogenic forcing, assess potential regional and global vulnerability of natural and human systems, and contribute to the development of policy related to both global change and sustainable development by providing the best scientific advice. The APN was officially launched in 1996 and its first Strategic Plan was adopted in 1999, the same year the secretariat was founded in Kobe, Japan. In 2005, the APN celebrated its 10th anniversary and adopted its 2nd Strategic Plan. Participation in the APN has expanded from 12 to 21 countries, since 1996. The APN has also received international recognition for its role in capacity building in the GEOSS and in Japan's Climate Change Initiative. Most of the financial support for the APN comes from the Japanese government via MOEJ and Hyogo Prefect with the United States as the primary source of additional funds.

With these funds, the APN is able to support a wide variety of projects in the Asia-Pacific region. Several of the projects were mentioned including Monsoon Asia Regional Study Phase I (MAIRS), vulnerabilities of the carbon-climate system, community relocation as an option for adaptation to the effects of climate change and others. Capacity Building and Enhancement for Sustainable Developing Countries (CAPaBLE) is a large initiative that is now an integral part of APN's activities. It works in developing countries in the Asia-Pacific region to develop scientific and educational capacity in order to improve decision-making in the areas of global/climate change, water and food security and other areas linked to sustainable development. CAPaBLE supports a variety of projects as well including a training institute on climate and extreme events in the Pacific, capacity building for greenhouse gas inventory

development in the Asia-Pacific countries and many others. The APN, in addition to its web site, also produces reports, syntheses, and its regular newsletter.

Mr. Hashizume next described the evaluation of the first phase of the APN. The goal of this activity was to review and summarize APN activities, assess the strengths and weaknesses of APN, and to reflect upon lessons learned in order to incorporate them into the second strategic plan. In this review, the annual regional call for proposals, networking and capacity building, and science and policy interactions. The APN, since 1998, has annually solicited proposals, and conducted and an extensive review and selection process in order to fund projects in the region. This process has rated well from a managerial standpoint and in comparison to other funding agencies. The APN's networking has also been extremely effective, particularly with regard to the CAPaBLE program. Science-policy interactions results were average with strengthening required. Specific steps in CAPaBLE and the second strategic plan are designed to address those issues.

The 2nd Strategic Plan, for period 2005-2010, has incorporated three initiatives scientific, policy-related and managerial. From the scientific side, the APN will place new emphasis on ecoystems, biodiversity and land use. From the policy perspective, the new plan reiterates the commitment to widening interactions with policy makers by providing them with the best science from the region to underpin their decisions. Institutionally, the APN plans to continue to promote active involvement of member countries, increase the financial base of the organization and continue work to align institutional priorities with the wider global change community.

Inter-American Institute for Global Change Research (IAI)

Dr. Holm Thiessen, the Executive Director of the IAI (http://www.iai.int/) gave a presentation describing the IAI, its current activities and future plans. The IAI is an intergovernmental organization, funded by 19 member countries in North, Central, and South America. The IAI has as its mission, improvement of the understanding of global environmental change and the social processes that drive large-scale change and will be impacted by it. The IAI, through its capacity building and scientific efforts, also encourages dialogue and other forms of exchange between policy makers and scientists in order to improve decision-making regarding present conditions and future predicted changes.

Dr. Thiessen described the scientific programs of the IAI and participation in them including the Small Grant Program II (SGPII), the Small Grant Program (SGP), the Program to Expand Scientific Capacity in the Americas (PESCA), the Collaborative Research Network Program (CRN), the Initial Science Program I-III (ISP), and the Start-up Grants Program (SG). The SGP and SGP II is designed to support small research, planning, and capacity building activities that will eventually lead to the development of larger scientific programs and research networks. PESCA is a program designed to expand scientific capacity in IAI countries with traditionally low participation in IAI activities. The projects in this program link to other projects under ISP and CRN. CRN is a regional cooperation program designed to assist scientists in addressing regionally relevant scientific issues across national boundaries. ISP I, II, and III are programs designed to augment on-going scientific activities in research, training and education, data and information collection, and workshops. Finally, the IAI also has a directorate fund that may be used to fund small scientific activities. Individually, and overall, these programs involve a great number of institutions, scientists, and IAI countries.

Dr. Thiessen next highlighted CRN between the years of 1999-2005. In all there are 14 networks that are all comprised of 4 IAI member countries or greater. The networks may be funded for up to 5 years and grants may be up to $1 million dollars. Currently, there are five clusters of CRN networks that include land, land-human dimensions, oceans, climate and climate-human dimensions. The next phase of CRN, CRN II will be implemented for the period 2006-2011. The program was developed through a SG program that began in 2004 and is designed to incorporate

linked networks, linked training activities, joint missions and explore policy relevance. The IAI received 93 pre-proposals of which 37 were selected for full proposals. Approximately ten of those projects will be selected for the five year grant period with grants of up to $1 million US dollars.

With regard to links with the development community, the IAI has held several training institutes. These institutes are thematic, generally last 2-3 weeks, and have approximately 20 participants. Generally, they are held jointly, with other organizations. In the future, the IAI will link these institutes with CRN's. In 2005, the IAI hosted training institues in Climate and Health and Vulnerability/Climate Variability.

The presentation also highlighted IAI efforts at addressing issues of policy relevance and links. Dr. Tiessen highlighted the November 2005 workshop on "Linking the Sciences of Environmental Change to Society and Policy-lessons learned from 10 years of research networks in the Americas." He also called attention to the fact that interdisciplinarity and networking are improving, but are still often seen as an imposition rather than an opportunity in the science community. Another point made was that interdisciplinarity, particularly with regard to integration of social and natural sciences, has great potential to improve the science and is critical in the development of policy relevant results.

SysTem for Analysis Research and Training (START)

Dr. Roland Fuchs, Director of the International START (http://www.start.org/) secretariat gave a presentation entitled: "An Update on START global change research and capacity building activities." START's mission is to conduct research through regional networks of collaborating scientists, enhance scientific capacity in developing countries, and mobilize resources for activities in developing countries. The program is implemented through a regional network structure that covers the entire globe, through cooperation with the IAI and APN. Dr. Fuchs proceeded to provide detailed information about START's extensive activities and programs, beginning with capacity building.

Capacity building at START is guided by a number of underlying principals. Capacity building to START is research-driven and includes confidence building and an emphasis on active participation in long-term research with other international science programs. START also attempts in its activities to promote a multiplier effect through work with early to mid career scientists in developing countries. In order to actually do capacity building, START utilizes a variety of modalities that include, among many others, regional science planning, research networks, research workshops, and long-term fellowships. The START program has held a great number of capacity building activities across a wide number of modalities. Dr. Fuchs estimated that approximately 1500 scholars from developing countries were involved in START activities in the year 2003-2004. He went on to state that approximately 150 young scientists are currently conducting research with START support. Next, he contined to describe several important activities and areas of progress.

START, in collaboration with the ESSP, the Third World Academy of Science (TWAS) organized the 1st "International Young Scientists' Global Change Conference" (YSC) in Trieste, Italy in November 2003. In preparation for that activity, START received over 1000 applications. Of that group, 640 applications were chosen for review and 84 applications were selected. The meeting, which was a great success, featured keynote presentations by a variety of internationally renowned scientists. The 2nd YSC is scheduled to take place between 9 and 12 November 2006 in Beijing, China directly before the 1st ESSP Open Science Conference.

The START program is involved with a number of research programs, and Dr. Fuchs highlighted results from the Climate Prediction & Agriculture (CLIMAG) program. The Monsoon Asia Regional Study

SYMPOSIUM

At the IGFA Annual Meeting, the host country selects a theme of wide community interest and importance and organizes a symposium around it. This year, and due to the success of the success of the Krusenberg Workshop: .., the theme of "Global Envirnonmental Change Research and Development" was chosen. For this session, several speakers were asked to provide their perspective on the issues surrounding the theme, including what their agency or organization is doing in the area, their thoughts on possible areas of synergy and areas for future cooperation. Chaired by Dr. Margaret Leinen, William Breed of the United States Agency for International Development (USAID), Dr. Marta Cehelsky of the Inter-American Development Bank (IDB), Dr. Robert (Bob) Watson of the World Bank, Dr. Neil Leary of the START program, Dr. Michael McClain of the Florida International University, Renee van Kessel-Hagesteijn of the Netherlands Organization for Scientific Research (NWO) provided valuable insights as to the state of the connections and the way forward (see speaker bios in appendix IV).

Dr. Robert Watson, World Bank

Dr. Watson began the session with some very useful remarks from his perspective as someone who is deeply involved with the development community and who also has extensive experience working in the global change research community. He began by stating the World Bank is focused on sustainable economic growth that is pro-poor. Embedded in that agenda are issues of hunger, security, health and environment. While the other issues are well integrated into the agenda, and despite the fact that environment in turn is embedded in each of the other issues, environment is not fully mainstream and is not well understood in the development community. The World Bank employs many environmental as well as social scientists, but environment is not very high on the list of priorities for the bank's clients, particularly finance ministers. The World Bank is pushing community-based development and has also a started to do more work in the area of climate change. This includes taking a lead role in the follow up from the Gleneagles Communique[1], e.g., how climate change may affect coastal zones, sea level, agriculture, and what are the most appropriate responses to these impacts.

From the World Bank's perspective, the social and economic aspects of the global environmental change programs are probably the most important. But the social and economic areas of the GEC programs are also the weakest. Of increasing interest, are ecological goods and services as well as biodiversity, though these areas are still developing scientific areas. Decision makers need to account not only for the values of ecological goods and services, but the non-market value. Currently, rigorous analyses of non-market values of human, social and natural capitol do not exist. Research into the human dimensions of global change should really be developed. Decision makers need to have information about who gains, who loses, equity issues, how are land degradation and poverty connected, what are the implications of the high rates of population growth in arid and semi-arid regions, how will shifts from rural to urban areas be impacted by global change.

In the donor world, waste management, air and water pollution are key issues. Many client countries say that these are issues for the developed countries, but this is not prescriptive. Developing countries have many of the same problems and could benefit equally, if not more, from research that improves the ability to mitigate and adapt to the impact of these problems.

In summary, some of in the Bank recognize the linkages, but we still need to work further to enable u to sell our agendas to finance ministers and economists. Putting science on the agenda is even more difficult than selling environment. The Bank was a major sponsor of the MA; is a major sponsor of an analysis of the role of agriculture in other areas, e.g., health.

[1] Chair's Summary of the G8 Gleneagles Communique 8 July, 2005:
http://www.g8.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1119518698846

The Bank does not operate schools on environmental economics. Perhaps it should consider adding this area to its schools program. Even in non-market valuations, some things cannot be put into dollar terms. So much of the research to date has been on single stresses – but this is yesterday's approach. We need to do much more multiple-stress research. We need to identify which stressors have economic value. We need to filter in uncertainty as well. The time frames between research and decision-making is a serious problem.

Q&A: You have identified needs that far outweigh the capabilities of the agencies around the table. Bob – if we can get research as a priority, then we have the chance to develop adequate funding for some of these areas. Is s&t a high priority for development aid agencies? Perhaps IFORD would be a good contact for IGFA. Strongly recommend IGFA's talking to IFORD.

Mr. William (Bill) BREED, USAID Team Leader for Global Environmental Change

USAIDS' mission objectives change over time to address changing needs. USAID and many development donors have pressing needs, such as avian flu, AIDS, malaria, hunger, and disaster responses. The particular issue determines the time frame of interest. USAID is realizing science needs, especially with regard to international conventions, e.g., UN Framework Convention on Climate Change, UN Convention to Combat Desertification. Discussions have changed as a result of climate change. Decisions related to sustainable development such as the Dehli Declaration[2] (2002), the Gleneagles Communique[1], the Asia-Pacific Partnership for Clean Development[3], and others. Discussions have also shifted from mitigation to adaptation, e.g. the five-year programme of action[4].

The climate change discussions have changed dramatically – the importance of sustainable development has become increasingly evident. A five-year plan for adaptation is being developed and needs scientific input. There is also a growing interest in global change and global change science. Development practitioners have come to appreciate the need for basing their efforts on the best available science. USAID has to make sure that its science programs are policy relevant.

Along with climate change being linked with efforts at sustainable development, there is growing awareness in the development community that science may have a good deal to offer in terms of making development assistance more effective. Clients as well as practitioners are interested in and aware of issues related to climate change, especially as they may impact ongoing and planned development efforts. This is particularly true for research that focuses on the needs of developing countries and capabilities. Research conducted at the scale of ongoing and planned development projects also has particular relevance.

USAID is involved with several climate-related ongoing scientific activities. Among the examples given were the Consultative Group on International Agriculture Research (CGIAR) (http://www.cgiar.org/), CGIAR Inter-center Working Group on Climate Change, the Famine Early Warning Systems Network (FEWS NET) (http://www.fews.net/), SERVIR (http://servir.nsstc.nasa.gov/about.html), and a series of adaptation pilot projects and guidance manual. CGIAR research involves development of drought disease and insect tolerant crops using genomics and molecular breeding and promoting policy analysis and scientific dialogue with policy makers. The CGIAR Inter-center Working Group on Climate Change focuses on climate risk management, vulnerability analysis and adaptation potential, the mitigation potential of promising adaptations and heat tolerance of key crops. FEWS NET, an U.S. interagency effort,

[2] UNFCCC Conference of the Parties Eight: Monday, 28 October 2002 THE DELHI MINISTERIAL DECLARATION on CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: http://unfccc.int/cop8/latest/delhidecl_infprop.pdf

[3] Asia-Pacific Partnership for Clean Development: http://www.dfat.gov.au/environment/climate/ap6/index.html

[4] http://www.ipcc.ch/meet/session25/doc9attach2.pdf

utilizes weather and climate data in order to provide a forecast of climate conditions in order to minimize impacts of adverse climatic conditions or capitalize on favorable ones. SERVIR is a regional monitoring and visualization system that uses satellite imagery and other data for environmental management and disaster response in Central America.

After discussing USAID's climate-related efforts a variety of research needs that would potentially improve the usability of scientific results were discussed. Generally speaking, improvement of the capacity and support for science and improved dialogue between social and natural scientists were viewed as important steps to be taken. Specific actions mentioned include:

- Regional and local climate impacts models,
- Downscaling and local feedbacks of climate predictions
- Models that can be run and utilized locally
- Geographic Information Systems (GIS) for community analysis
- Improved understanding of soil carbon storage potential and dynamics in agro-ecosystems
- Social scientific information about how disruptions in ecosystem services affect human activities.

In his summary, Mr. Breed provided a view of the future and potential future events for IGFA. Clearly, awareness is growing regarding the importance climate variability and change. The links between natural resource management, economic development and sustainability are also being forged. At the same time, tools for predicting regional impacts and short-term climate variability are improving. Data collection, sharing, and scientific capacity are also improving in developing countries. He suggested communication with the development community about how what we know about global environmental change may inform their efforts. He also suggested a focused application of narrow portions of the science needs for development e.g. – climate change adaptation in a water development project.

Dr. Marta Cehelsky, Inter-American Development Bank (IDB)

Dr. Cehelsky gave a presentation entitled Science, Technology and Development: The IDB Perspective" that described IDB discussed the relationship between science, technology, and investment, and closed with the IDB science and technology strategy. She began by briefly describing the IDB, and it's approach to development funding.

The IDB is the regional bank for social and economic development and the principal source of multilateral development financing. The IDB is owned by 47 member countries including 26 borrowing and 21 non-borrowing members (including the U.S., Japan, Canada, Israel, Korea, and 16 European countries). The bank seeks has as its goal support of sustainable economic growth and reduction of poverty. The IDB provides development support through direct loans, technical cooperations, multilateral co-financing and country strategies. After describing the IDB and modes of operation, Dr. Cehelsky continued to describe the established links between investment in science and technology and economic growth.

Links between science and technology investment and economic growth have been made in several different studies, beginning with Solow's efforts in the late 1950s and the concept of the residual factor. Several others have investigated these links and studies have estimated that the social return on investment in research and development can range from 50% (Mansfield) up to 100% (Griliches). The Organization for Economic Co-operation and Development (OECD)[5] defines investment in knowledge as expenditure aimed at the enhancement, acquisition, and diffusion of knowledge. The key areas of this sort of investment are in research and development, information technology, and human capital. Next, several slides were shown that clearly support the assertion that technology and innovation are key drivers of increased growth, performance, and productivity.

[5] http://www.oecd.org

In terms of science and technology and sustainable development, there are a variety of issues that are top priorities. Among those issues are: energy efficiency and development of alternative energy; affordable drugs and disease eradication; access to clean water and water purification systems; sustainable production and consumption of resources; and, hazardous waste and disaster management. These and several other issues are part of the Millennium Development Goals (MDG)[6] and a strong emphasis on science and technology is believed to be an element of realizing the goals. The community of organizations that fund development recognize more that science and technology investments are necessary for sustainable development and realizing the MDG's. The increasing importance of S&T to development is demonstrated by the investments of OECD countries. Across OECD countries, the investment in research and development, software, and higher education as a percentage of gross domestic product (GDP) has grown.

But there is still a clear disparity between developed and less-developed countries as demonstrated by their investments in science and technology. Data were presented comparing the investments in research and development of advanced nations with Latin American Countries demonstrated marked differences. As a percentage of GDP advanced nations invest 2-3% versus an average of 0.6% for Latin-American Countries in research and development. Investigators per 1000 economically active persons is between 6 and 10 for advanced nations versus 0.7% for Latin American Countries. Advanced countries also have a markedly higher (50%) internet penetration than Latin American Countries (5%).

The IDB has invested approximately $1.7 billion USD in S&T, only recently spreading to smaller countries. Since the 1970's the Bank has had explicit policies related to science and technology. Between the 1960's and 1980's the focus was on human and physical infrastructure (Universities), science funding agencies, and laboratories and research institutions. Between 1988 and 1998, the focus shifted to technology, partnerships, and applied research. Currently, the focus is on national innovation systems. The IDB's strategy bas been successful with over 25,000 scientists trained, establishment of national scientific institutions and, support for over 120 universities for laboratories, and research centers and providing a stimulus for private sector innovation. The 2001 IDB strategy recognizes technology as key driver of economic growth and development in today's global knowledge economy. The IDB, in its S&T investments should promote innovation and technological change.

The IDB sees environment and global change as essential to sustainable development and has a good history of supporting environmental S&T. The IDB focuses on mainstreaming environment into country development strategies and programming. The IDB also is beginning to see increased attention to global and environmental challenges, including change. As a demand-driven institution, the IDB highlights the importance of environmental management and looks for win-win opportunities to demonstrate its value. With respect to climate change, the IDB primarily focuses on disaster risk reduction and preparation, including improved information and warning systems.

In the future, the IDB will give high priority and visibility to S&T investments. Emphasis on organizational strengthening and resources will augment the effectiveness of these efforts. Efforts in science and technology investment are ultimately aimed at mainstream S&T into IDB and national planning. The IDB is now at a critical point due to the convergence on the role of S&T in economic growth and productivity and social well-being. In-country capacity is essential along with supporting science for decision-making. Collaborations and regional approaches will also be important for progress.

Dr. Michael McClain, Florida International University

[6] http://www.un.org/millenniumgoals/

Dr. McClain gave a presentation "Global Change and Rivers of the Amazon Headwaters" provided a view from the ground of a global change researcher on the ground in a rapidly developing and changing area in the Andes. The presentation also demonstrated how environmental science and global change research can aid local governments and individuals by informing their decisions.

The Andean Amazon is a large, biologically diverse area that is home to tens of millions of people. These are highlands with numerous ridges and valleys, well-populated and heavily used, undergoing development, both agricultural and otherwise are the source of greater than 95 percent of the sediments carried by the river and drive the character and ecosystems of the river as a whole. The river has a major role in the lives of the people who live in the Andes, providing drinking water, food, pathogens, transportation, contributing to soil fertility, recreation, and religion. It was the role of rivers in the lives of the people of the Andes that determined the focus of the study. Fish represent 50 percent or more of the protein in people's diets in this region.

The Andes are also vulnerable in a variety of ways to global change including glacial retreat, El Nino//La Nina cycles. However, Peru has experienced a 22% reduction in their glaciers. This area has also experienced El Ninos for decades. Land use is changing throughout the region. About 40% of the land in the region has already undergone change or have been impacted by such change. People are relocating to cities in the region, none of which have sewage treatment. The region is also struggling with a variety of development-related issues including urbanization, deforestation, and sewage, as well as petroleum exploration and production. Dr McClain's research focused on the changes that are going on – especially with respect land use change – and their interaction with other processes and with the population. We looked at pilot catchment areas in each of the four countries of the region.

The research, in addition to providing a number of insights about the region, also provided important insights about working in the region and how to successfully partner with different groups. After the project was funded, McClain's group went into the region to talk with federal and other officials. They found almost no interest among these officials, especially the feds, whose priorities lay elsewhere. After they developed more experience, they found that the federal government officials had little impact in the regions, they spoke with local residents and received a much more positive response.

In working with local residents, the research group focused on developing tools that would enable locals to more reliably predict future conditions and mitigate their vulnerability to change and predict future impacts and threats. The methods that were developed were readily transferable to other local areas.

The research demonstrated that the eastern slope of the Andes is experiencing rapid rates of land-use change, among the highest in the Amazon basin. Andean Amazon aquatic ecosystems, due to slope instability and rapid response to runoff events, are highly vulnerable to land-use change. These changes are driven by expansion of roads and associated increases in population densities and other biophysical factors. Direct impacts of land-use change are visible and measurable in the aquatic ecosystems of the region ranging from degraded physical habitat to altered water quality.

Dr. Neil Leary, START/AIACC

Dr. Leary opened by quoting a 2003 United Nations Development Program (UNDP) report entitled "Poverty and Climate Change, Reducing Vulnerability of the Poor through Adaptation"[7] which established that climate change, because it will further reduce access to drinking water and poverty reduction, is a development issue. The report also stated that adaptation must be integrated into sustainable development and poverty reduction strategies. Several ongoing START activities have enabling adaptation as their goal including Assessments of Impacts and Adaptations

[7] http://www.undp.org/energy/climate.htm

to Climate Change (AIACC), Climate Prediction and Agriculture (CLIMAG), Monsoon Asia Integrated Regional Assessments (MAIRS), Vulnerability of Water Resources in Africa & Asia, and Advancing Capacity for Climate Change Adaptation (ACCCA). The START experiences with the AIACC and ACCCA programs were described in the presentation.

Assessments of Impacts and Adaptations to Climate Change (AIACC)

The AIACC program, a Global Environment Facility (GEF) enabling project, works in Latin America, Africa, Asia, and several small island states, and has climate change as a focal area. The project is managed jointly by the United Nations Environment Program (UNEP), START, and the Third World Academy of Sciences (TWAS) and is supported from the GEF, USAID, the Canadian International Development Agency (CIDA), the U.S. Environmental Protection Agency (EPA), the Rockefeller Foundation, and co-funding. The objectives of the program are to build scientific and technical capacity in developing countries, advance scientific understanding of climate change, and link the science and policy communities with each other, especially for adaptation planning and execution. The program is implemented through 24 regional vulnerability and adaptation assessments. The program provides support with technical assistance, mentoring, training, and networking after engaging stakeholders. Program participants also work with the United Nations Framework Convention on Climate Change (UNFCCC) and national communications teams. The program also conducts a variety of synthesis activities, holds workshops, published documents, and holds science and stakeholder meetings.

The AIACC has accomplished a great deal since its inception in 2001. Dr. Leary described those accomplishments in terms of capacity building, advancing scientific understanding, and linking science to policy. Using a “learning-by-doing” methodology, the AIACC has involved more than 300 developing country scientists and students in the 24 regional assessments. The AIACC has also involved more than 100 young scientists in global training workshops and many others in regional and national training workshops. The program has also been successful at bolstering developing country scientist participation in international scientific and assessment activities. More than 30 of the AIACC investigators are authors for the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4), several other participated in the Millennium Ecosystem Assessment (MA), and many others have participated in and presented papers at international conferences. The participants in the program, through their participation, have established networks that link science and stakeholder institutions inside of and across 62 countries.

Dr. Leary noted that the activities supported by the AIACC have also attained milestones in terms of advancing climate change science. AIACC scientists have published 48 peer-reviewed journal articles, 19 peer-reviewed articles in *AIACC Working Papers*, and several publications, including two books are in preparation. Efforts supported by the program have also advanced the science of climate scenario generation, vulnerability indicators, livelihoods approaches, integrated assessment modeling and cost/benefit analysis.

The program has also achieved its goals in terms of linking the science and policy making communities. AIACC national communications teams contributed to their country’s UNFCCC National Communications. Most teams also engaged in national policy discussions about management of climate-related risks. The program also succeeded in raising public awareness about climate change-related risk by holding stakeholder workshops and publishing outreach materials. Finally, AIACC teams also worked with local communities on adaptation projects and several are developing plans and proposals for new projects.

Advancing Capacity for Climate Change Adaptation project (ACCCA)

The ACCCA project is a new effort, funded by the European Commission EuropeAID Co-operation office and The United Kingdom Department of Environment, Food and Rural Affairs (DEFRA). Partners in the project include the United Nations Institute for Training and Research (UNITAR), the Stockholm Environment Institute (SEI), START,

Climate System Analysis Group of the University of Cape Town (CSAG-UCT, and Environnement et Développement du Tiers Monde (ENDA-TM). The ACCCA project will link assessment activities with action by implementing nine "pilot actions in Africa and Asia.

The projects will be selected by peer review based on merit. Once selected the pilot actions will be executed through partnerships of scientific, practitioner, and stakeholder institutions. The pilot actions will follow a similar protocol that will involve the following steps: 1) Identify and prioritize climate risks, 2) Assess available information and synthesize it in terms relevant for decision making by stakeholders, 3) produce, test, and disseminate risk communication materials, 4) produce recommendations for adaptation, and 5) promote action on the recommendations through stakeholder and policy dialogues.

Dr. Leary closed his presentation with a series of lessons-learned for AIACC and ACCCA and some final notes on climate data, access, and capacity. *The lessons learned fell into five broad categories: Temporal scale, spatial scale, decision-making focus, stakeholder involvement, and capacity building*.

- Lessons learned with time scale had to do with the reality that people face climate-related risks in the present, rather than the distant future, as is it often portrayed. This is particularly true with developing countries in that climate change is a present threat to the millennium development goals. The research agenda also has to account for time scale as the horizon for adaptation decisions is typically 10-20 years, with longer time horizons reserved only for large, irreversible changes.

- In terms of spatial scale, impacts and adaptation options are strongly influenced by conditions and processes at the sub-global to local scales and development and adaptation projects are at national to local scales. As a result, place-based research is critical as is downscaling for climate and other drivers.

- Adaptation and development-related decisions necessitate information that is temporally, spatially, and sectorally specific. Given these needs, a logical way forward that was suggested would be to identify a decision making context where development goals and climate risks intersect, characterize the risks, the decision process, and information needs, and target research and risk communication to these needs.

- With stakeholders, START has learned to engage them in substantive ways throughout the research planning and implementation process. Involve the right stakeholders including all relevant parties, should be involved in setting the research agenda in order to assure the research is usable. Consider using participatory assessment methods and develop working relationships between research, development, and stakeholder institutions.

- Building scientific capacity should be considered adaptation and, development. Scientific capacity is necessary to generate data and information about climate risks and response options, to communicate knowledge, apply knowledge, and link science, policy, practitioner, and community institutions. Building capacity should be part of the research agenda and this is where development and global environmental change meet.

Dr. Leary closed with some thoughts on climate data, access and capacity. He noted that the IPCC has identified needs in developing countries and countries with transitional economies for climate data products for their regions, access to data and data products, and capacity to access and utilize data. The information and capacity to utilize it currently are obstacles to understanding of climate change risks and planning adaptation responses. START has been approached to help develop a program and mobilize resources to fill these needs.

Dr. Renee van Kessel-Hagestejn, Netherlands Organization for Scientific Research (NWO)

Dr. van Kessel-Hagestejn gave the last presentation in the session entitled "Interface between global change and Development Oriented Research- Next Steps." She began by providing a summary of the Krusenberg Workshop, challenges identified in it and recommendations resulting from it. She highlighted one of the recommendations,

"identification of potential future activities of high and mutual interest," and used it as the basis of her presentation in which she laid out a variety of potential ways to consider cooperating with development agencies. She began by describing some of the challenges associated with potential cooperation.

The global environmental change and development communities have different goals that can potentially make cooperation challenging. On the one hand, most organizations and agencies that fund global change research have as their primary goal, support of the very best scientific research and cutting edge research whereas development agencies focus on activities and projects that are aimed at poverty alleviation and sustainable economic growth. The development and global change communities also consider different spatial scales- global environmental change is evolving from the global to the regional scale, while most development research and work is done at the regional and national scale. The communities also function differently in terms of timescales of consideration, procedures, and a host of other issues.

The level of ambition was discussed in the next portion of the presentation- to what extent would our respective communities like to take this cooperation. Would cooperation be exchange of information and results with AID agencies? Would it be comparing and possibly integrating research agendas? Would it be an issue identified as "fine-tune" funding wherein funding new streams of funding would be developed for the research programmes through AID agencies? Could it be a combination of the options presented. Issues of who would lead in such efforts and what IGFA's role would be were also raised.

Several models for cooperation were described: parallel, trust, co-funding, entity, and network funding. The models were presented in order of increasing complexity and level of coordination and cooperation required. In parallel funding, donors independently provide funds to a recipient, as in the case of research grants. *Models for cooperation include: parallel: easy, but little synergy*. In trust funding, donors independently give funds to a trust that is ultimately disbursed to the recipient. *Trust funds: funds from both go to one lead agency that manages the trust fund. Funders identify constraints, but usually limited. Downside is limited to small scales.*

In co-funding, donors provide funding to an intermediary organization that interacts with and disburses funds to the recipient, as in the case of the START programme and others. *Co-Funding: CGIAR example; START; possibly ESSP. Loose arrangements that operate by consensus; loose goals and based on mutual trust.* In entity funding, donors provide funds to an intermediary entity that controls the disbursement of funds to a particular objective or set of objectives. *Entity funding: Set up a separate governmental entity; very sustainable, but can be rigid and not easy to develop flexibility. European Malaria Vaccine Initiative is one example. This is very challenging because of the formality and number of partners.* In network funding, donors interact to provide funding, without an intermediary, directly to recipients as in the case of European Commission ERANETs. *Network funding combines the best of the above. ERAnet is one example. No legal entity, but an MOU. Network allows ministries to participate*

With some of the challenges and different models for a path forward laid out, Dr. van Kessel-Hagestejn posed a variety of questions to the group in order to motivate discussion:

a) How does IGFA recognize itself? Is it a network? Is it co-funding? And in the larger sense, what does IGFA whish to be?

b) What would be the best model for cooperation with development/AID agencies?

c) Is there a need for a new model that can more appropriately address some of the constraints on cooperation?

d) Who will be the recipients of in the cooperation?

e) What would the cooperation entail?

After posing the questions, the presentation returned to the concept of the level of ambition. It was noted that there are a variety of ongoing cooperative activities between development and global change research programs. As such, is there an identified need or reason for expansion of this cooperation? And, if yes, to what extent. Would this be sharing of information and exchange of results, comparing and eventual integration of research agendas, or so-called fine-tune funding? Next, Dr. van Kessel-Hagestejn suggested a possible way forward by first laying out the first-order considerations.

She posited that IGFA must determine the level of ambition by considering the scale and scope of possible cooperation and the ability between all parties to translate their mission-specific goals into common ones. Several options for doing this were presented:

A. Continue and better monitor the outcome of ongoing cooperative activities
B. Develop a comprehensive a la carte menu for GCR and development oriented research for donors to consider
C. Develop pilot activities to ensure A and to explore B.

The path forward that was suggested was approaching AID agencies and setting up a working group comprised of AID agency and global environmental change funders. That group would have as part of its terms of reference to collect information on mutual research priorities and consideration of ways to build upon proven systems ESSP, START). That group would be tasked with making recommendations to IGFA and Aid agencies about what pilots would be suitable for financial support and would report back to a future IGFA meeting.

UPDATES FROM MEMBERS ORGANIZATIONS

Hans de Boois from the Netherlands Organization for Scientific Research (NWO) served as the Chair of the session in which presentations were given by 18 IGFA members (available on the CD). Written reports from nine of the presenting member organizations may be found in the second section of this report.

Every year, members are asked to provide an update that reports on recent funding trends, new agency or national priorities, important changes, new initiatives, and new, large programs. In addition to providing an update on those issues, the Steering Committee selects additional questions of particular pertinence to the IGFA community. This year, the Steering Committee chose to ask members to focus on the extent to which national global change research agencies and ministries communicate with development agencies. Members were also asked to describe the extent to which the Millennium Development Goals, as they pertain to climate, play into setting the global change research agenda. Additionally, members were asked to describe the extent to which they are being driven to support research that is relevant to decision making and policy. And last, members were also asked to explain how the ratification of the Kyoto protocol has affected the global change research agenda in their country or agency.

Members reported that the funding levels for global change research are stable or slightly increasing. Members from Mexico, China, Beijing, and Chinese Taipei, reported increases in funds to global environmental change research. Several members also reported on new research programs related to sustainability and sustainable development. Earth observations were also an important theme in member reports. Activities related to the International Polar Year were also featured in member reports.

Many agencies reported that communication between global environmental change research and development agencies exists in their country or is gaining new attention. Several IGFA members, including Sweden, Switzerland, and the Netherlands reported long-standing relationships with their development agencies. IGFA members noted that their agencies, ministries, and governments, regardless of membership in the United Nations, are aware of the MDG's and have programs that ultimately feed into achieving the set of international goals.

Most IGFA members described extensive and growing interest in climate change and in general global environmental change at high levels within their governments. The ratification of the Kyoto protocol was acknowledged as one of the drivers for changes in the global change agenda and for some of the heightened, high-level interest. As ministries, agencies, and departments with responsibility to fund global environmental change research, many IGFA members acknowledged that the policy community is one of the groups that the research they support is intended to reach. In many cases, research institutions or researchers themselves communicate research results. In general, IGFA members reported a spectrum of approaches ranging from direct engagement of policy by researchers to generation of scientific results with policy relevance without direct engagement.

REPORTS SESSION

Mountain Research Initiative (MRI)

Mountain regions have long been considered important in programs such as the IGBP, but the MRI took form with the publication of the 1999 report “Global Change and Mountain Regions.” MRI differs from most of the research program’s core projects in that it has as its primary focus, a place as opposed to an element or system. MRI takes a multidisciplinary approach by incorporating the biophysical as well at the socio-economic aspects of global change. The coordination office for the project is in Berne, Switzerland and runs from 2004 to 2007. MRI also partners with other relevant programs, such as the Global Mountain Biodiversity Assessment (GMBA). MRI also works closely where appropriate with the WCRP Climate and Cryosphere project.

The presentation laid out several reasons that mountains are important to understanding global change. First and foremost is that changes in mountain regions are felt far beyond them. A prime example provided was with respect to water. Many regions rely on river discharge for fresh water. Many other areas also rely on discharge for powere generation. Changes in mountain regions could have significant impacts on downstream communities and have significant implications for development as well. Like the poles, future climate changes will be amplified in mountain regions. Mountain regions are marginal environments and as sensitive to change. Population pressures also exacerbate environmental changes in mountain regions. But there remain significant gaps in knowledge that hinder our ability to develop mitigation and adaptation strategies.

The key scientific objectives of the MRI are to:

- Develop high resolution climate scenarios for mountain regions
- Prediction of storage and flow through hydrologic networks
- Assess changes in natural hazards
- Predict forest volume and community change
- Predict responses of key species
- Estimate the social and economic impacts on liveliehoods in the context of ongoing development
- Assess the adaptive capacity of governance to deal with change
- Define best practices for interaction with governance institutions

The presentation closed with a variety of suggestions regarding programs that IGFA members could support in order to advance this initiative. One of the programs mentioned was the Consortium for Integrated Climate Rsearch in Western Mountains (CIRCMOUNT). Another program mentioned was the EU funded Global Change in Mountain Regions (GLOCHAMORE) project to develop a global change research strategy for UNESCO MAB Biosphere Reserves. Several integrated regional programs including LBA and new efforts to study the Andes region.

European Research Area for Global Change Research/IGFA Europe

Hans de Boois described a proposal for a new European Research Area network (ERAnet) designed to foster better collaboration between European countries on Earth System Science. Dr. de Boois updated IGFA members on the status of the proposal and explained the objectives of the proposed network.

The proposal, submitted in October of 2005, included input from 18 partners including 12 European Union countries and the European Science Foundation (ESF). The network was designed to support Earth system science including the many interrelations between different parts and levels of the system. This perspective includes social systems e.g.- governance, institutions, risks, perceptions, energy, waste and emissions, and natural resource, management. It also includes biogeochemical cycles at a variety of different scales. The network was designed in such a way as to

integrate with and compliment the work of the 11 existing single-discipline global change ERAnet's in Europe.

The ultimate aim of the proposed network would be pan-European cross-border collaboration in funding European research and infrastructure, including International Project Offices (IPO's).

Global Earth Observing System of Systems (GEOSS) and the Integrated Global Observing Strategy Partnership (IGOS-P)

Thomas Spence of the National Science Foundation gave a presentation that updated IGFA members on the status and plans of the Global Earth Observing Strategy Partnership (IGOS-P). The presentation also discussed a variety of different ways in which IGFA could remain engaged with both organizations.

Dr. Spence began by describing the GEOSS and its development beginning with the Earth Observation Summit in Washington, DC 2003. At the ministerial summit, ministers affirmed the need for timely, high quality, long-term, global information and supported:

- Improved coordination of strategies and systems for observations
- Coordinated efforts to involve and assist developing countries
- Full and open exchange of observations
- Preparation of a 10-year Implementation Plan

At the Second Earth Observation Summit, ministers approved the "Framework Document" which described the benefits of a global Earth observing system and the elements of such a system. The 10-year Implementation Plan for the GEOSS was endorsed at the Third Earth Observation Summit. The intergovernmental Group on Earth Observations was also established at this meeting. Two documents, the 10-year Implementation Plan and the 10-year Implementation Plan Reference Document were published in February of 2005 and serve as the foundation for the GEOSS.

The 10-year Implementation Plan highlights nine areas in which society will benefit from a global Earth observing system of systems, called societal benefit areas. The nine areas are very broad and set forth a challenging agenda for the GEOSS:

- Reducing loss of life and property from natural and human-induced disasters;
- Understanding environmental factors affecting human health and well-being;
- Improving management of energy resources;
- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change;
- Improving water resource management through better understanding of the water cycle;
- Improving weather information, forecasting, and warning;
- Improving the management and protection of terrestrial, coastal, and marine ecosystems;
- Supporting sustainable agriculture and combating desertification;
- Understanding, monitoring, and conserving biodiversity.

The first meeting of the GEO was held in Geneva in May of 2005 with 58 countries and the European Commission as members and 43 international organizations as participants. There, the executive committee was selected and the secretariat established at the WMO under the direction of Dr. Jose Achache. A work plan team, Chaired by Dr. Guy Duchossis, was also established. Using the GEOSS Reference Document as a source for tasks, the work plan team identified 107 two-year targets, 82 six-year targets, and 52 ten-year targets. Work packets based on these targets were developed and sent to 75 experts. Over 800 elements were suggested for implementation as a result of this process. The GEO Work Plan for 2006 including several examples of the different elements of the plan.

Dr. Spence closed his comments on the GEOSS with several broad recommendations for IGFA. They include: Consider and support an appropriate role for IGFA in the development of GEOSS; reviewing and commenting on the GEOSS-related documents as requested; ensuring a strong role for the science community in the development of GEOSS; and encouraging national agency involvement in GEOSS.

Next, Spence shifted the discussion to the Integrated Global Observing Strategy (IGOS). The IGOS-Partners (IGOS-P) seek to provide a framework to harmonize the common interests of the major space-based and *in-situ* systems for global observation of the Earth. The partnership serves as an over-arching strategy for conducting observations of the climate, atmosphere, oceans, coasts, land surface and Earth's interior. The partnership has as its aim to build upon existing programs.

The IGOS partnership is organized around themes, a strategy intended to allow for a progressive and coherent strategy to be applied while also allowing for different elements to be at different stages of development. User communities were encouraged to propose themes for consideration and were selected based on established criteria. The teams prepare proposals, engage the relevant partners, establish responsibilities, and develop implementation arrangements. Currently, there are five approved themes: oceans, integrated global carbon observation, integrated global water cycle, geohazards, and atmospheric chemistry. Four themes, integrated global coastal observations, integrated global land observations, integrated global cryosphere observations, and dynamic Earth, are in preparation.

Spence reminded IGFA members that IGFA has been a charter partner in IGOS-P since 1998. The WCRP and IGBP are also active members. At the Norwich Plenary meeting in 2002, IGFA members agreed to:

- Participate actively in IGOS
- Provide intellectual input to guide the IGOS agenda
- Strive to increase coherence among participants
- Encourage national administrations to support IGOS

IGFA members also agreed that updates on IGOS should be provided annually at the IGFA Annual Meetings. It was recommended that IGFA continue to pursue the actions agreed at the Norwich Plenary and continue to support the research programs efforts in planning and implementing the relevant themes. IGFA may also have an role in ensuring that IGOS-P activities contribute to the GEOSS. Finally, it was noted that IGFA will become the curator for the IGOS web site after the IGOS-P 12 bis meeting in London.

Africaness

Dr. Anthony Nyong of the University of Jos, Nigeria, reported to IGFA on the Africaness Workshop. The Workshop was motivated by a number of factors. First, it is recognized that Africa lacks long-term, stable, intergovernmental support for global environmental change research and related capacity building. The Asia-Pacific and the Americas have adopted successful approaches to the same problem.

The meeting was organized by the Earth System Science Partnership (ESSP) and the International Council of Science (ICSU) with support from the US National Science Foundation, the New Partnership for Africa's Development (NEPAD), the South African National Research Foundation (NRF), and the Norwegian Agency for Development Cooperation (NORAD). Logistical support and organization of the event was provided by the Pan-African START secretariat.

The Workshop had as its primary objective to gauge the needs and preferences of the African scientific community as to the best way to organize regional networking in order to best serve support of global change research. In doing so, the workshop sought to identify and build upon past successful attempts at regional networking, recommend the optimal structure and processes for such networking, and begin to develop the long-term funding required for such

an endeavor. The discussions centered around building a high-quality global environmental science network, building research capacity, sharing scientific agendas, concerns, and resources.

The Workshop program was comprised of keynote presentations and group discussions. Keynotes focused on Earth system science, the relevance of global change science to Africa, the science connected to the sustainable development agenda of Africa, and experiences with and lessoned learned from existing regional global change research networks. Group discussions focused on governance and structure, funding and partnerships, the scientific agenda, the science-policy interface, and the way forward.

Seventy-five people participated in the workshop. Participants were drawn from the African global chane research community, development aid agencies, regional global change research and capacity building programs, the African Academy of Science (AAS) and the National Academies, the Third World Academy of Science (TWAS), and governmental and non-governmental agencies.

Four discussion groups identified a variety of issues related to governance and structural organization, funding and partnerships, key thematic GCR issues, and Policy-Science-Practice interface. The Workshop found strong overall support for an African network for global change research. Many potential benefits for having a network were identified and included: new, significant, independent funding opportunities; facilitation of access to funding and knowledge transfer; research prioritization and advocacy at an Africa-wide scale; coordination and convergence of research agendas and; a unified voice to policy related to global change.

The structure of the network was discussed in detail and it was decided that it must be comprised of two equally weighted components:

I. A structured component such as a general assembly or board, secretariat, science advisory committee.
II. A forum for dialogue between science, policy makers, and society. The forum would serve as a way to gather key African issues of policy and societal relevance.

The network should complement existing research initiatives and provide coordination that avoids duplication and overlap. It should have the ability to mobilize the African scientific community and identify and prioritize the African GEC agenda. It should also provide a link to other international networks, research programs and GEC research groups. Finally, the network should engage, involve, and inform the policy-making community. The architecture of the network was drafted at the meeting and described in the presentation.

Funding of the network was also discussed including internal as well as external funding sources. Internally, funding could be generated through the national research councils of African countries, African organizations including regional ones, and membership fees, and seed funding. External funding could be sought from the G8 and other developed countries, the European Union, UN agencies, as well as multi- and bi-lateral arrangements.

The Workshop participants were also able to agree on Key Thematic Research Areas for the network. These multidisciplinary areas are:

Water and climatic modeling
Desertification
Land degradation, biodiversity, and food security
Health and pollution
Marine Ecosystems

The Workshop also laid out a multi-tiered plan for developing the science-policy interface. Initially, the goal of the task force is to set up a safe space for dialogue. Next, the secretariat would be formed in order to enable an official or authorized space for dialogue. Through the other dialogues, a policy level, science level and societal level dialogue space would be set up in order to facilitate exchange.

A Steering Committee/task group, comprised of 14 members and ICSU and UNEP, was set up at the Workshop. The task group's first task was to bring the recommendation to set up a global change network of networks tro the NEPAD Ministerial meeting (AMCEN). The committee will continue its work in order to produce the meeting report, establish a secretariat, develop the architecture and governance of the network, and develop sustained support for the network.

International Polar Year (IPY)

The polar year, an internationally coordinated, interdisciplinary pulse of research and observations focused on the Earth's Polar regions begins 1 March 2007 and ends 1 March 2009. The IPY began through suggestions made independently by a number of scientists and organizations. ICSU established an IPY planning group and endorsed an IPY in 2007-2008. The WMO in 2003 also approved a 2007-2008 IPY activity. Later that year, a report that included input from scientists in 35 nations produced a report entitled "A Framework for the International Polar Year 2007-2008." After a joint ICSU-WMO committee was formed and ideas were solicited from the international community six themes and three cross-cutting themes were chosen:

1. Current Status of Polar Regions
2. Changes in the Polar Regions
3. Global Linkages
4. New Frontiers
5. Polar Regions as Vantage Points
6. The Human Dimension

Cross-cutting themes:
1. Observational Initiatives (IGOS Cryosphere Theme, GEOSS)
2. Data Management
3. Education, Outreach, and Communication

Along with the chosen themes, IPY activities also have to meet several criteria. Activities must first make significant advances within one or more IPY themes. They must also involve at least one polar region and take place within the IPY timeframe. Projects must also contribute to international collaboration and build capacity by developing the next generation of polar researchers. Activities must also present a viable management plan that includes the science, logistics, data management, and outreach. Finally, investigators and coordinators must be able to secure national or regional funding in support of their activity.

Expressions of intent represent a broad, evenly distributed spectrum of scientific disciplines with the majority aimed at Arctic research. 109 expanded proposals were submitted by 30 June 2005. 75 of the 109 expanded proposed activities were given conditional IPY endorsement. 11 outreach and data activities were also supported. An average of ten countries of the 52 nations represented in the 75 endorsed projects.

Initial funding for the planning of IPY was provided by ICSU with in-kind secretariat staff support. The ICSU-WMO Joint Committee for IPY planning and coordination will require will require roughly $60,000 USD (€50,000) for the years 2005-2009. The IPY International Program Office will require approximately $280,000 USD (€225,000) for the years 2005-2009. The cost of research for the IPY is substantial, on the order of $1-2 billion USD, without infrastructure costs. Dr. Rosswall closed by highlighting several of the endorsed IPY activities.

IGFA, GLOBAL CHANGE RESEARCH (GCR) AND RESEARCH FOR DEVELOPMENT (RFD) ISSUES

The session began with an overview of the May 2005 Krusenberg workshop *The Interface Between Global Change and Development-Oriented Research* and its main conclusions. Those were summarized as:

- The development community is much more heterogeneous than that of IGFA;
- Aid agencies are doing ground work underpinning GCR, but not research itself;
- There are RFD agencies that fund research into modes of development, and others that fund capacity building;
- Both 'sides' in this debate agreed there was a strong need to continue the discussion;
- All the groups that had taken part should take some responsibility for being part of that continued dialogue;
- More scientists from 'the South' need to be convinced of the value of participating.

The workshop felt that future discussions should include as priorities:

- How we do things –e.g. agendas, nature of the participation process, scaling issues, networking and capacity building;
- What we do – e.g. adaptation and mitigation approaches, making joint approaches to potential funders;
- What is needed for success – e.g. all parties need to be at the discussion table, there should be an emphasis on ownership of the process and on tangible outcomes.

In the discussion in this session IGFA was seen as having a key role to play in the next steps in the process, principally by continuing commitment, in engaging research for development agencies to continue, and in working with the research and funding communities to identify a mutually beneficial initial dialogue. ICSU had agreed to discuss the interface issue with its various committees and with IGFA, and to take advantage of opportunities at key meetings to highlight the intersection between GCR and RFD.

ICSU commented that the Krusenberg meeting had converted numerous skeptics to enthusiasts, yet much remained to be done in convincing both sides of the benefits of joint working. In the key actions envisaged, highly important elements were policy links, socio-economic and sustainable development and participatory approaches involving all the principal relevant stakeholders. The best ways to develop such approaches were still not entirely clear, but must involve the community of development aid agencies from the outset to ensure a feeling of true ownership. However, it was noted that there were some models from both sides that may be helpful, and that as this relatively new process would inevitably be slow to start with all concerned should be realistic about their expectations of what could be achieved.

Ms. Sara Farley of the World Bank and Rockefeller Foundation emphasized that the shared problems of knowledge and of process represent both major challenges and major opportunities; and in addition, development and global change problems have tended to be funded and researched as unrelated issues. There has been much 'business as usual' thinking and rather little along the lines of integrated innovations. It is essential to understand and overcome differences between RFD and GCR in order to develop new paradigms. To reach a 'Tomorrow' position in interfacing from that represented by 'Business as usual' needs much integration of presently isolated challenges; more systematized, cross-disciplinary knowledge; global, not Northern, agenda-setting; and shared, reasonable time frames for change and commitment. An 'innovation accelerator' could be envisaged which would build on strategic integration, with IGFA facilitating knowledge sharing, leading to tangible outcomes ideally within 3-4 years from the start of the exercise.

In discussion of this concept it was agreed that something radical did need to be done but that making progress might be harder than was suggested, partly because of the limitations of funders and that the best strategy could be

to influence funders' agendas, with a regional focus being the ideal scale for operational activity. However, it was noted that the general issue was being tackled in numerous RFD fora and there was evidence of a broad-based movement making progress. IHDP noted that there was a good range of research topics based at the community level, and that cross-scale interactions offered good opportunities for learning. Understanding was needed of a number of processes operating in parallel at local and larger scales.

The Krusenberg workshop had been intended to promote collaboration between the GCR and RFD communities, which was a somewhat separate issue from North-South collaboration, or co–working between the natural sciences and social research. Users and providers do not have a shared vision. An important question was why some initiatives and interactions already in place work very well while others do not: what is the secret of success? Inclusiveness is essential and must include North-South interaction. A particular problem was seen to be that funders tend to be possessive of their projects and trying to overcome this should be addressed through pilot projects linking GCR and RFD.

In discussion of the next steps to be taken it was unanimously agreed that it was essential to continue the effort begun by the Krusenberg workshop. There must be continued involvement of the international programmes and the engagement of appropriate people to ensure that further initiatives undertaken are new and not repeating any earlier ventures that had attempted to bring GCR and RFD together. The means for making progress might be a pilot investigatory group of IGFA and development funders, or a second Krusenberg type event, or some mixture of the two. Whatever the means, it was vital that it should be built on informed and accurate assessment of the strengths, limitations and gaps in understanding of both the GCR and RFD communities. The target areas for activity in the exercise should be those with the greatest effect on the world environment, e.g agriculture, energy, access to water.

The concluding reflections on interaction between GCR and RFD noted that in participating in this work IGFA must be clear on what it was entering into and that it was very important to offer a clear and coherent strategy to all parties. This was a very complex area involving markedly heterogeneous institutions and agencies; with its long experience of collaboration and information exchange IGFA was in a good position to explore possibilities and synergies, and how to capitalize on the interactions already in place or under development. A key factor was that policy and decision makers are more influenced by development agencies than by GCR. Next steps must therefore have an eye to the importance of making the most of 'success stories' and collaborating with development agencies. It was also crucial to keep in mind the sensitivities on both sides of the engagement: interaction initiatives should be promoted with due care, yet without being over-cautious. Events such as the UK Gleneagles conference had done much to set the stage for bringing GCR and RFD players together and the time was now ripe for activities that built on the outcomes of such key initiatives. The ICSU open science conferences offered an excellent opportunity for bringing the two communities together to examine both the problems and the scaling issues.

It was finally agreed that IGFA should set up a small working group to engage GCR experts who are familiar with the development agenda and to examine the best options for possible ways forward in the light of the Krusenberg meeting and the outcomes of the Washington plenary.

THE FUTURE ROLE OF THE IGFA WITH THE RESEARCH PROGRAMS

Kirsten Broch Mathisen started the session by presenting some of IGFA's history. IGFA was established in 1990 in order to help coordinate the funding of WCRP and IGBP research. At that time, the focus of the discussions was on the exchange of information (funding level, mechanism and research policy). During it's 15 years, IGFA has focused on several different issues: Collaboration between the natural science community and the social science community, the role of developing countries, International Project Office (IPO) funding, resource assessment, relations with aid agencies, collaboration with the IHDP and Diversitas, the funding of multi- and interdisciplinary research, scientific integration, North - South, observing systems, research, and glue money. A snap shot of the activities of the IGFA shows that issues have resurfaced on different levels during the last 15 years.

The discussion focused on a letter that Margaret had sent to the programmes on the infrastructure funding issues. The IGFA asked the programmes to suggest some alternative models for funding that might better meet the needs of the programs and the funding agencies.
The following issues were raised in the letter:

International project office (IPO)

- The funding of core project offices and their activities. The IGFA asked the programmes to consider whether the new models for core project support might be appropriate.

Open science conferences

- The funding and scheduling of open science conferences. The IGFA asked the programmes to think about how to coordinate the global change program efforts and to discuss the timing of such conferences.

International reviews

- The arrangements for and the funding of international reviews of the programs.

The IGFA Steering Committee and Staff Group had a meeting with the Programmes in advance in order to brainstorm on the issues raised in the letter.

Reflections from ICSU and the Program Directors

Kevin Noone presented reflections on behalf of the programs in plenum, and encouraged the continuation of the brainstorming session, as in the pre-meeting, and to skip the traditional report at the next Annual meeting. He also pointed out that the issues raised in the letter are mutual, but that the programmes have individual concerns. In the end he showed a map of the network of programmes and related organizations - a complex diagram - and focused on strategy and tactics. There are limited resources for the programmes and the expanding responsibility. The programmes will work on IPO and open science conferences.

The programmes agreed that the issues raised in the letter are important. Focus was put on bringing policy people into the process to get a mutual understanding. The open science meeting is not very relevant for policy people.

Emphasis was also placed on involving funding agencies in the early planning of international programmes to encourage a strengthening of the IGFA, to work with funding agencies in foresight studies and to create a dialogue between research funding agencies and bilateral and multilateral donors.

Report from the pre-meeting with the Programmes, IGFA Steering Committee and Staff Group

The discussion focused on finding the most useful ways to allocate limited amount of funds. There is a need for new ideas and/or processes for developing new ideas on how to improve this position. The IGFA could perhaps become more pro-active, e.g. in considering the distribution of all of the IPO's that the glue money supports, but it would have to be done carefully.

IPO's
It seems to be a trend that the support for IPO's has somewhat shifted from stable sources to less stable sources. Following questions were raised: Is there a trend for the core projects to set up working group offices or other sub-offices that might be similar? Should we channel funds for project offices through their parent umbrella programs?

As with the wider glue money issues, the IGFA agencies are experiencing "fatigue" when it comes to finding support for IPOs. Ideas for discussion: A more inventive approach to overcome resistance to the "classic" model of distributed offices might be through adding a percentage to research awards in a particular area, or considering funding of coordination by support for perhaps a major facility or international centre of excellence and then looking at its "investment value".

The programmes could help the IGFA and its member agencies by for example letting them know what is going on "in the wings": Has the programmes approached potential funders within a country other than the agency presently providing support? This is an increasingly important element, which contributes to bring together the natural sciences and socio-economic research.

Open Science Conferences
Both the IGFA and the programmes agree that these conferences are very important. As well as enabling scientific exchange they demonstrate that the ICSU and its component programmes are doing a good job of productive co-ordination.

There is a significant problem in the lack of predictability of demand for the agencies' support of these events, because on average there is one open science conferences every couple of years. What the funding agencies need is something along the lines of a five-year program that we can feed our national funding processes. This is because agencies need this to justify why they are funding these instead of some of their own research.

The programs have responded to this point by acknowledging that they need to do a better job of strategizing the open science conferences, and are considering running some as joint events.

Evaluation
Introduced by Uno Svedin
A reasonable evaluation cycle for the international programs is every 6-10 years. The IGFA might play a role in these ICSU (and others) jointly organized evaluation processes.

The evaluation has to be considered as a process in several steps. The first step that might to be taken is a preliminary evaluation survey activity performed by a specially assigned working group. It could start its work in early 2006, if possible, and be ready within 6 months. The major tasks would be to:
-Absorb earlier evaluation experiences
-Consider which types of data that would be needed for the evaluation
-Consider preliminary evaluation targets in a process of consultative nature together with the international programs that are to be evaluated - but also in close contact with "sponsoring" organizations and the IGFA
-Consider how the further process might look like

The working group should report to the ICSU and the WMO and other relevant core bodies if any, and to the IGFA.

The final step involves the evaluation itself and the delivery of its result.

Preliminary considerations for the target of the evaluation could be

That the elements to be assessed are several:

- Scientific value
- Value added
    - A global versus national program (added value of coordination)
    - The impact of the global program on national programmes
    - Global programmes are a driving force (new science, inter/multidisciplinary…)
    - Interaction with other science org (e.g. EU)
- Organizational aspects
    - Planning process
    - Efficiency of coordination
    - Inter-intra coordination
- Policy impact
    - National / international policy processes

That the dynamics of the field are taken into account, although tasks that initially were defined also are important for the evaluation as a starting point.

Discussion in plenary

A lot of issues were converged in the discussion: Central IPO, few countries finance IHDP, the lack of co-ordinated services, existing financier inviting new, not a good idea to finance IPO, easiest to support a package - on big IPO, other scientific fields are better organized, the importance of all countries knowing the list of all IPOs, overview of countries contributions to the programmes, important with a strategy, centralized structure for IPO, agreement on support for infrastructure, the programs will give the IGFA the information they need and it is important with a similar dialog on the IGFA meeting in order to learn from each other.

Comments in the discussion about evaluation: Two types of evaluation, one more political (What happens in the future?), the other: What has been done?, strategic plans should focus on the future, important to see evaluation of the IGBP and the WCRP as a whole. The programs must take part in the evaluation. It is important that the programs are regularly evaluated.

Conclusion

Kirsten Broch Mathisen concluded the session by expressing that co-ordination is important and that it is not the funding level that is the problem, but the mechanisms. She suggested taking action after the Annual meeting, and asks the programs about their funding, needs for funding and suggestions for funding mechanisms in the future. IGFA considers that periodic international review of the four programs is not only desirable, but essential.

Action

1. A working group with the participation of the IGFA members and the Program directors. This group will present their suggestions at the next Annual meeting.

2. IGFA will continue to discuss with the ICSU ways in which IGFA might join with ICSU in co-sponsoring such reviews. As a first step IGFA Steering Committee will offer suggestions on procedures and evaluation criterions.

She ended the session with asking plenary to join her in the singing of the IGFA song.

IGFA Song

(to the tune of Summertime)

IGFA-time,
and the living's not easy,
We come together,
to share our views and ideas,
Though there's little money,
we try to share all our resources,
So that global change research booms and blooms.

One of these days,
government's will realize,
That this research,
is the key to it all,
Until that moment,
we'll work bravely together,
So, Hi!, IGFA members, don't lose hope.

CLOSED IGFA MEMBER SESSION

In the interest of transparency and due to the fact that there was not a great deal of pressing internal IGFA business, the session was very short. The short closed member session was devoted to the election of two Steering Committee members, as the terms of two had passed.

ELECTIONS

IGFA members elected Irene Gabriel or Austria and Andres Flores-Montalvo of Mexico to the steering committee.

NEXT IGFA ANNUAL MEETING

No decision was taken at the meeting though discussions about possible locations for the meeting were started. **(Note: At the printing of this document, the IGFA 2006 Annual Meeting was planned for 31 October through 3 November in Montreal, Quebec, Canada.)**

APPENDIX I
LIST OF DOCUMENTS AVAILABLE ON THE CD

Name of Folder	Name of Document	Type of File
2005 Meeting Information		
	Annual Meeting Agenda	PDF
	Participants List	PDF
Presentations and Remarks		
	United States Agency for International Development (USAID)- William Breed	PDF
	Inter-American Development Bank (IDB)- Marta Cehelsky	PDF
	Assessments of Impacts and Adaptations to Climate Change (AIACC)- Neil Leary	PDF
	Global Change and Rivers of the Amazon Headwaters- Michael McClain	PDF
	Interface between Global Change and Development Oriented Research **Next steps**- Renee van Kessel-Hagesteijn	PDF
	Swiss Mountain Research Initiative (MRI)- Raymond Bradley and Gregory Greenwood	PDF
	European Research Area (ERAnet) for Global Change Research/IGFA Europe- Hans de Boois	PDF
	Global Earth Observing System of Systems Update (GEOSS)- Thomas Spence	PDF
	International Polar Year (IPY)- Thomas Rosswall	PDF
	Africaness Workshop- Anthony Nyong	PDF
	Beyond Krusenberg- Sara Farley	PDF
Updates from Member Organizations		
	Austria	PDF
	Belgium	PDF
	Canada	PDF
	China Beijing	PDF
	Chinese Taipei	PDF
	European Commission	PDF
	France	PDF
	Iceland	PDF
	Japan	PDF
	Mexico	PDF
	Netherlands	PDF
	Norway	PDF
	Spain	PDF
	Sweden	PDF
	Switzerland	PDF
	United Kingdom	PDF
	United States of America	PDF
Program and Regional Network Presentations		
	International Council for Science (ICSU)	PDF
	World Climate Research Programme (WCRP)	PDF
	International Geosphere-Biosphere Programme (IGBP)	PDF
	International Human Dimenions Programme (IHDP)	PDF
	Earth System Science Partnership (ESSP)	PDF
	SysTem for Analysis Research and Training (START)	PDF
	Inter-American Institute for Global Change Research (IAI)	PDF
	Asia-Pacific Network for Global Change Research (APN)	PDF

APPENDIX II
LIST OF PARTICIPANTS AT THE ANNUAL MEETING 2005

First Name	SURNAME	Affiliation
David	ALLEN	U.S. Climate Change Science Program
Chris	BAKER	Natural Environment Research Council
Raymond S.	BRADLEY	University of Massachusetts
William	BREED	US Agency for International Development
Hans	de BOOIS	Netherlands Organization for Scientific Research (NWO)
Louis	BROWN	National Science Foundation
Marta	CEHELSKY	National Science Foundation
Yucheng	CHAI	National Natural Science Foundation of China
Jody	CHAMBERS	Asia-Pacific Network for Global Change Research
Chen-Tung	CHEN	National Sun Yat-Sen University
Dawn	CONWAY	Canadian Foundation for Climate and Atmospheric Sciences
Robert J.	DELMAS	Laboratoire de Glaciologie et Géophysique de l'Environnement (LGGE)
Valery	DETEMMERMAN	World Climate Research Programme/WMO
Sara	FARLEY	World Bank & Rockefeller Foundation
Andrés	FLORES-MONTALVO	Instituto Nacional de Ecología (INE)
Roland J.	FUCHS	The International START Secretariat
Irene	GABRIEL	Austrian Ministry for Education, Science and Culture
Gregory B.	GREENWOOD	The Mountain Research Initiative
Hans	GUDMUNDSSON	RANNIS - The Icelandic Centre for Research
Hiroki	HASHIZUME	Asia-Pacific Network for Global Change Research
Johannes	KARTE	Deutsche Forschungsgemeinschaft (DFG)
Jack A.	KAYE	National Aeronautic and Space Administration (NASA)
Renee	van KESSEL-HAGESTEIJN	Netherlands Organization for Scientific Research (NWO)
Chester J.	KOBLINSKY	National Oceanic and Atmostpheric Administration (NOAA)
Kabineh A.	KONNEH	National Oceanic and Atmostpheric Administration (NOAA)
Thorbjorg (Tobba) Valdis	KRISTJANSDOTTIR	RANNIS - The Icelandic Centre for Research
Anne	LARIGAUDERIE	DIVERSITAS
Cornelius (Neil) A.	LEARY	International START Secretariat
David M.	LEGLER	U.S. CLIVAR Project Office
Margaret	LEINEN	National Science Foundation
Ingunn Borlaug	LID	The Research Council of Norway

First Name	SURNAME	Affiliation
James R.	MAHONEY	National Oceanic and Atmostpheric Administration (NOAA)
Norman	MARCOTTE	Natural Sciences & Engineering Research Council of Canada (NSERC)
Kirsten Broch	MATHISEN	The Research Council of Norway
Michael	MCCLAIN	Florida International University
Linda	MOODIE	National Oceanic and Atmospheric Administration (NOAA)
Richard	MOSS	U.S. Climate Change Science Program
Lars	NILSSON	Swedish Research Council (VR)
Kevin	NOONE	International Geosphere-Biosphere Programme (IGBP)
Mercedes	PARDO	Spanish Committee on Global Environmental Change Research
Jurg	PFISTER	Swiss National Science Foundation (SNSF)
Esteban Manrique	REOL	MINISTERIO DE EDUCACION Y CIENCIA (MEC)
Martin	RICE	Earth System Science Partnership (ESSP)
Vanessa	RICHARDSON	National Science Foundation
Thomas	ROSSWALL	International Council for Science (ICSU)
Peter A.	SCHULTZ	U.S. Climate Change Science Program
Ching-jyh	SHIEH	National Science Council
Thomas W.	SPENCE	National Science Foundation
Uno	SVEDIN	The Swedish Research Council for Environment, Agriculture and Spatial Planning (FORMAS)
Holm	TIESSEN	Inter-American Institute for Global Change Research (IAI)
Ahsha N.	TRIBBLE	National Oceanic and Atmospheric Administration (NOAA)
Naoya	TSUKAMOTO	Ministry of the Environment Japan
Pierre	VALETTE	European Commission
Martine	VANDERSTRAETEN	Federal Office for Science, Technical and Cultural Affairs, Belgium
Bernard	WEHRLI	Swiss Federal Institute for Aquatic Science & Technology (Eawag)
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Appendix III

Schedule for the IGFA 2005 Annual Meeting

Monday 24 October

Arrivals to Washington, DC Area

Tuesday 25 October

1200-1700 Registration **Location: Carlyle Foyer**

1230-1800 IGFA Steering Committee and Staff Group Meeting

1500-1700 Steering Committee and Staff Group Meeting with Program Directors

1700-1800 IGFA Steering Committee and Staff Group Meeting (cont.)

Wednesday 26 October

Note: Light breakfast items, coffee, and juice will be available during the morning until morning coffee. Soft drinks and water will be available throughout the day.

830-900 Welcome and presentation of the Annual Meeting Agenda
Location: Carlyle Room

Dr. James MAHONEY, Director, U.S. Climate Change Science Program
Margaret LEINEN, (IGFA Chair)

900-1100 Program Presentations, Session I (15 minute presentations, 5 minutes Q&A)
(Chair: Dawn CONWAY)(Rapporteur: Tobba KRISTJANSDOTTIR)

The International Council for Science (ICSU)	Thomas ROSSWALL
World Climate Research Program (WCRP)	Valerie DETEMMERMAN
International Geosphere-Biosphere Program (IGBP)	Kevin NOONE
International Human Dimensions Program (IHDP)	Oran YOUNG
Diversitas	Anne LARIGAUDERIE

1100-1130 Coffee **Location: Carlyle Foyer**

1130-100 Program Presentations, Session II (15 minute presentations, 5 minutes Q&A)
(Chair: Dawn CONWAY)(Rapporteur: Tobba KRISTJANSDOTTIR)

Earth System Science Partnership (ESSP)	Martin RICE

System for Analysis Research and Training (START)	Roland FUCHS
Inter-American Institute for Global Change Research (IAI)	Holm THEISSEN
Asia-Pacific Network (APN)	Hiroki HASHIZUME

1300-1400 Lunch **Location: Brent Room**

1400-1830 Symposium- Global Environmental Change Research and Development
(Chair: Margaret LEINEN)(Rapporteur: Lou BROWN or David ALLEN)

Speakers:

United States Agency for International Development (USAID)	William BREED
Inter-American Development Bank (IDB)	Marta CEHELSKY
World Bank	Robert WATSON
START Project Speaker	Neil LEARY
IAI Project Speaker	Michael MCCLAIN
Research Speaker	Renee van KESSEL-HAGESTEIJN

1600-1630 Coffee (at the discretion of the Chair) **Location: Carlyle Foyer**

1830-1930 Reception: Beer, wine and soft drinks as well as a cash bar will be available for meeting participants (Holiday Inn Select, Brent Room 1)

1930- IGFA Annual Meeting Banquet- The Wharf

Wharf Restaurant
(703) 836-2836
119 King St
Alexandria, VA 22314

Thursday 27 October

Note: Light breakfast items, coffee, and juice will be available during the morning until morning coffee. Soft drinks and water will be available throughout the day.

0830-1030 Reports from IGFA Members **Location: Carlyle Foyer**
(Chair: Hans de BOOIS)(Rapporteur: Lars NILSSON)

Country Reports

1030-1100 Coffee **Location: Carlyle Foyer**

1030-1230 Reports:
(Chair: Hans de BOOIS)(Rapporteur: Lars NILSSON)

Swiss Mountain Research Initiative (MRI) (30 minutes)

European Research Area (ERAnet) for Global Change Research/IGFA Europe (Hans de BOOIS) (15 minutes)
Global Earth Observing System of Systems Update (GEOSS) (Thomas SPENCE)(30 minutes)
International Polar Year (IPY) (Thomas ROSSWALL (20 minutes)
Africaness Workshop Report (Anthony NYONG) (20 minutes)

1230-1400 Lunch **Location: Brent Room**

1400-1830 Global Environmental Change Research and Development: The Role of IGFA
(Chair: Uno SVEDIN)(Rapporteur: Chris BAKER)

Presentation of Draft background paper on IGFA and development reported to plenary
Presentation by Sara Farley

1600-1630 Coffee **Location: Carlyle Foyer**

1900 Walking tour of Alexandria
Participants will split into two groups and be guided through Old Town. The tour will end at a restaurant in Old Town for a reception and dinner at a location to be determined. Walking tour will end at restaurant for dinner.

2030- Dinner: Restaurant Gadsby's Tavern

Gadsby's Tavern
134 North Royal Street
Alexandria, Virginia 22301

Friday 28 October

Note: Light breakfast items, coffee, and juice will be available during the morning until morning coffee. Soft drinks and water will be available throughout the day.

0830-1100 The Future Role of IGFA with the Research Programs
Location: Carlyle Room
(Chair: Kirsten Brock MATHISEN)(Rapporteur: Ingunn LID)

Reflections from ICSU and the Program Directors (15 minutes)
Reflections from IGFA Steering Committee (15 minutes)
Discussion in plenary

1100-1130 Coffee

1130-1230 IGFA Member Session (IGFA Staff and Steering Group and IGFA Members)

1230-1400 Buffet lunch and tour de table **Location: Snowden Rooms 1,2 and 3**

1400	**Meeting Adjourn**
1430-1730	**Steering Committee Meeting** (Open to the IGFA Steering Committee)

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International Group of Funding Agencies for Global Change Research

Updates from Member Organizations

Holiday Inn Select
Old Town Alexandria, Virginia, USA
October 25-28, 2005

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NATIONAL UPDATES 2005: GUIDELINES FOR ORAL AND WRITTEN SUMMARIES

Every year, the participating funding "agencies" respond to the plenary IGFA by contributing approximately one to two pages of information described below. This information has to do with how global change research is funded, organized and in general terms supported by the respective agencies. The members are encouraged to give a broader "national" perspective than what just pertains to their own agency.

Short oral presentations at the plenary IGFA meeting (5 min each) should be based on and referred to in the written material. The written report and the slides for the oral presentation should be sent to the secretariat in advance of the meeting (IGFA@usgcrp,gov), or at the latest at the registration at the conference site in Alexandria. *A standardized powerpoint presentation template is provided for your use to assure consistency of the presentations.*

This year, the report should emphasize the following issues:

A. As always, please describe the current status of national Global Change Research funding (up/steady/down). Please also describe important changes, new agency and/or national priorities, new activities, new initiatives, and large new programs.

B. The formation of the Earth System Science Partnership (ESSP) and initiatives by organizations such as the World Bank to incorporate climate change as a necessary component decision-making related to development, it is clear that global change research will increasingly be utilized in development research and projects. What communication currently exists to supply timely and useful climate information to development agencies? Do the Millennium Development Goals, as they pertain to climate play in any way into setting the global change research agenda in your agency or at the national level? Please describe what, if any national manifestations of this trend.

C. Increasingly, scientists and funding agencies involved in global change research are being called upon to conduct and support research that it relevant to decision -making and policy. Please describe how this trend is applicable to your agency and how it may be relevant at the national level as well. How has the ratification of the Kyoto protocol affected the global change research agenda in your country? Is there a mechanism for

providing climate information to decision makers, resource managers and other stakeholders in a timely and useful manner?

Finally, please include an appropriate agency contact point for your report.

BELGIUM - Belgian Federal Science Policy (BELSPO)

NATIONAL UPDATE 2005

1. Important changes, new initiatives/foci, new developments

1.1 Science for a Sustainable Development (2005-2010)(SSD)

The Council of Ministers approved implementation of a third Multi-annual Research Programme 'Science for a Sustainable Development (2005-2010) (SSD) Global change research is embedded within this new programme. The total budget is 65,4 MEUR. It can be considered as a follow up of the Second Scientific Support Plan for a Sustainable Development Policy. The drivers behind this proposal are international treaties or strategies such as the Lisbon Strategy (with the 3 % objective), the Amsterdam Treaty, the revised E.U Sustainable Development Strategy, commitments which Belgium has made within the framework of different international Conventions and Agreements[8], recommendations by divers international organizations, development of national policy plans and in particular the creation of a European research area.
The network projects can include a non-Belgian university or research institute. This participation w takes place on a co-financing basis. Maximum 50% is paid by the BELSPO and this amount is limited to 20% of the overall budget of the submitted proposal. Where possible and interest is manifested, the link of selected projects with the bilateral programmes with China, Russia and Vietnam, coordinated by the Unit for international coordination, is also encouraged

The Programme addresses the following priority areas: 'Energy', 'Transport and mobility', 'Agri-food', 'Health and environment', 'Biodiversity', 'Climate (incl. Antarctica and the North Sea)','Atmosphere, terrestrial and marine ecosystems (incl. Antarctica and the North Sea)' and 'Transversal research'. The entirety of the priority research areas was chosen because of the necessity to deal with the complex, global, interrelated problems which lie at the basis of a sustainable development policy. This choice responds to the strategic needs, of different levels of authority, for policy-supporting research and to the challenge to maintain and develop a national scientific expertise in complex and strategically important areas. In order to better translate the concept of sustainable development in and between the priority areas, transversal and generic research is necessary. Accordingly, the Programme includes a "Transversal research" part, in order to deal with the following questions:

- the change of unsustainable production and consumption patterns;
- the role of spatial and temporal dimensions of sustainable development;
- the search for and analysis of instruments to support a sustainable development policy, in particular instruments aimed at a better equilibrium between the social, economic and environment-related pillars of sustainable development.

[8] Agenda 21, the Implementation Plan of the WSSD (World Summit on Sustainable Development), the Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, the Vienna Convention and the Montreal Protocol, the Convention on Long-Range Trans-boundary Air Pollution (LRTAP), the Convention on Biological Diversity (CBD), the Antarctic Treaty and the Madrid Protocol, the declarations of the inter-ministerial North Sea Conferences, the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic Ocean, the Aarhus Convention, the Millennium Declaration of the UN, the Doha Declaration of the World Trade Organization (WTO), the Frankfurt Charter, the Helsinki Agreement on Health and Environment…

The programme is based on several calls of proposals over a period of 4 years, mainly for financial reasons.

The first call of mid 2005, related to the themes 'Climate' and 'Atmosphere' and with a budget of 13,25 MEUR resulted in a proposal for funding of 15 projects out of the 36 'letters of intent'. 4 projects include a foreign partners (Finland, Germany, and UK). All the proposals are peer reviewed by 3 foreign experts and by a review panel. The strategic evaluation is the role of the Steering Committee which consists out of representatives of Federal and Regional Administrations responsible for areas that are related to the programme. The final decision on the selection of projects to be funded has to be taken by the Minister The next call is planned for the beginning of 2006 and relates to all the other areas.

The budget for the first call is more or less status quo with respect to the investments in the previous years but there has been a little shift. The budget includes and research in support for the preparation and evaluation of the climate policy in particular with respect to adaptation and mitigation and funding of foreign partners and the cost of scientists went up. The second call will address i.e. energy- research which is also important in the framework of mitigating climate change as well as the impact of climate change on biodiversity as well as on terrestrial and marine ecosystems

1.2 Involvement of the Federal Science Policy in the EUROCORE 'Eurodiversity'

In 2004, the Federal Science Policy has joined the EUROCORE Eurodiversity initiative of the European Science Foundation. In this way, an additional funding opportunity was offered to Belgian scientists in the field of biodiversity. It is also a way to extend the Belgian expertise developed in the framework of the SPSD on a European scale After the selection of projects by the ESF, 3 research teams will benefit, with a budget of about 750 000 EUR.

1.3 A new Belgian research station in Dronning Maud Land, Antarctica

Following the decision of the Council of Ministers, held on the 6 February 2004, a new Belgian research station will be set up in the Sør Rondane Mountains, Dronning Maud Land, Antarctica.

In order to complete its information on the interests and needs of Belgian researchers to develop research activities related to the functioning of the newly planned research station in Antarctica, the Belgian Science Policy launched a call for Expressions of Interest (EoI) (deadline July 2005) to the Belgian science community. This survey of the Belgian science interests will make it possible to put-up a first priority list of projects to support within the first station working seasons as of end 2008. The major goal of the call at this point is to gather the necessary information to develop the concept and design of the base in function of the needs of the scientists.

1.4 Involvement of BELSPO in Global Change related ERA-NETs

The Federal Science Policy is taking part in diverse ongoing Global Change related ERA-NETs *(European Research Area – Networks)*such as MARINERA, CIRCLE, EUROPOLAR, BIODIVERSA etc. It is also a partner in ERA-NET

proposals that were introduced to the E.C. on October 4th such as ESS-NET (Earth System Science)

1.5 GEOSS

Belgium participates in GEOSS (Group on Earth Observation System of Systems), wherein the EC-initiative GMES represents an important and independent contribution of Europe. Belgium is in favour of not creating completely new structures to govern GEOSS and to give mechanisms such as IGOS-P a dedicated role. It supports strongly the 'user dialogue 'and the 'capacity building' part of GEOSS. It is very strongly involved in the EC's GMES integrated project on land cover and vegetation entitled 'GEOLAND and in particular within the work units regarding Food Security and Crop Monitoring.

1.6 Other

BELSPO financially contributes since 2001 (to 2006) to the GBIF, and since to 2004 to DIVERSITAS and the IPCC. It supports the LUCC core project office until in order to ease the transfers to the new IGBP project on land use and land cover and to finalise some final publications as well as to take care of the transfer and integration of results of the LUCC Project into the policy development in particular with respect to the desertification convention, the UNFCC and the Convention on biodiversity.

BELSPO supports the SOLAS secretariat by providing for Focus 1 a part time post doc for 2 years (15-12-2004 / 14-12-2006)
The proceedings of the international symposium on "Tropical forest in a changing global context, Brussels, 8-9 November 2004, announced in the previous IGFA meeting are available now: http://users.skynet.be/kaowarsom/nd/actnd.html)

2. Development links

2.1 Desertification

In 2006, announced as the 'Year of (struggle against) Desertification', BELSPO, in co-operation department responsible for Development Cooperation plan to organise a conference, possibly in twinning with Morocco. The conference will aim at a better information exchange and an improved co-ordination between the experts for implementing adequate multi-disciplinary projects addressing specific regional needs.

2.2 China R&D cooperation

In the framework of Sino-Bel co-operation agreement, a common project is launched (2005-2007), entitled 'Hydrological Modelling and Remote Sensing to Support Integrated Management of Water resources and the Arid and Semi-Arid Ecosystems in the Tarim Basin'. The project is linked with the UNESCO HELP (Hydrology for the Environment, Life and Policy) Programme. It deals with the most fragile river basins in the world.

3. Policy Links

More and more, the decision makers want research to be policy relevant on the short term. Economical considerations (cost-benefit on the short term and employment (other than as a

researcher) seem to be more important than pursuing long term environmental objectives supported by adequate basic focused research. It is difficult to convince policymakers of the policy relevance of oriented basic research.

The more, acquiring all necessary scientific knowledge required to provide answers to policy questions in the field of Global Change is far beyond the scope of individual regions, countries, and disciplines. Therefore BELSPO programmes aim to stimulate contributions to international research efforts.

Strategic tools have been introduced into the programmes to increase project effectiveness e.g. the promotion of multidisciplinary research and project user groups, project clustering. Additional support mechanisms include the organization of workshops and symposia where scientists and policymakers meet, programme and project information is disseminated, and press contacts on policy relevant issues take place.

Occasionally, specific reports are produced and scientists are invited to take part in policy-preparing fora. Discussion platforms constitute a specific supporting action. The current platforms are 'Biodiversity' and 'Indicators'. In 2004, the structure of the Belgian Biodiversity Platform has been reshaped and reinforced (notably in integrating the former Belgian node of the GBIF and the meta-database on Belgian scientific resources in biodiversity).Today, the platform is a network of 3 Information Technology specialists and 6 high-level scientist experts in biological diversity. The main aim of the platform is to facilitate dialogue and collaboration between scientists, science and environmental policy makers working in the field of biodiversity and biodiversity related research in Belgium and abroad

BELSPO programme managers are involved in several policy-preparing fora at the national and international levels, where they have the opportunity to exchange information from their research programmes, notably on relevant research projects and results, and bring back new elements to be included in future research programmes.

Occasionally, specific reports are produced such as the A&I Report on Global Change Research in Belgium that was funded by BELSPO . This is just one of the initiatives taken towards improved integration of research results into information relevant to policymaking...

The report though incomplete, is an illustration of how scientific results can be integrated into policy-relevant information. It aimed at presenting an illustration of Belgian research results presented via policy relevant questions and answers, clustering scientists around 'hot spots'. It also mentions how research output and expertise is integrated in the policy development. The latter is based on questionnaires that were addressed to the scientists.

The report (hard-copy or CD-ROM) is available on request. And can be consulted on http:///www.belspo.be

National Update 2005: A summary of People's Republic of China

1. Current status

The total amount of funding global change research in 2005 still cannot exactly be quantified, as funding comes from many sources and different funding agencies define GCR in different ways. However, the total GCR funding approximation in China is at least 50 million USD for 2005. The funding for GCR this year is rising shapely as the overall R&D funding in China does.

Funding for GCR in China is spread amongst many Ministries, e.g. the National Natural Science Foundation of China (NSFC), Ministry of Science and Technology (MOST), Chinese Academy of Science (CAS) and several other administrations such as the Ministry of Land and Resources, Ministry of Education□China Meteorological Administration(CMA),State Oceanic Administration(SOA),etc., all carry out their own intramural or extramural research related to global change.

According to result of an inadequacy statistical, this year the amount of Earth Science Department of NSFC funded GCR, via projects under the categories of General Program, is about 120 projects with support of about 35 million RMB.

The Department of Earth Science of NSFC has designed a special emphasis area named "global change & earth system science" to fund the key projects related to GCR in China. Within this area 7 proposals with support of about 10 million RMB are funded in 2005.

Major Research Plan of NSFC titled "Global Change and the Regional Responses" support 5 key projects and 4 general projects in 2005, with the total amount spent of about 7 Million RMB.

The major Chinese GCR related events of the year 2005 includes:

- January 2005, a 12-man Chinese expedition arrived at the highest icecap peak in Antarctica. They are the first humans to reach the peak of Dome A Icecap 4,093 meters above sea level. The polar expedition was organized by the State Oceanic Administration. Scientists in this expedition obtained ice core samples that can provide high-quality, high fidelity and abundant information for their research into global climatic changes. An automatic weather station was also established on the ice peak by Chinese Academy of Meteorological Sciences.
- China Climate Observation System (CCOS) was proposed several ago by CMA. This year, a big progress is made and a detailed blueprint of CCOS was drawn by scientists from CMA, CAS and other research institutions. The ambitious observation system will be implemented next year.
- MOST approved to establish the National Marine Research Center, a national marine research flagship. The center will be built in Qingdao, a seaside city where more than half of marine research institutes of China locate.
- To further strengthen its efforts in regional carbon research, the Executive Committee of the

Global Carbon Project (GCP) approved an affiliated office established in Beijing. Housed at the CAS Institute of Geographical Sciences and Natural Resources Research, the GCP Beijing Office has a supporting and coordinating role nationally, and performs as an activator to boost an integrated regional carbon research within Asia, in particular to provide scientific information on regional carbon cycling, and its relevance to global climate change.

- To examine the potential to form a China National Geotraces program and an Asian regional Geotraces network, A regional workshop of GEOTRACES has been held in Xiamen under supported by NSFC and the US National Science Foundation.
- To further strengthen its efforts in marine biodiversity research, NSFC supported a workshop of Census of Marine Life (CoML) in 2004 and China National Commission for CoML was set up.

2. New trends related to development

The formation of the Earth System Science Partnership (ESSP) and other international initiatives to incorporate climate change as a necessary component decision making related to development have big impacts on global change research in China. New research projects show more development oriented trends. National development agencies increasingly sponsored global change related research projects.

Currently the existing communication to supply timely and useful climate information to development agencies includes:

- Almost each development agency or government ministry that required climate information have their regularly briefing meetings, in which representatives from research institutes and universities give their timely information on climate, hydrology etc..
- National Climate Center of China and National Marine Environmental Forecast Center are two major sources for providing current climate status and forecasts.

The UN's Millennium Development Goals, as they pertain to climate and global change, generally increase awareness of the importance of global change research in China.

3. New trends related to decision-making

There is an overall increasing trend in global change research related to decision-making and supporting in China. However different funding agencies play different roles in the loop of basic research-application research-decision-making research. NSFC emphasis more on basic research while other agencies such as MOST, Chinese Academy of Sciences (CAS) and other agencies emphasis more on application research and decision-making research.

For global change research, the data collecting and sharing are crucial for both basic research and decision-making related research. NSFC's funding for global change has been put these on top priority. Department of Earth Sciences of NSFC continues to carry out data share work in Atmosphere and Ocean discipline in 2002 in order to conduct better National Natural Science Foundation of China program management and data share.

Ratification of Kyoto protocol has changed agenda on global change research in China. It is important to get accurate information on emission of green house gases. In recent few years several funding agencies including MOST, NSFC, CAS etc. have funded big research projects on emission of green house gases, carbon cycle and clean energy etc.

There is an effective mechanism for providing climate information to decision makers in China. China Meteorological Administration and State Ocean Administration , along with their local branches, are two official channels to provide climate information both at the national and local levels.

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National Updates to IGFA from Taiwan (2005)

Ching-Jyh Shieh

National Science Council, Taiwan

A. Current status of national Global Change Research funding, and description of important changes, new initiatives, new activities and large new programs.

The funding level of the national global change research within the National Science Council (NSC) has slightly increased to around 3.2 million US$. Within the NSC, the Department of Life Sciences has allocated a special fund to set up a new program to consolidate biodiversity related research. And a special fund has also been allocated to conduct global change impact, adaptation and technology assessments to meet new challenges in the post-Kyoto era.

Furthermore, in response to the formation of the Earth System Science Partnership (ESSP), the NSC funded projects to study the carbon cycle in the East and South China Seas. The South China Sea Regional Carbon Project involved scientist from six Southeast Asian countries and was endorsed by the Global Carbon Project. A call for proposal has also been issued to study the water cycle in South East Asia.

The Academia Sinica located in Taipei also established a new Research Center for Biodiversity. The goals are to promote, coordinate and sponsor basic biodiversity research in Taiwan, and to enhance and integrate domestic and international research cooperation, linking biological, biotechnological, ecological and socio-economic disciplines in order to pursue integrated research.

B (I). What communication currently exists to supply timely and useful climate information to development agencies?

The National Council for Sustainable Development of Taiwan is chaired by the Premier, with the Environmental Protection Administration (EPA) and the Research Development and Evaluation Commission (RDEC) serving as the secretariat. This secretariat is responsible for the coordination of national sustainable development related issues and also provides relevant climate information to the related agencies. It is also responsible for publishing the UNFCCC's national communications for Taiwan.

B (II). Do the Millennium Development Goals, as they pertain to climate and global change, play in any way into setting the global change research agenda in your agency or at the national level? Please describe what, if any national manifestations of this trend.

Although Taiwan is not a member of the UN, our government is following UN activities closely and is committed to meet the millennium development goals. Some of the goals are mainly the responsibility of other ministries. However, the NSC, along with the EPA can make substantial contributions to the goal of "ensuring environmental sustainability." It aims to integrate the principles of sustainable development into national policies and programs, reverse loss of environmental resources, and others. For the past six years, the NSC has supported an

integrated project, **Sustainable Taiwan: Vision and Strategy**. More than 50 scientists from various disciplines participated. The major results from that project included the construction of a set of sustainable development indicators for Taiwan, and also the vision of a sustainable Taiwan and the strategies to realize the vision derived from scenario simulations. Some of their conclusions were adopted as national policies.

The NSC can be instrumental and will continue to support relevant policy-oriented projects that can contribute toward environmental sustainability, at least in Taiwan.

C (I). How has the ratification of the Kyoto protocol affected the global change research agenda in your country? Is there a mechanism for providing climate information to decision makers, resource managers and other stakeholders in a timely and useful manner?

Yes, indeed, the ratification of the Kyoto Protocol (KP) did affect our global change agenda. The adaptation and early warning issues are receiving higher priority, however, basic data monitoring and impact assessment are also being strengthened.

In response to the KP ratification, the government set up a special Committee (chaired by the Premier) in Spring 2005 to deal with the issues related to the KP, which included (i) CO_2 reduction strategy and planning, (ii) economic impact, adaptation and incentive policy for emission reduction, (iii) international negotiation and general coordination, and (iv) scientific research and educational outreach. While several key ministries are responsible for work related to issues (i) to (iii), the NSC and Ministry of Education are responsible for issue (iv). This Committee thus serves as a capable mechanism to provide relevant climate information to policy makers and resource managers. But for other stakeholders, say NGOs or the general public, the mechanism is not so well established.

C (II). Increasingly, scientists and funding agencies involved in global change research are being called upon to conduct and support research that is relevant to decision –making and policy. Please describe how this trend is applicable to your agency and how it may be relevant at the national level as well.

As stated in the earlier paragraph, the NSC is responsible for scientific issues within the special Committee formed to meet the challenges after the KP ratification. Since several other ministries (Council of Agriculture, EPA, and Ministry of Economic Affairs) are also responsible for global change related activities, the NSC is urged to conduct an extensive review on the overall performance of those agencies, and also to come up with a strategic plan. Responding to this request from the government, the NSC organized a team of experts to address two topics. One is related to carbon dioxide reduction, recovery and storage technology, as well as renewable energy technology assessment and recommendation. The other topic is a global change impact and adaptation strategy study for Taiwan. These works are still underway, and their recommendations will serve as an important reference for longer term planning. Other funding agencies are also encouraging scientists and NGOs to conduct global change related research at the regional, national and local levels. Again, although Taiwan could not sign the Kyoto protocol, the government is doing its best to abate the increasing rate of CO_2 emission.

On other national level activities, this country conducted two important meetings over the past nine months, the “Seventh National Science and Technology Conference” and “National Energy Conference.” During those meetings, the vision of sustainable economy, sustainable

environment and sustainable society were reaffirmed. And the issues of sustainable energy and green technology development were designated as higher priorities. Thus many scientists from various disciplines and institutions are involved in completing the action plans related to those prioritized issues.

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German

Bundesministerium für Bildung und Forschung and

Deutsche Forschungsgemeinschaft

GCR in Germany is mainly funded by the Federal Ministry for Education and Research (BMBF) and the German Research Foundation (DFG). Institutes of the Max Planck Society, the Helmholtz and Leibniz Association contribute significantly to GCR. The overall funding situation is stable to rising.

BMBF is funding two new research programs on climate protection as well as on the sustainable development of the mega cities of tomorrow. A contract has been signed for a new research-air craft (HALO).

DFG is funding new programs on paleo-climatic reconstructions including a significant contribution to the ESF EUROCORES “EUROCLIMATE”. In addition, two new programs on “Megacities: Informal Dynamics of Global Change” and “Mass Transport and Mass Distribution in the Earth System” (contribution of the new generation of satellite gravity and altimetry missions to geosciences) have been established for funding. A set of new GCR priorities has been defined by the National Committee for GCR. Initiatives for cooperation and joint funding have been taken on a bilateral level, e.g. with scientists from the UK and P.R. China.

After the government’s decision on an “Initiative for Excellency”, aiming at funding clusters of excellency, large graduate schools and innovative concepts for universities, DFG will experience a nearly 30 % increase of its budget from 2006. The response to this initiative is overwhelming, with a number of submitted proposals dedicated to GCR.

The governmental scientific advisory board for Global Change is giving advice to both the Federal Ministry for Research and the Ministry of Economic Development. The Millennium Development Goals are mandatory for all members of the German government. They, therefore, influence BMBF’s global change research agenda. An example is the new mega cities research program, which in general aims and improving living conditions of mega city-dwellers.

For BMBF research relevant for decision-making has become increasingly important in recent years whereas DFG follows more bottom-up philosophy.

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Netherlands

IGFA 2005 National update The Netherlands

1. Funding mechanisms and funding levels

Over the last couple of years, NWO is increasingly involved in funding of international cooperation in research. That started with relatively small bilateral exchange programmes, but expanded considerably with the ESF Eurocores. The EC-FP6 mechanisms have increased the multilateral cooperation in NoEs and IPs, but at large, that was independent from NWO-funding. The ERA-NET mechanism however, triggered an acceleration of international cooperation between the national funding agencies in Europe. NWO is involved in many of the current ERA-NET proposals. One of these proposals (ESS-NET) was initiated by the European IGFA members and is specifically aimed at the multidisciplinary area of Earth System Science. The proposal was submitted in October 2005. The aim of ESS-NET is to foster multilateral cooperation between the European GECR funding agencies, eventually resulting in multilateral programmes and calls with joint funding. If this proposal gets approved for funding by the EC, this will add an important dimension to IGFA as well.

In The Netherlands budgets for global change research in 2005, the impacts of the national impulses for “the knowledge infrastructure” are becoming effective. An impulse of M€ 40 over 5 years is dedicated to climate change and spatial planning. Another impulse of M€ 20 is for a programme on water management. In both cases the programmes are predominantly focussed at domestic issues, the more because requirements are that stakeholders and additional (private) funding should be involved. Consequently, the international spin-off of these programmes will be limited.

NWO has no role in the funding and management of the above two programmes. Over 2004-2005 the NWO funding level of GECR is stable, but the current programmes will expire in 2006 through 2008. So far, there is still little view on funds for continuation of funding. The future is still gloomy. Preparations are being made to give earth system science a proper place in the NWO Strategy 2007-2010.

2. Communication with development agencies on climate information and MDG

A few of the Millennium Development Goals have immediate relations with the research agenda of GECR programmes, but the MDG are interrelated. In particular this emphasises the relevance of a cross cutting approach as the programmes of ESSP. In the NWO strategy 2007-2010 two themes will be proposed which pertain to the MDG: 1) energy and emissions and 2) water, rivers and coastal zones. In both themes a wide spectre of disciplinary issues come together, requiring efforts from technical sciences, various natural sciences and from the social sciences. Both these themes relate to the MDG, so far as research proposals are connected to developing countries. In 2004 NWO, together with the Royal Academy for Arts and Sciences and the Indonesian Institute of Sciences, launched a research programme on the coastal area of East Kalimantan, explicitly aiming at multidisciplinary and development relevant research proposals. As explained here below, there is no separate communication with the development aid agency on climate information. This is considered to belong to the tasks of the researchers themselves and their institutions.

3. Communication with policy on climate information; policy relevance

Global change is not restricted to a specific sector of policy. The Ministry of Housing, Environment and Spatial planning has the lead on national climate change policy, in particular the Kyoto-process and mechanisms. The Ministry of Public Works has the prime responsibility for national water management and flood control, but this applies also for the provincial and water board level. The Ministry of Economic Affairs has the lead in energy policy. There is no specific communication action aimed at one of these ministries, nor at the national development aid agency DGIS.

NWO has a generic communication strategy, aimed to bring the need, challenges and benefits of research and science to the wider public, varying from school children to policy makers. The key research institutes on the topic of climate change work together in communication on climate change issues. In particular the two above mentioned programmes are very relevant for different fields of policy and management. These programmes keep close contact with the relevant ministries, provincial bodies and water boards.

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The Research Council of Norway (RCN)

Status of national Global Change Research and important changes
In Norwegian research there is now an increased focus on research for internationalisation and innovation. In recent years the pace and extent of international research cooperation has accelerated tremendously. Norwegian research activities must be adapted to international trends. The overall expansion of European research cooperation and national participation in the European Communities Framework Programme for Research and Technological Development is important in this respect. There is also a particular focus on involving Norwegian projects and research groups directly in the major international programmes, for example WCRP, IGBP and IHDP. There is also a change to see in funding as an increasing number of Ministries are funding programmes for different global change research.

The current status of national Global Change Research funding
The Research Council of Norway's funding for global change research is steady. However, there is an increase, if the research for renewable energy and energy efficiency is included.

Important Tasks for the Research Council- New Whitepaper on research
In spring 2005 the Government presented its 2005 White Paper on research. The Government presented a promising and ambitious plan for Norwegian research policy. The White Paper plans a considerable increase of Norway's research investments, and suggests several initiatives to strengthen Norwegian research.

In its White Paper no. 20 "Vilje til forskning" ("Commitment to Research"), the Government aims for an increase in the total investment in research to three per cent of the GDP by 2010. This requires a real growth of NOK 5.8 billion until the year 2010. The Government also proposes to increase the capital in the Research and Innovation Fund by NOK 14 billion to NOK 50 billion from 1 January 2006.

Three structural areas are to be given priority: Internationalisation of research, basic research (with emphasis on research quality and the natural sciences and mathematics) and thirdly, research-based innovation and business development. The Government proposes to strengthen research particularly within the thematic areas of energy and environmental issues, food, oceans and health. The three technology areas of priority are information and communication technology (ICT), biotechnology, materials and nanotechnology. They are all relevant to the development of environmental technology.

New environmental research programme(s)
The Research Council has started a strategic planning process with the aim of starting one or more environmental research programmes in 2006. This research area is to a large extent policy relevant in Norway, and the government (Ministry of environment and Ministry of food and agriculture) is actively participating in the planning process. The new research activity should build on five environmental programmes. The research themes in the existing programmes include pollution, biological diversity, wild salmon stocks and management, ecosystem and landscape changes and conditions for sustainable development. There are clear interlinkages between the research themes, particularly in relation to decision making and policy, and it is expected that the planning process will improve coordination and strategic relevance of environmental research in Norway. Globalization and internationalisation are among the guiding perspectives in the planning process, along with ecosystem and landscape perspectives, society drivers and pressures and environmental management.

Global change committee

The Research Council of Norway has appointed a national committee to assist in its efforts to strengthen and coordinate research on global environmental change.

The Norwegian Global Change Committee will be an advisory body to the Research Council on global change research. The committee will assist in the efforts to strengthen and coordinate Norwegian global change research as well as in the communication of research results and research activities. The committee will also be working for the advancement of an interdisciplinary and holistic approach to this type of research.

The committee will mainly focus on the four international global change programs and the International Institute for Applied System Analysis (IIASA), and also ensure close connections with the global change research under the Framework Programs of the European Union.

The committee has an advisory role; it has no funds of its own. However, the administration of the Research Council has set aside funds for global change related activities such as workshops, travels, membership fees, means to support junior researchers who attend the IIASA's summer school, and other forms of networking activities.

Distinguished Guests at Global Change Workshop
The directors of the four major Global Change programmes IHDP, IGBP, WCRP and DIVERSITAS, and the director of the International Institute for Applied Systems Analysis (IIASA) presented global change research at a workshop hosted by the Research Council of Norway November-2004. Norwegian research communities are strongly present in international global change research but not very active in the international global change programmes (Except for the 6th Framework Programme of the E.U.). In an attempt to rectify this, the Research Council was organising and funding this information workshop.

International Project Office for GECHS Programme at the University of Oslo
GECHS (Global Environmental Change and Human Security is one of the core projects within IHDP. The newly established IPO is funded by the The Research Council of Norway and will be running at the University of Oslo for the next 3 years. Some of the key themes addressed through GECHS include:

- environmental change, peace and cooperation
- environmental security and conflict
- social vulnerability and adaptive capacity
- global environmental change in the context of globalization
- health and human security,
- gender, human security and environmental change

West-Balkan cooperation programme
Cooperation with the countries on West-Balkan will continue for another four years (2006-2009) in the second phase of the West-Balkan programme. The thematic focus in the second phase of the programme are “governance and democracy building” and environmental protection, management of natural resources and marine issues”. The programme will also support projects which are indirectly linked to these topics and that will contribute to development in the mentioned thematic areas.

A new centre for environmental research
A new Centre for Interdisciplinary Environmental and Social Research, CIENS, at the Oslo Innovation Centre opened in spring 2005. CIENS co-locates seven institutions of environmental and social research, and the Research Council of Norway has contributed with approximately NOK 20 million to the centre. The construction of the new centre starts at the beginning of 2005 and will be completed in the summer/fall of 2006, according to the plans. CIENS is a collaborative effort involving the R&D section of the Norwegian Meteorological Institute, the

Norwegian Institute for Urban and Regional Research (NIBR), the Norwegian Institute for Air Research (NILU), the Norwegian Institute for Nature Research (NINA), the Norwegian Institute for Water Research (NIVA), the Institute of Transport Economics (TØI) and the Department of Geosciences at the University of Oslo. Co-locating these research communities increases the potential for cooperation significantly, and The Research Council expects major scientific benefits to come out of it.

The Research Council has allocated NOK 2.5 million to a joint scientific programme of the seven institutions. Among the target areas are climate, air pollution, integrated coastal zone management and sustainable urban development.

RCN participation in the FP6 ERA-NET scheme
The Research Council takes part in several ERA-NETs associated with environmental research in the spheres of climate, global change as well as in relation to the needs of environmental management authorities.

B. Climate change as a necessary component for decision-making related to development
The Millennium Development Goals play a role. The Centre for International Climate and Environmental Research (CICERO) gives input to The Norwegian Agency for Development Cooperation (NORAD) which keeps the Goals in mind when developing its aid policies. CICERO works actively to keep other research communities, decision-makers, and the general public informed about recent developments in both the political and scientific arenas. CICERO, founded by the Norwegian government in 1990, is an independent research centre associated with the University of Oslo. CICERO's mandate is twofold: to both conduct research and provide information about issues of climate change.

The Millennium Development Goals, as they pertain to climate and global change, are setting the global change research agenda in our agency and at the national level to a certain degree. There is more focus on development research, and integration of environment and development research in policy documents. At the same time there is a need for integrating development research in climate change research and to ask questions such as: How does climate change influence development in the south? How will climate change in the south have socio-economic impacts in the north?

Norway will continue to encourage international collaboration for a sustainable development. This will contribute to compliance with the Millennium Development Goals, and aims at ensuring a sustainable development.

Norway has an important responsibility for contributing to the global development of knowledge, particularly in areas that benefit the least developed countries, as are emphasized in 2005 White Paper on research. The Government's measures to strengthen the internationalisation of Norwegian research include for example:

- Research is being more actively integrated as an instrument in international aid policy
- More scholarships and exchange schemes have been set up for researchers and those with doctorates in order to promote mutual research cooperation as an element in both international aid policy and research policy.
- Norway's strong position in research on security, peace, conflict and development has been maintained. A new research programme on poverty and peace (POVPEACE) research has recently been established, with an ambitious plan (and budget) of further strengthening and promoting the existing Norwegian institutions focusing on development-related research.

C. Research that is relevant to decision –making and policy

There is an increased focus on dissemination of research results in general to the policy makers and the public. The Research Council of Norway plays a key role in Norwegian research as an advisor on research policy for the authorities. It has the main responsibility for following up overarching priorities in research policy. The Research Council has recently been reorganised, and the restructuring process has placed emphasis on the fact that the Research Council must have an open method of working and an active dialogue with research communities, business and industry, public administration and other clients. Instruments and procedures have been adapted to the various user groups. The Research Council of Norway is responsible for the entire spectrum – from basic research to innovation. This provides good opportunities for coordination and for forming connections between basic research and research-based innovation.

The ratification of the Kyoto protocol has affected the global change research agenda positively in Norway. On initiative from the Ministry of environment, the Research Council has appointed a planning group with the task of providing advice on how to strengthen the strategic role of climate change research in Norway. This includes all aspects of climate change: research on the climate system, on climate change and its consequences, adaptation to and mitigation of climate change. The strategic plan for climate research will be on a high level, identify gaps in research activity and suggest actions to accommodate research topics that are not covered sufficiently. All ministries are contacted to provide input to the process, and the Ministry of environment participates in the planning group.

There is also an increased focus on the research programmes *Climate change and its impacts in Norway* (NORKLIMA) and *Renewable energy and energy efficiency* (RENERGI).

In the large-scale research programmes NORKLIMA and RENERGI there is a mechanism for providing climate information to decision makers, resource managers and other stakeholders. Public founders and other stakeholders, included non-state actors, are involved more directly in the work of the programmes. In general our working procedures are such that relevant users are invited to participate in defining research needs, follow programme activities and be informed about research results.

The Centre for International Climate and Environmental Research (CICERO) also hosts the Climate Forum, where researchers and representatives from government and business can exchange information and viewpoints away from the media limelight.

CICERO also publishes the Norwegian bi-monthly climate magazine, Cicerone. It is free and distributed to decision makers, resource managers and other stakeholders. Cicerone contains popular scientific news from climate and environmental research, the political arena, and CICERO, as well as updates from the research programmes NORKLIMA and RENERGI.

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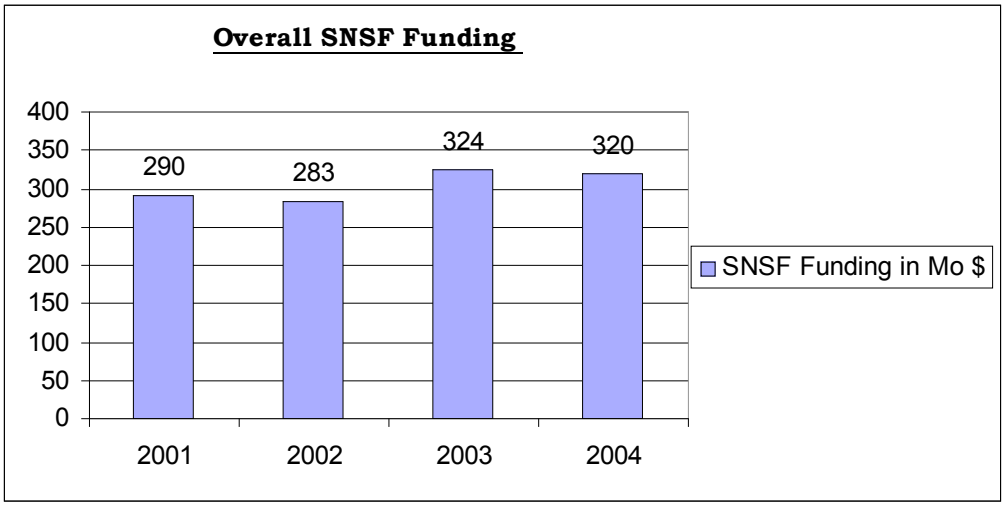
National Update – Global Change Research in Switzerland (2004)

Current status of Global change research

1. Background

It is quite difficult to evaluate precisely the trend of Global Change Research (GCR) activities supported in Switzerland for several reasons. First of all almost 70% of the R&D expenditure is made by the private sector and there are few data available regarding the allocation by fields of research. Secondly, some GCR activities are carried out or funded by governmental agencies, such as the Federal Office for Environment, Forest and Landscape (BUWAL) and the Swiss Agency for Development and Cooperation (SDC), for which we do not have detailed information. Furthermore, research activities are mainly carried out in Universities, which are funded by federal and regional governments, without specific allocation by science area or activity. Last but not least the classification of projects by the theme global change can vary according to the interpretation of global change.

However, most of the external subsidies granted to universities for basic research are distributed by the Swiss National Science Foundation (SNSF), whose budget has increased from 2001 to 2004 by about 10 %. If we extrapolate from these figures, we can assume that GCR activities funded by the SNSF have also increased.



There are no major changes in the funding of GCR in Switzerland. The centres of competence and the initiative that existed in 2001 are still running.

2. Funding of GCR research projects

The funding of CGR by SNSF can be found in investigator-driven research, which accounted for 80% of the funds allocated by SNSF in 2004 and also in targeted research (20% of the funds).

a. Investigator-driven research projects : 227 GCR projects were running in 2004 for a total budget of 25 million USD[9] (approx. 110'000 USD per project).

b. Targeted research : In order to strengthen research and the application of results to strategically important fields of research, the SNSF launched in 2001 a new instrument, the National Centres of Competence in Research (NCCR). Each NCCR has to ensure the combination of basic research and technology transfer, to set an emphasis on multidisciplinary research and to promote the next academic generation and the advancement of women in these fields of research. Out of the 20 currently running NCCRs, two can be considered as having a strong link with GCR :

NCCR Climate : Climate variability, predictability and climate risk.
The annual budget of 7.5 Mo USD (30 Mo USD for 4 years) is co-financed by the SNSF, the University of Bern and other sources (e.g. Federal Office for Environment, Forest and Landscape, some private insurances, etc…).
The aim of the NCCR Climate is to better understand the climate system by carrying out interdisciplinary research on its variability and its potential for change. The NCCR Climate is a scientific network bringing together 130 researchers from 13 partner institutions. The research encompasses reconstruction of past climate, study of key physical, chemical and ecological processes, and also development of procedures for seasonal forecasting. The NCCR studies the impact of climate risks on the economy and society as well as exploring post-Kyoto perspectives in climate policy. It is unique in its interdisciplinary focus, not just for Switzerland or Europe , but globally.
For more information : http://www.nccr-climate.unibe.ch/

NCCR North-South : Research Partnerships for Mitigating Syndromes of Global Change
The annual budget of 6.45 Mo USD (25,.8 Mo USD for 4 years) is co-financed by the SNSF, the Swiss Agency for Development and Cooperation (SDC) the University of Bern and other sources.
The NCCR North-South focuses on international research co-operation and promotes high-quality disciplinary, interdisciplinary and transdisciplinary research with the aim of contributing to an improved understanding of the status of different syndromes of global change, of the pressures these syndromes and their causes exert on different resources (human, natural, economic), and of the responses of different social groups and society as a whole. By identifying the potential of social systems to mitigate syndromes, by considering their dynamics, and by adopting existing innovative solutions, the NCCR North-South primarily aims to help design ways to mitigate syndromes. The programme enables Swiss research institutions to enhance partnerships with institutions in developing and transition countries, thereby building the competence and capacity of research on both sides to develop socially robust knowledge for mitigation action.

[9] This estimation is based on a database by ProClim.

For more information : http://www.nccr-north-south.unibe.ch/

3. **Coordination and networking activities**

PAGES-IPO : The SNSF provides core funding (on an equal basis with the USA) of the PAGES-IPO located in Berne. The SNSF contribution is of 270'000 USD.

MRI (Mountain Research Initiative) located in Berne : 230'000 USD (SNSF : 192'000 USD)

IGBP : annual contribution of the Swiss Academy of Sciences 24'000 USD

IHDP : annual contribution of the Swiss Academy of Human Sciences 10'000 USD

DIVERSITAS : annual contribution of SNSF : 25'000 USD

ProClim / OcCC : financed by the Swiss Academy of Sciences and the BUWAL for an annual amount of 420'00 USD.

ECORD (IODP) : SNSF contribution for 2004 : 400'000 USD.

IFS (International Foundation for Science) : SNSF contribution for 2004 : 220'000 USD.

Development links

There is no "top-down" organised co-operation between the two research communities. However, there are some noticeable interactions between them, and national manifestations have been organised recently. The above mentioned NCCR North South conducts GCR activities in a development perspective, for instance.

The Commission for Research Partnerships with Developing Countries (KFPE), supported by the Swiss Academies, fosters research for development and tries to promote co-operation between the two communities. In this sense, a workshop entitled "How global does Swiss research think? " was set up in 2005. The KFPE also organised with ProClim a parliamentary meeting in the Summer 2005 on the impacts of global change for developing countries.

As far as the allocation of funds by the SNSF are concerned, one must say that the Millennium Development Goals (MDG) do not have an influence on the selection of global change research projects.

Policy links

The selection of projects for investigator-driven research at the SNSF, which are reviewed by international experts, is based upon the excellence of the proposals. Relevance to decision making and the Kyoto protocol thus have little influence upon the funding of this type of research project.

However, Switzerland has a professional support structure with ProClim – the forum for climate and global change and the OcCC (Advisory Body on Climate Change) with joint office. ProClim acts as a science broker and the OcCC is the official voice to decision makers. The two structures :

- Closely interact with scientists
- Organise dialogue sessions with Swiss Parliament members
- Publish material for media and public (newsletter, fact sheets)
- Co-ordinate involvement of Swiss scientists in the IPCC process
- Encourage young scientists to enter into a dialogue with the end-users
- Advise the government and the ministers

It can also be added that the NCCR Climate also provides information to the public and that its scientists have close contacts with policy makers and the economic sector.

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UNITED KINGDOM

NATIONAL UPDATE

Natural Environment Research Council (NERC)

A. (i) Trends in the UK Research Councils

- Every two years the UK Government holds a Spending Review (SR) and the Research Councils (RCs) are awarded funds through Government's consideration of their proposed individual prioritised programmes of research. In SR2004 most of the RCs received relatively low allocations compared with SR2002; and much of the 2004 funding was provided to enable them to meet the full economic costs of the research they support in universities. SR2004 provided £30m funding to the Engineering and Physical Sciences Research Council (EPSRC), to be used for new cross-Councils work on energy in the **Research Councils' Energy Programme.**

(ii) Trends in NERC

- From the 2002 Spending Review, in NERC in 2002/3 28% of the total budget, or £60 million ($97m at 02/03 year average exchange rate) was devoted to climate change work. However, the portion of NERC budget devoted to GCR was actually greater than that, because there are also contributions to GCR through NERC's work in its reporting categories of sustainable economies (20% of total budget) and on Earth's life support systems (29%).

- The 2004 Spending Review outcome allocated NERC about £1 billion over three years. This means NERC's budget will grow from £352.8 million in 2005/06 to £388.0 million in 2007/08. If around 30% of NERC funds continue to be spent on climate change work, that equates to a rising trend from £106m (2005/06) to £116m (2007/08).

- In addition to an ongoing prioritisation to enable the science base to respond quickly to new research needs, NERC also undertook a reprioritisation exercise associated with SR2004. This exercise has led to about 3% of the NERC budget to be redirected to new interdisciplinary science; over the next three years the reallocated funding will be used to:

    - increase investment in research on aerosols to develop research capability to tackle one of the biggest uncertainties in climate change;
    - generate new knowledge of the large-scale processes and interactions of the Earth system through understanding climate processes;
    - evaluate the trans-Atlantic observing system for the North Atlantic overturning circulation;
    - provide new trained people in interdisciplinary research areas related to climate change.

- In January 2005 UK and Japanese scientists formalised a unique and powerful collaboration that will significantly advance the science of predicting climate change for the 21st century. This is a 5-year partnership that will combine the expertise of top UK and Japanese climate science experts with cutting-edge supercomputing technology in Japan. The UK is investing £1.4M in this initiative. In July 2005 NERC and the National

Natural Science Foundation of China (NNSFC) signed their first ever agreement to co-operate in environmental research.

- Marine experts from around the UK have pooled their knowledge on how the world's ocean systems work, to launch the National Centre for Ocean Forecasting (NCOF). This centre of excellence, forecasting the 'weather in the oceans' opened in Exeter, Devon in March 2005
- **New aircraft for atmospheric science**
  The Facility for Airborne Atmospheric Measurements (FAAM) is a collaborative venture between UK universities, NERC and the Meteorological Office. In February 2005 NERC accepted its new BAe-146 aircraft, which is modified specifically for atmospheric research, carrying three crew, up to 18 scientists, and a wide range of instruments and equipment. It can fly for up to six hours at a time and can operate at altitudes from 50 to 35,000 feet.[http://www.faam.ac.uk]

- **Progress on new research ship**
  In January 2005, construction started on NERC's new £36 million Royal Research Ship *James Cook*, which will replace the *RRS Charles Darwin*. The 5,800-tonne *RRS James Cook*, will be 89.2m long and 18.6m wide, and will have 54 berths, including 32 for scientists. It will be more manoeuvrable and have better technical facilities than our present research vessels, so will be able to operate worldwide and in rougher conditions. The UK Office of Science and Technology's Large Facilities Capital Fund is providing £25 million and NERC is funding the remainder.

B. GCR and UK Development Research

In 2002 the UK set up the Environment Research Funders' Forum (ERFF) to bring together the major public sector sponsors which fund or use environmental research and trained scientists. The goal of the Forum is to maximise the coherence and effectiveness of UK environmental sciences funding. (Environmental research is defined by ERFF as research and associated monitoring, survey, policy, regulation and training). Four working groups were established in 2004 to progress the ERFF work-plan. They are: Research co-ordination; planning; training; and stakeholder engagement. [http://www.erff.org.uk/]

The membership of ERFF includes the **Department for International Development** (DFID) Other members include NERC, the Meteorological Office, Environment Agency, and Department for Environment, Food and Rural Affairs. The main Forum and its working groups therefore provide a very effective means of communicating climate information to DFID from these other relevant members.

The Department for International Development recognises that the *Millennium Development Goals* have a crucial part to play in reducing poverty and encouraging progress in the developing world. As a result, DFID has made them the main focus of all of its work.
[http://www.dfid.gov.uk/]

IGFA may wish to note the following areas identified by DFID Policy Division:

- **Climate Observing Systems:** A key G8 commitment relates to improvements in climate observing systems. This involves developing technical and scientific capacity to use climate data in planning and the development of decision-support systems and tools relevant to local needs, noting that Africa's need is greatest. DFID will work with G8 counterparts to develop a plan of action to improve climate data gaps in Africa.
- **Risk Assessment:** The G8 commitments agreed to put climate risk management procedures in place for donor-funded development investments, to increase their resilience to climate change impacts. DFID will collaborate with the World Bank and others to develop guidelines on climate risk management practice, including initiating pilot climate risk assessments of DFID's country programmes.
- **Climate Change and Health:** DFID is funding a health and vulnerability assessment in 12 Least Developed Countries that aims to engage the health sector in climate change discourses, highlight adaptation responses, and provide recommendations on effective mainstreaming responses. This should be completed by Spring 2007.
- **Multi-donor paper:** Following on from 'Poverty and Climate Change', DFID is collaborating with other donors on a second paper on disaster risk reduction and climate change. The paper will aim to provide initial operational guidance on effective ways to assess and manage disaster and climate change risk. Completion is due in 2006.
- **Disaster Risk Reduction Policy and implementation plan:** There is ongoing work to develop a disaster risk reduction policy and implementation plan over the next few months.
- **Contribution to the GEF:** Under GEF 3 (2003/4 – 2006/07), DFID has committed to a core contribution of £103 million and an additional £15 million as a signal of its commitment to addressing global environmental problems, making the UK the fourth largest donor to the facility. Negotiations for the fourth replenishment are underway and will be complete by the end of 2005.
- **UNFCCC Adaptation Funds:** DFID has committed £10 million over 3 years to the UNFCCC Special Climate Change Fund (aimed at developing countries) to mainstream climate change responses into development planning, policies and implementation. DFID is intending to contribute to the Least Developed Countries Fund, to support the implementation of National Adaptation Programmes of Action (NAPAs), pending adoption of agreed Decision text by the Conference of Parties.
- **Capacity building for LDC negotiators:** DFID has funded over the last two years negotiation preparation workshops prior to the Conference of Parties for Least Developed Countries. Another such workshop is planned for later this year.
- **Adaptation Research**:

Bangladesh

1. Support to the Comprehensive Disaster Management Programme (CDMP) DFIDB is providing £6 million over 5 years to support UNDP and GoB in the establishment of the Comprehensive Disaster Management Programme.

2. Climate Change Component A significant component of CDMP (to which DFID has committed £1,200,000) specifically addresses climate change, with the aim of facilitating the management of long term climate risks and uncertainties as an integral part of national development planning.

3. FAO/GoB work on Drought-Related Risks Also as part of CDMP, and in collaboration with FAO and the GoB Department for Agricultural Extension, we are piloting a livelihood adaptation strategy approach for drought-related climate risks.

4. Climate Change and Disaster Risk Assessment - DFID-B is working with Policy Division and CHAD to develop a framework for assessing climate change and disaster risks across DFID-B's programmes.

India

DFID India is funding a study by the World Bank addressing vulnerability to climate variability and climate change in India through an assessment of adaptation issues and options.

China

DFID China and DEFRA are collaborating on £550k climate change initiative in China. The programme, entitled "Integrated Assessment of Impacts of Climate Change on Chinese Agriculture and options for adaptation", will combine cutting-edge scientific advice with practical policy recommendations.

UK Research Councils

Among the UK Research Councils, the MDG are most relevant to the remit of the Medical Research Council (MRC) and to some extent that of the Economic and Social Research Council (ESRC). For MRC the term 'development research' refers to the work that it supports on health research relevant to developing countries. It includes a total of £49 million direct support to MRC Units in The Gambia and Uganda.

C. GCR and Policy

- Global Change is a prominent driver in the policy of UK Government and its key departments and agencies such as the Department for International Development (DFID) Department for Environment, Food and Rural Affairs (DEFRA), and the Environment Agency. Both the Prime Minister and Chief Scientific Adviser have emphasised the key importance of climate change in present and future environments in the recent G8 discussions.

- The UK Global Environmental Change Committee (GECC) is an inter-agency Committee which provides a forum to coordinate UK involvement in the science and technology of climate change and other global environmental change, both nationally and internationally. It reviews the effectiveness of the national capacity, capability and performance in these areas and makes recommendations, including identification of lead agencies. [www.ukgecc.org.]
- The GECC works to ensure that UK Government policy is sufficiently informed by the work undertaken by the science base. It also seeks to ensure that its requirements are effectively communicated to those advancing the science and providing supporting observation and monitoring activities. As part of this, the GECC supports effective UK participation in international science and technology programmes.

- The Meteorological Office's Hadley Centre for Climate Prediction and Research produces the climate forecasts the government used for negotiating the Kyoto protocol. [http://www.metoffice.com/research/hadleycentre/]

- The UK Climate Impacts Programme (UKCIP) provides scenarios that show how the UK climate might change and co-ordinates research on dealing with that future climate. It shares this information, free of charge, with organizations in the commercial and public sectors to help them prepare for the impacts of climate change. [http://www.ukcip.org.uk/]

- The Carbon Trust, a government-funded independent company, helps businesses and the public sector to cut carbon emissions and capture the commercial potential of low carbon technologies. *[http://www.ukcip.org.uk/ http://www.thecarbontrust.co.uk/carbontrust/]*

- **NERC**
  GCR has for long been a principal driver of the NERC mission. The NERC research strategy, *Science for a Sustainable Future*, launched in 2002, is based on Earth system science, acknowledging that planet Earth is a complex interacting system that requires understanding not only of the processes, cycles and dynamics within the component parts but also the interactions between them, and with human society. Global change research is therefore prominent in the activities of NERC-funded research. [http://www.nerc.ac.uk/publications/strategicplan/]

  The new Chief Executive, Prof. Alan Thorpe, has emphasised that NERC funding should support science that will give the government the evidence it needs to develop policy, building on the multi-disciplinary approach to environmental science promoted by his predecessor, Prof. John Lawton. He wishes to see the next strategic plan focus on funding research to find solutions to specific environmental problems that could in future affect the UK

  NERC's relationship with government, in particular with the Department for Environment Food and Rural Affairs, has grown, through the development of fora such as ERFF. The NERC chief executive attends the meetings of DEFRA's science advisory council. This gives an understanding of what DEFRA's policy needs are, and also gives NERC an understanding of the direction it needs to follow in its funding strategies to meet those requirements. Policy linkage and communiciation chanels are also served through having DEFRA's scientific advisor and the head of science at the Environment Agency on NERC's Council.

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Overview of the U.S. Climate Change Science Program and its International Activities

Prepared by the U.S. Climate Change Science Program Office[10]
for the IGFA 2005 Annual Meeting, Alexandria, Virginia, USA

Overview of the U.S. Climate Change Science Program

The purpose of the U.S. Climate Change Science Program (CCSP) is to integrate federally supported research on global change and climate change. Its vision is:

> *A nation and the global community empowered with the science-based knowledge to manage the risks and opportunities of change in the climate and related environmental systems.*

The program's conceptual framework is provided by five overarching goals:

1. Improve knowledge of the Earth's past and present climate and environment, including its natural variability, and improve understanding of the causes of observed variability and change.
2. Improve quantification of the forces bringing about changes in the Earth's climate and related systems.
3. Reduce uncertainty in projections of how the Earth's climate and related systems may change in the future.
4. Understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes.
5. Explore the uses and identify the limits of evolving knowledge to manage risks and opportunities related to climate variability and change.

Details on how the program has organized itself to address these goals are described in the *Strategic Plan for the U.S. Climate Change Science Program* (http://www.climatescience.gov/Library/stratplan2003/final/default.htm). Program implementation is carried out according to the following program elements, with strong cross-element coordination and integration:

- Atmospheric composition
- Climate variability and change
- Water cycle
- Land-use / land-cover change
- Carbon cycle
- Ecosystems
- Human contributions and responses to environmental change
- Modeling
- Decision support
- Observations and data management
- Communications
- International research and cooperation

CCSP's activities are sponsored by 13 U.S. Government departments and agencies.

[10] For further information on the program, contact the Climate Change Science Program Office Director (Richard Moss, rmoss@usgcrp.gov) or the Staff Coordinator for the CCSP Interagency Working Group on International Research and Cooperation (David Allen, dallen@usgcrp.gov).

- Department of Agriculture (USDA)
- Department of Commerce / National Oceanic and Atmospheric Administration (DOC/NOAA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Department of Health and Human Services (HHS)
- Department of the Interior / U.S. Geological Survey (DOI/USGS)
- Department of State (DOS)
- Department of Transportation (DOT)
- Agency for International Development (USAID)
- Environmental Protection Agency (EPA)
- National Aeronautics and Space Administration (NASA)
- National Science Foundation (NSF)
- Smithsonian Institution (SI)

The program's total budget is approximately $1.9 billion. CCSP budget requests are coordinated through CCSP interagency research working groups. Accountability resides with the departments/agencies. Funding is distributed across 9 of 13 annual appropriations bills in Congress.

Every year CCSP provides an annual report, *Our Changing Planet* (http://www.usgcrp.gov/usgcrp/Library/ocp2004-5/default.htm), that describes the program's research achievements, plans for the coming year, and budget. The budget analysis is presented in several distinct ways:

- By CCSP goal (see Appendix A)
- By agency (see Appendix B)
- By USGCRP research element (see Appendix C)

CCSP's International Activities

The United States continues to advocate the development and maintenance of an informal international framework to enhance international cooperation within which climate change science, including research and observational programs, may be planned and implemented effectively. The goals of U.S. efforts to promote international cooperation in support of CCSP are to:

- Actively promote and encourage cooperation between U.S. scientists and scientific institutions and agencies and their counterparts around the globe so that they can aggregate the scientific and financial resources necessary to undertake research on global change at all relevant scales, including both the regional and global.

- Expand observing systems in order to provide global observational coverage of variability and change in the atmosphere, oceans, and on land, especially as needed to underpin the research effort.

- Ensure that the data collected are of the highest quality possible and suitable for both research and forecasting, and that these data are exchanged and archived on a timely and effective basis among all interested scientists and end-users.

- Support development of scientific capabilities and the application of results in developing countries in order to promote the fullest possible participation by scientists and scientific institutions in these countries in research, observational, and data management efforts.

These goals draw directly on the needs identified by the U.S. scientific community and are described in the CCSP *Strategic Plan.*

CCSP participates in and provides input to major international scientific and related organizations on behalf of the U.S. Federal government and scientific community. It does so, in part, through its working groups, including the Interagency Working Group on International Research and Cooperation. In addition to promoting and encouraging participation of U.S. scientists and scientific institutions in international climate science, CCSP also shares in multilateral international support to maintain the central coordinating infrastructure of major international research programs and international activities that complement CCSP and U.S. government goals in climate science.

The United States encourages international cooperation in the development of observing systems through its continued participation in the Global Earth Observing System of Systems (GEOSS) and other activities such as the Global Climate Observing System (GCOS) and the Global Observations of Forest Cover and Land Cover Dynamics (GOFC-GOLD) Project. The United States also cooperates with its partners in a number of international scientific assessment and decision support activities such as the Intergovernmental Panel on Climate Change (IPCC), the Scientific Assessment of Ozone Layer Depletion, the Arctic Climate Impact Assessment (ACIA), Millennium Ecosystem Assessment (MA), and other application-related programs such as the International Research Institute for Climate Prediction (IRI) and Famine Early Warning System Network (FEWSNET). Participation in these international assessment and decision support activities complements CCSP's own efforts to produce a broad range of observations, analyses, interdisciplinary research products, communication mechanisms, and operational services that provide timely and useful information to address questions confronting policymakers, resource managers, and other users. An example of these efforts is the production of 21 synthesis and assessment products that range from assessments of the physical climate system to the societal utilization of climate information.

The United States supports several major international global change research programs, including the World Climate Research Programme (WCRP), the International Human Dimensions Programme (IHDP), the International Geosphere-Biosphere Programme (IGBP), and DIVERSITAS. These programs are now coordinating their activities through the Earth System Science Partnership (ESSP). The SysTem for Analysis, Research and Training (START) receives strong U.S. support for its activities to promote outreach and capacity building that supports the WCRP, IGBP, IHDP, and Diversitas. The United States also supports international regional global change research networks such as the Inter-American Institute for Global Change Research (IAI), and the Asia-Pacific Network for Global Change Research (APN). The United States, through CCSP agencies, supports a variety of climate-related international research programs that advanced several Presidential initiatives and the suite of 15 climate change bilateral agreements coordinated by the U.S. Department of State.

APPENDIX A

CCSP Budget by Goal

	DOE	NASA	NOAA	NSF	USDA	EPA	USGS	DOT	NIH	USAID	SI	DOS	Res Subtotal	Obs Subtotal	TOTAL
FY 2006 Request															
Goal 1	14.8	51.9	68.4	42.0	0.0	0.8	16.2	0.0	0.0	0.0	0.4	0.0	194.5	262.8	457.3
Goal 2	40.3	100.2	48.1	53.0	31.9	0.0	3.0	0.6	0.0	0.0	0.9	0.0	278.0	282.4	560.4
Goal 3	61.2	82.0	55.9	57.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	257.5	267.7	525.2
Goal 4	14.8	12.1	0.0	28.3	26.3	13.0	7.0	2.4	65.5	0.0	3.4	0.0	172.8	68.0	240.8
Goal 5	1.0	34.7	8.5	16.7	30.3	6.7	2.1	0.0	0.0	6.0	1.0	0.0	107.0	0.0	107.0
TOTAL	**132.1**	**280.9**	**180.9**	**197.0**	**88.5**	**20.5**	**29.7**	**3.0**	**65.5**	**6.0**	**5.7**	**0.0**	**1,009.8**	**880.9**	**1,890.7**
FY 2005 Estimate															
Goal 1	14.8	54.3	50.6	42.0	0.0	0.0	16.1	0.0	0.0	0.0	0.4	0.0	178.2	285.8	464.0
Goal 2	39.3	104.2	29.0	54.0	27.7	0.0	2.9	0.6	0.0	0.0	0.9	0.0	258.6	324.9	583.5
Goal 3	58.9	85.6	34.7	57.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	237.7	289.8	527.5
Goal 4	14.6	12.6	0.0	28.3	15.5	15.6	7.2	2.4	64.6	0.0	3.4	0.0	164.2	71.0	235.2
Goal 5	1.0	35.4	9.4	16.7	29.5	4.4	2.1	0.0	0.0	6.0	1.0	1.0	106.5	0.0	106.5
TOTAL	**128.6**	**292.1**	**123.7**	**198.0**	**72.7**	**20.0**	**29.8**	**3.0**	**64.6**	**6.0**	**5.7**	**1.0**	**945.2**	**971.5**	**1,916.7**
FY 2004															
Goal 1	13.1	58.5	43.2	44.0	0.0	1.4	16.2	0.0	0.0	0.0	0.4	0.0	176.8	300.6	477.4
Goal 2	41.0	110.9	26.0	55.3	27.3	0.0	2.9	0.3	0.0	0.0	0.9	0.0	264.6	327.7	592.3
Goal 3	58.7	90.8	36.3	59.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	245.5	306.1	551.6
Goal 4	15.6	13.6	0.0	29.7	14.4	11.6	5.7	3.7	62.0	0.0	3.4	0.0	159.7	76.0	235.7
Goal 5	0.9	36.5	10.8	26.7	28.5	4.0	2.1	0.0	0.0	6.0	1.0	1.0	117.5	0.0	117.5
TOTAL	**129.3**	**310.3**	**116.3**	**214.7**	**70.2**	**17.0**	**27.6**	**4.0**	**62.0**	**6.0**	**5.7**	**1.0**	**964.1**	**1,010.4**	**1,974.5**

APPENDIX B

CCSP Budget by Agency

FY 2004–2006 BUDGET BY AGENCY
[DISCRETIONARY BUDGET AUTHORITY IN $M]

Agency	FY 2004 USGCRP	FY 2004 CCRI	FY 2004 CCSP	FY 2005 Estimate USGCRP	FY 2005 Estimate CCRI	FY 2005 Estimate CCSP	FY 2006 Request USGCRP	FY 2006 Request CCRI	FY 2006 Request CCSP
USDA	63.8	6.4	70.2	64.7	8.0	72.7	76.7	11.8	88.5
DOC / NOAA	82.6	33.7	116.3	74.7	49.0	123.7	123.3	57.6	180.9
DOE	102.5	26.8	129.3	103.6	25.0	128.6	105.2	26.9	132.1
HHS / NIH	62.0	-	62.0	64.6	-	64.6	65.5	-	65.5
DOI / USGS	27.6	-	27.6	29.8	-	29.8	29.7	-	29.7
DOS	-	1.0	1.0	-	1.0	1.0	-	-	-
DOT	-	4.0	4.0	-	3.0	3.0	-	3.0	3.0
USAID	-	6.0	6.0	-	6.0	6.0	-	6.0	6.0
EPA	17.0	-	17.0	20.0	-	20.0	20.5	-	20.5
NASA	269.3	41.0	310.3	249.5	42.6	292.1	238.3	42.6	280.9
NSF	184.7	30.0	214.7	173.0	25.0	198.0	172.0	25.0	197.0
SI	5.7	-	5.7	5.7	-	5.7	5.7	-	5.7
Scientific Research Total	**815.2**	**148.9**	**964.1**	**785.6**	**159.6**	**945.2**	**836.9**	**172.9**	**1,009.8**
NASA Space-Based Observations	**986.7**	**23.7**	**1,010.4**	**914.4**	**57.1**	**971.5**	**873.2**	**7.7**	**880.9**
CCSP Total	**1,801.9**	**172.6**	**1,974.5**	**1,700.0**	**216.7**	**1,916.7**			
President's Request							**1,710.1**	**180.6**	**1,890.7**

APPENDIX C

CCSP Budget by Research Element

Agency	Atmospheric Composition	Climate Variability	Carbon Cycle	Water Cycle	Ecosystems	Land Use	Human Contributions	TOTAL
FY 2006 USGCRP Research Elements								
USDA	24.2	-	12.2	17.2	18.2	5.0	-	76.8
DOC / NOAA	24.3	76.7	7.3	8.3	-	-	6.7	123.3
DOE	12.6	55.1	13.7	-	18.7	-	5.1	105.2
HHS / NIH	-	-	-	-	-	-	65.5	65.5
DOI / USGS	-	10.5	4.4	4.9	6.8	3.1	-	29.7
EPA	7.1	-	-	-	8.1	-	5.3	20.5
NASA	50.9	60.0	40.7	44.6	27.1	15.0	-	238.3
NSF	16.1	80.5	23.2	12.3	27.7	-	12.2	172.0
SI	-	1.3	0.3	-	3.3	0.8	-	5.7
TOTAL	**135.2**	**284.1**	**101.8**	**87.3**	**109.9**	**23.9**	**94.8**	**837.0**
FY 2005 USGCRP Research Elements								
USDA	24.9	-	10.5	8.1	17.8	3.5	-	64.8
DOC / NOAA	6.9	42.9	8.1	9.9	-	-	6.9	74.7
DOE	12.8	55.1	11.8	-	18.7	-	5.2	103.6
HHS / NIH	-	-	-	-	-	-	64.6	64.6
DOI / USGS	-	10.7	4.0	4.8	7.2	3.1	-	29.8
EPA	7.3	-	-	-	8.1	-	4.6	20.0
NASA	53.3	62.8	42.6	46.7	28.4	15.7	-	249.5
NSF	16.1	81.5	23.2	12.3	27.7	-	12.2	173.0
SI	-	1.3	0.3	-	3.3	0.8	-	5.7
TOTAL	**121.3**	**254.3**	**100.5**	**81.8**	**111.2**	**23.1**	**93.5**	**785.7**
FY 2004 USGCRP Research Elements								
USDA	24.4	-	11.7	7.2	17.6	2.9	-	63.8
DOC / NOAA	9.3	44.1	10.6	10.2	-	-	8.4	82.6
DOE	14.4	55.2	11.9	-	15.8	-	5.2	102.5
HHS / NIH	-	-	-	-	-	-	62.0	62.0
DOI / USGS	-	10.4	4.0	4.6	5.5	3.1	-	27.6
USAID	-	-	-	-	-	-	-	0.0
EPA	6.4	-	-	-	6.3	-	4.3	17.0
NASA	57.5	67.8	46.0	50.4	30.6	17.0	-	269.3
NSF	16.7	85.1	24.2	12.3	29.2	0.0	17.2	184.7
SI	-	1.3	0.3	-	3.3	0.8	-	5.7
TOTAL	**128.7**	**263.9**	**108.7**	**84.7**	**108.3**	**23.8**	**97.1**	**815.2**