International Group of
Funding Agencies for
Global Change Research

IGFA

National Updates

Beijing International Convention Center
Beijing, China
October 24 - 28, 1999

The International Group of Funding Agencies for Global Change Research (IGFA) is an informal group of representatives of agencies and ministries of 21 countries and the EU, responsible for the funding of global change research. The purpose of the Group is to facilitate international global change research in the natural, social and economic sciences by bringing the perspective of these national funding agencies to strategic planning and implementation of such research.
IGFA's goals are:
(i) internal communication about funding issues;
(ii) communication with the international organizations dealing with global research issues;
(iii)addressing specific issues related to global change research and its funding.
Once a year IGFA has a plenary meeting

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INTRODUCTION

24-28 October 1999 IGFA had its annual plenary meeting at the Beijing International Convention Center, Beijing, China.

Presentations on relevant developments in the countries have a prominent place on the agenda of the annual plenary meeting of IGFA. Representatives submit brief written communications and deliver brief oral presentations. The presentations give insight in the position of global change research on the national policy agendas, in the funding structures and trends in the funding of global change research in IGFA member countries.

For the 1999 plenary meeting the participants were specifically asked to provide updated information on issues related to the two crosscutting items of the meeting agenda:

- Funding of inter- and multidisciplinary science; and
- Regional approaches to global change research.

AUSTRIA

AUSTRIA
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Global Change Research

1. General information/Highlights 1999

National emphasis was given to the establishment of the co-ordination unit of the Human Dimension Program Austria (HDP-A), which was included as netnode into the Austrian Network for Environmental Research with focus to stimulate research exchange between the various fields of environmental research in the area of Human Dimension in Global Change. Focal activities in 1999 included an international HDP-A workshop in Graz, Austria, attendance at the IHDP-IT Open Science Meeting in Amsterdam and the IHDP Meeting in Japan as well as the Central and Eastern European and Newly Independent States Regional Workshop on National HDP in Amsterdam. Upcoming activities will focus on the Human Dimensions Sessions at the European Ecological Eonomics Meeting in Vienna (3-6 May, Vienna; website: http://augenblix.wu-wien.ac.at/esee2000/) and the international workshop ‚High mountain lakes and streams. Indicators of a changing world' (4-8 September, Innsbruck, Austria; http://zoology.uibk.ac.at/congress) in 2000.
There is intense co-operation between HDP-A and IHDP International; Austria also supports the Bonn IHDP Central office and intends to continue to do so.

Besides focus on IHDP, other project initiatives to be mentioned for global change research in Austria during 1999 include the GCTE project „Alpine indicators of climate change – Identification of relevant hydrological and ecological indicators of global change effects along an altitudinal gradient of selected mountains of the Alps"; a project contributing to the IGBP Mountain Workplan. The research initiative GLORIA (Global Observation Research Initiative in Alpine Environments), emerging from this project, is dedicated to initiate a global indicator network for effects of climate change. Other GCTE initiatives involving Austria include the project on „Changes of trophic interrelations between plants and microorganisms in soils of different grasslands under elevated CO_2", focusing on the quantification of carbon pools including total carbon, carbonate and water soluble low molecular organic substances together with soil microbial biomass and microbial activity parameters at elevated CO_2. Further, a project on the influence of cloudiness and aerosols on the radiative transfer of UV and the respective meaning to the radiative budget, the investigation of the palaeolimnology of Alpine – Adriatic Lakes and a project on the adaptation potential of Austrian forests under scenarios of climatic change.

2. Funding of inter- and multidisciplinary science

Austria's political research strategy gives particular importance to inter- and multidisciplinary science and methods throughout various research areas. One example from the environmental sector is the inter- and multidisciplinary research program „Cultural landscape research" that is funded as joint venture of various Austrian ministries. The research program is faced with the task - in accordance with efforts at the European level - of demonstrating ways for reducing the flow of substance produced by human beings and maintaining biological diversity, while taking quality of life of the population into consideration. Both, interdisciplinarity (seen as co-operation between different scientific disciplines) and transdisciplinarity (seen as co-operation between scientists and other involved actors) is prerequisite to the structural organisation of the program

which is subdivided in mutually dependent subsections. Local and regional inputs and case studies are essential for linking interdisciplinary science and transdisciplinary dissemination of results of the work program. Global change research is not explicitely emphasised in the program, but inherent to many of the individual cultural landscape research projects.
With regard to the Cultural Landscape Research program, one of the hypotheses is, that interdisciplinary research activates internal innovation potentials and enables solution oriented handling of complex environmental problems. To reach this goal, interdisciplinarity needs strong disciplinary research as prerequiste; single disciplines need to have a theoretical and methodical firm basis in order to influence the innovative character of interdisciplinarity positively. New institutional frameworks and methods (e.g. for reviewing projects) need to be developed and introduced for this approach, which is also goal of this program.

3. Regional approaches to global change research

Research on regional and sustainable regional development is strongly supported in Austria, involving also research with global change focus (see program ‚Cultural Landscape research' under pt. 2).
In regard to mechanisms in science –funding to support research in foreign countries, Austria supports research projects within the scope of the East-West-Fund, concentrating on the collaboration with eastern European countries (MOEL). In these projects, few differences in the support of national and foreign scientists are made (e.g. natl. project leader).
Outside the scope of MOEL, Austria supports single research projects with other countries (e.g. the coniferous woods research and education project commenced in Bhutan. This project builds on a research partnership between Austrian forest scientists and the Renewable Natural Resources Research Centre in Jakar, aiming at building research potential in forest ecology, improving the knowledge base to preserve productivity and biodiversity as well as to prevent forest degradations).

Co-operation between aid agencies and science is preferably overseen by the Development Co-operation Unit of the Ministry for Foreign Affairs with regard to key regions such as the Himalayan region (Bhutan, Pakistan and Nepal). In Bhutan, activities in sustainable forestry go along with tourism consulting and education, construction of hydroelectric power plants and consultation on restoration of cultural heritage.

BELGIUM

Belgian Contribution to the IGFA (International Group of Funding Agencies of Global Change Research) Plenary Meeting, 24-28 October 1999

1. Update of the national presentation of 1998

The 4-year research programme on Global Change and Sustainable Development is in progress, with a budget of 14 mEUR. There are no changes in the level of funding.

Belgium has a new government since last summer. This government gives much importance to "ecological sustainability". Therefore, and since the ongoing programmes will end soon, we plan new research activities to start in late 2000 or early 2001, in the framework of a programme entitled "Global Change, Ecosystems and Biodiversity". This programme is part of a Scientific Support Plan for Sustainable Development. It will be based on the expertise of the three ongoing programmes: "Antarctica - Phase IV", "Sustainable Management of the North Sea", and "Global Change and Sustainable Management".
These three programmes are being integrated into a comprehensive whole

- because they share several common aspects (biodiversity, climate change, biogeochemical cycles etc.);
- because many environmental problems are related;
- because of the current tendency (at both the research and policy levels) to use an interdisciplinary, problem-oriented approach with emphasis on problem solving.

Socio-economic aspects will mainly be tackled in the programme on sustainable consumption and production patterns. This is only a preliminary outline to be discussed with the Minister and Steering Committees.

1. Funding of inter- and multidisciplinary science

The ongoing Global Change Programme is based on a previous 4-year programme. When the call for proposals for the current programme was launched, the teams were advised to submit multidisciplinary proposals. To ensure that the proposals' multidisciplinary character did not hinder evaluation, each project was evaluated by 3 experts, one generalist and two with expertise in the disciplines most relevant to the project. Then all projects in a given area were again evaluated by a panel of experts, basing its assessment on the written evaluations.
To promote integration of the results (and to avoid a mere compilation of the work of the different teams), the guidelines for reporting emphasised filing a yearly integrated scientific report. Yet we notice that there is still a long way to go…
To achieve a truly multidisciplinary approach, many obstacles remain to be overcome, related to factors such as the history of the disciplines, their different methodologies, poor communication, structural constraints, the educational system, the evaluation systems, the funding systems, reward practices, etc.

The following suggestions can be made as to how the funding agency could enhance multidisciplinarity.

Most research teams have expertise in only one discipline. Interdisciplinary research requires co-operation between several teams, in the same institution or different ones, with expertise in different disciplines. This kind of co-operation requires good management. Interdisciplinary projects often lack good managers, a detailed and efficient management plan, and a separate work package for management. The management plan should be subject to a thorough, independent quality evaluation and there should be separate and clear funding rules.

As regards the planning of "scientific" work packages, attention should be given to the "multidisciplinary field of interaction". It should be very clearly stated when and how the scientists will work together, which information is to be exchanged and when, and what are the criteria or specifications of this information transfer.

Multidisciplinary research requires that the scientists be familiar with each others' disciplines, their complementarity and interactions. This is often not the case. One solution might be "co-location" of the different teams. Scientists sent by one team to work with another could actually "live" the other team's discipline. This would promote cross-fertilisation as well. Since each team depends on the other teams' results, each should delegate members to become involved in the work of the other teams, where it is being carried out, to ensure that the results produced meet the needs of the delegating team. This approach could be promoted in the calls and by the funding agencies.

Rather than exploiting one person's competence acquired over several years, multidisciplinary research requires pooling the expertise and know-how of several people according to the specific task or work package. To work in this way, the teams need a critical mass and continuity. This means that each team should have several projects involving all its members, each according to his specific expertise.
The results of multidisciplinary research are not satisfactory when there has not been the input of real experts, i.e., senior scientists, PhD's, post-docs).

2. *Regional approaches to Global Change research*

Funding research in foreign countries is the responsibility of both federal agencies (the OSTC, the Foreign Aid Agency) and regional authorities.

The OSTC promotes scientific and technological collaboration with foreign countries in the framework of bilateral agreements, through the funding of joint research and demonstration projects. Such agreements exist with the Central and Eastern European Countries. They are based on the principles of reciprocity and mutual interest. Each partner covers the laboratory costs in its own country and each country pays the wages and international travel expenses of its own participants. The receiving party supports the transportation and board and lodging expenses of the sending party's expert during his work in the host country.

As of 1991, research grants are offered to highly qualified researchers (PhDs or equivalent experts) from Central and Eastern Europe, to give them the opportunity to work for 6 to 12 months in a Belgian research unit involved in OSTC R&D programmes. The visiting scientists thus gain access to highly technological equipment and a wide range of Western scientific literature.

The OSTC supports research on and related to the needs of developing countries, in particular as regards the application of remote sensing techniques. From time to time, the OSTC is asked by our Foreign Aid Agency or by international organisations (Worldbank, FAO,…), NGO's or the developing countries, to provide expertise in remote sensing for projects pertaining e.g. to agriculture or the environment.

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CANADA

Canada
National Highlights for IGFA 1999

1. National news and recent developments

a. Government interest in environmental issues

The recent Speech from the Throne contained encouraging statements about the government's commitment to the environment. There were mentions of Canada's need to meet international commitments to address climate change by reducing greenhouse gases, the need to protect species at risk and their natural habitat, and the need to strengthen Canada's capacity for environmental research. These statements are backed up by the recent appointment of a new Environment Minister who is taking a strong interest in these issues. This renewed interest in environmental issues is a good sign for forthcoming funding decisions.

b. Activities related to the Kyoto Protocol

National Implementation Strategy

Canada is currently engaged in a national process to examine options for the implementation of the Kyoto Protocol, prior to Canada's ratification. Expert committees, called Issue Tables will provide expert input to the analysis, identification and assessment of greenhouse gas reduction opportunities in their sector (e.g. transportation, electricity, industry, agriculture, etc.). Each Table is responsible for the development of a report on their specific sector or issue, and will present an options paper as input to the national implementation strategy (NIS). As part of this activity, a **Science, Impacts and Adaptation (SIA) Table** is preparing an Options Paper which will provide recommendations for inclusion in the NIS related to climate system science, impacts and adaptation, including Canadian systematic climate observing networks.

Climate Change Action Fund

The Climate Change Action Fund (CCAF) was set up in 1998 to help Canada begin to do work in key areas to address its Kyoto commitments. $50M per year for three years was allocated, with 10% going to **climate science, impacts and adaptation**.

National workshops were held over the past year, bringing together federal, provincial, university and private sector experts to determine needs in several key areas of science, such as climate observations, arctic research and monitoring, greenhouse gas sources and sinks, risk management, climate scenarios, etc. The workshops have formed the basis for several calls for research proposals, of which 3 are complete: Climate model improvements; Greenhouse gas sources and sinks; and Climate observing systems. A fourth call underway covers arctic research and monitoring. The CCAF Science component addresses key science issues, as well as initiating activities. For example, the projects on climate observing systems will do analytical work to support major efforts needed to fill gaps in the observing network. The CCAF also supports Canadian scientists playing key roles in the work of the IPCC - some 30 individuals are currently supported.

The Impacts & Adaptation component of the CCAF has funded research in the fields of health, water resources, sea level rise (coastal zone), forestry, fisheries, agriculture and hazards. The work funded ranges from exploring the impacts of climate change on critical species, such as caribou, to looking at the impacts of and possible adaptation strategies for dealing with sea level rise on the coasts of Canada. Another call for proposals is expected this fall. Work is also being done to raise awareness of impacts and adaptation issues, and to create a Canadian Climate Impacts and Adaptation Research Network.

c. Funding update from the granting agencies

Funding for global change activities from the Canadian granting agencies remains at about the same level as last year. One highlight is the partial funding ($32k per year for 3 years) by the Social Sciences and Humanities Research Council (SSHRC) of the GECHS International Project Office at the University of Victoria. A proposal for the remaining funds will be submitted to the Natural Sciences and Engineering Research Council (NSERC). Following the introduction of the International Opportunity Fund last year (which funds international research planning activities), NSERC now has a Collaborative Research Opportunities program (ramping to $6M by 2001). The new program will facilitate the participation of teams of Canadian researchers in major national and international research projects that present a special opportunity for collaboration. In contrast to the IOF, this program will support research costs. Several projects due for renewal or under review at NSERC include Canadian research contributions to GEWEX and GLOBEC, as well as a major activity linked to GCTE.

d. Rejuvenation of the Canadian Global Change Program

The CGCP has recently been reactivated at the University of Victoria. It has been inactive for 18 months and its budget is significantly reduced. The new CGCP will probably have a more narrow focus, such as an increased emphasis on non-climate-related global change issues and on the human dimensions of environmental change. It will continue to serve the research community in Canada, by providing a focal point and secretariat for the Canadian National Committees of international programs (IGBP, SCOPE and IHDP); convening meetings of Canadian researchers for effective research planning; and providing funding to enable researchers to attend international meetings of these organizations. The CGCP will continue to have a strong communications role, by providing objective information on relevant issues to policy and decision-makers, educational community, etc.

2. Funding of inter- and multidisciplinary research

Both NSERC and SSHRC have a range of programs designed to support different modes of research activity. Each has a Research Grants program essentially designed along disciplinary lines. These grants go towards basic, ongoing research programs and are usually awarded to individuals. Each Council also has an interdisciplinary selection committee that is designed to support those researchers whose research does not fall within a single discipline.

More major collaborative activities are almost all supported by interdisciplinary funding programs. Strategic themes are problem-oriented and review is conducted by multidisciplinary committees. These programs have been the main vehicle used to support major Canadian global change projects. Some new programs are specifically being designed to favour interdisciplinary research in its broadest sense (e.g. NSERC's CRO), but the research supported will still have to lie within the mandate of the granting agency. Only limited mechanisms exist to support smaller-scale research at the interface of natural/physics, social and health sciences. At the larger scale (i.e. projects of more than $3M per year), the tri-Council Networks of Centres of Excellence program received a major funding boost this year and will support up to 8 new Networks.

A major new development is the transformation (and increased funding of) of the Medical Research Council into the Canadian Institutes for Health Research (similar to the US NIH). This will create new opportunities for connections between the health, social and natural/physical scientists through new programs and Institutes, some of which will require participation from researchers supported by at least two of the three Councils. There will be an emphasis on interdisciplinary research in the health and social sciences.

Outside the granting agencies, the CCAF (mentioned earlier) is designed to meet the needs for Kyoto and is by definition interdisciplinary. Calls for proposals are not designed along discipline lines, but are targeted to the problems to be solved.

3. Regional approaches to global change research

The granting agencies do not normally provide funds for research conducted by foreign researchers in their own countries. Canada has two federal agencies responsible for supporting and delivering assistance to the developing countries – the International Development Research Centre (IDRC) and the Canadian International Development Agency (CIDA). Their activities in support of research in developing countries described last year continue. With the introduction of the CCAF, new activities are becoming possible. For example, the CCAF has jointly funded (with CIDA and IDRC) a contribution of $300k to the International Institute for Sustainable Development (IISD) for the South-North Knowledge Network on Climate Change. This project aims to enhance the ability of developing countries to shape an effective, equitable and sustainable climate change regime.

Canada is a founding member of the IAI and has ratified its Charter. This year, the IAI Executive Council and the 6th meeting of the IAI CoP were held for the first time in Canada. This created an opportunity to raise the profile of the IAI in Canada and explore how Canada might expand its global change research activities by collaborating with other research efforts in the Americas. It was generally agreed that Canada could contribute towards a stronger IAI by creating a Canadian National Committee for the IAI, perhaps through the renewed Canadian Global Change Program. It was also proposed to assist the IAI in targeting interested researchers in Canada and linking them to those in other IAI member countries by using national research networks.

CHINA, BEIJING

The Funding Policy and Foci of Global Change Studies in China

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1. Present Status of Funded Projects in Global Change Studies

The funding agencies in China have greatly increased their input to the studies of global change. According to the statistics of year 1996 to 1998, the Ministry of Science and Technology (MST) supported 8 projects with RMB 90.5 million fund, and the Chinese Academy of Sciences (CAS) supported 9 major projects with RMB 36 million fund, and the National Natural Science Foundation of China (NSFC) supported 8 major projects, 32 key projects and 82 general projects with total RMB 86 million grant. The total grant to the global change research of above 3 major funding agencies in China was RMB 212.5 million from 1996 to 1998. The figure of total fund to the global change research in China was about RMB 130 million in the period of 1985 to 1995.

In the results of over one hundred projects, significant progresses have been made in paleo-environment, climate system, terrestrial ecosystem, mass flux and transportation in coastal zone, ocean ecosystem dynamics, the mechanism and monitoring of source and sink of trace gas and the studies of polar region etc. [1-3]

2. Strategy Objectives

NSFC organized a special scientific committee to study the opportunity and challenge on global change research in 21st century. The report of the committee described the strategy objectives of global change research as: [4]

(1) To understand and distinguish the impact of natural factor and human activities on global change.
(2) To analyze the impact of global change on environment, society, economy and health in China and provide assessment report on global change impact in this country.
(3) To predict the tendency of environmental and climate changes in this country and its impact; To explore the ways regulating the climate and environmental changes in the direction of in favor of human being.
(4) To provide scientific basis concern sustainable development in this country.

1. Support Policy

NSFC treated global change as the Special Fields in its annual program guide during 1989 to 1995. Global change research has been chosen as a priority-funding field on its guideline from 1996 to 2000. MST and CAS will continue their efforts on provide more and more fund in support global change research.

2. Funding Foci

Global change research in China will focus on regional and synthesis approaches. In the guidelines of NSFC on next 5 years describes the regional response of global change as: combining the unique regional features in China with the knowledge we have to develop synthesis study on key problems which have directly relationship with regional environment. Its founding emphases are:

(1) The formation and evaluation of East Asian environment and its interaction with the global change
(2) The ocean-atmosphere-land interactions and water cycle
(3) The interaction of productive force on terrestrial ecosystem with global change
(4) The bio-geochemistry processes of key biogenic elements such as carbon, nitrogen and phosphorus

The Chinese National Committee for IGBP has established an ad hoc working group on synthesis research to start pilot investigating in the following scientific issues:
(1) the adaptable research of global change with sustainable development
(2) global change and national security
(3) the key processes and mechanism on the evolution of the earth system
(4) the interactions between natural and social system and subsystems in natural system
(5) the predictive study of global change
(6) the collection and share of the data.

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CHINA, TAIPEI

China-Taipei National Updates for IGFA Meeting

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1. General Outline of Academic Research on Global Change

Organized research in global change in Taiwan was first initiated in 1989 by a group of university scientists with the support from the National Science Council (NSC). Currently, about one hundred and fifty scientists are involved in many different research programs in related topics, with an annual budget above 5 million US dollars. Both the funding level and community size have increased steadily over the years.

The strategy of global change research in Taiwan is to "think globally but act indigenously." Therefore, most of our global change projects are closely related to relevant international programs such as those under IGBP, WCRP and IHDP. On the other hand, every one of those projects is aimed to understand the changes occurring in the indigenous Taiwan region, with main goals set to:

- understand the effect of global change on the local natural environment;
- collect regional data to contribute to the understand of the processes of global change;
- construct a regional environmental and climate model with predictive capabilities;
- assist government and industry in complying with the international requirements related to global change;
- assess the impact associated with climate and environmental changes, and to outline viable strategies that will lead to a sustainable future.

1. Organizations

The major funding agencies to promote basic research are the ***National Science Council*** and the ***Academia Sinica.*** Within the ***National Science Council, t***he main body to coordinate the global change research funding is the ***Environment and Development Committee*** between 1994-1996, which is now re-organized to be the ***Commission on Sustainable Development Research***.

Other organizations such as the ***Environmental Protection Administration,*** the ***Energy Committee of the Ministry of Economic Affairs***. the ***Bureau of Industry***, the ***Central Weather Bureau,*** etc. also support their own global change research programs. Those programs are more mission-oriented, e.g. to evaluate the development of Climate Convention and its possible impact on local economy. In addition, under ***the Executive Yuan***, a ***Policy Guidance Task Force for Global Environmental Change*** has been specifically established to coordinate the efforts of the different government agencies since 1994. In the middle of 1997, the Task Force has been re-organized to be the ***National Council on Sustainable Development***.

Although not a funding agency, ***the National IGBP Committee*** does supervise the development of the major national global change research program. It also serves to interact with the international IGBP committee and other related bodies, such as the WCRP and IHDP. A useful diagram to illustrate the interaction among scientists, NSC, IGBP national committee and international organizations, is shown in Fig. 1.

2. New Research Initiatives

Three new research initiatives supported by the Commission on Sustainable Development Research, National Science Council were launched in 1998.

(1) Sustainable Taiwan – Vision and Strategy

The project is multi-disciplinary and mission oriented. The goals are to study the strategies for island Taiwan's sustainable development, to establish sustainable development indicators for Taiwan in the areas of ecological resources, environmental pollution, policy and regulations, land use social structure and economic activities, and to integrate existing data

and establish and environmental information system. The project includes three main programs: (i) Sustainable Taiwan 2011, (ii) SustainableTaiwan – Evaluation System, and (iii) Sustainable Development Information System for Taiwan. This general program is presented based on the above plan, with general coordinator of Dr. Chao-Han Liu, President of Central University. Other Associated Coordinators include Hsin-Huang Hsiao, professor of the Academia Sinica, and Jiunn-Rong Yeh and Yue-Hwa Yu , professors of National Taiwan University. The Associated Coordinators are responsible for respectively inviting other professors to work on the implementation of above-mentioned three main programs. For further details please refer to project website at http://www.gcc.ntu.edu.tw/foresight/.

(2) Evaluation and Analysis of Environmental Changes in Taiwan and the Impact of Global Atmospheric Change on Taiwan

The project includes eight main subjects, namely, meteorology, water resource, land use, terrestrial ecosystem, marine ecosystem and fishery, coastal zone, public health and soil environment. Data concerning the aforementioned eight items of environmental changes in Taiwan since the 19th century will be analyzed and concluded in order to elucidate the mechanisms and indicators for such environmental changes; in addition, the impact of global atmospheric and meteorological changes on the environmental change on Taiwan will also be figured out. A strategic plan and model to predict the future sustainable development in Taiwan would be developed from the research findings. This effort is particularly important for the policy makers for the sake of sustainable development in Taiwan and healthy environment for generations to come.

(3) National Science and Technology Program for Hazards Mitigation

Natural hazards such as earthquake, flood, and landslide occur frequently in Taiwan. Studies show that natural hazards casualty and property loss are gradually increasing in recent years. To reduce hazards casualty and property loss, a national science and technology program for hazards mitigation was launched in 1998. The basic goal of the program is to reduce the risk of individual citizens and the society from natural hazards. The first main objective of the National Science and Technology Program for Hazards Mitigation is to provide a sound technological basis for practical hazards mitigation efforts. Thus, development of effective hazards mitigation measures will be its central task. Through implementation of these measures it should be possible to reduce significantly the fatalities of people, loss of properties and destruction of the environment caused by natural hazards. The program combines academic researchers and government agencies to develop spatial decision support system for hazards mitigation. The spatial decision support system will provide decision-makers with the information of potential hazard areas, hazard loss estimation, scenario simulation of various hazard mitigation options.

1. Future Prospects

The steady support of the government and the organized efforts by the academia have given Taiwan a head-start on its global change research program. Infrastructures supporting the research have begun to function. In the future, the aforementioned research programs will undergo periodic examination and re-evaluation. Fig. 2 illustrates a recent effort by local community to re-organize the global change research programs funded by NSC.

One of the ultimate goals of global change research is to invoke public awareness on the causes and consequences of global changes, so that they might be willing to adjust their lifestyle and support the idea of developing a sustainable future. However, because of the high population density, scarcity of resources and the need for economic development, Taiwan faces a very challenging task in achieving this goal. Fortunately, both the government and the academia have fully recognized the importance of this problem. Programs promoting global change education and public awareness are underway, and this will continue to be one of the areas of concentration in the future.

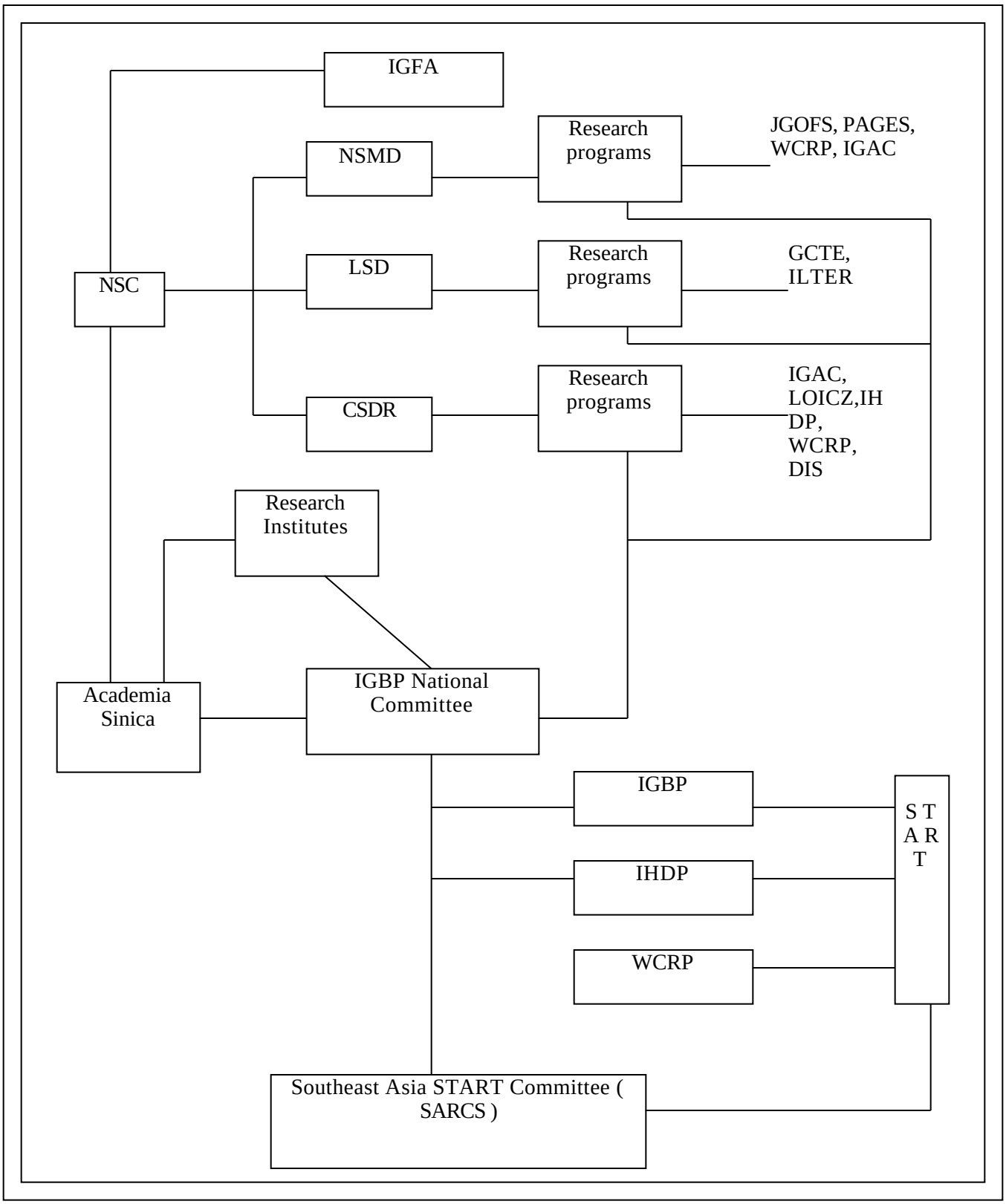


Fig 1: A diagram to illustrate the interactions among the funding agencies, research programs,. national IGBP Committee, international organizations, etc. related to the global change research in Taiwan (NSC: National Science Council; NSMD: Natural Science and Mathematical Division; LSD: Life Science Division; CSDR: Commission on Sustainable Development Research)

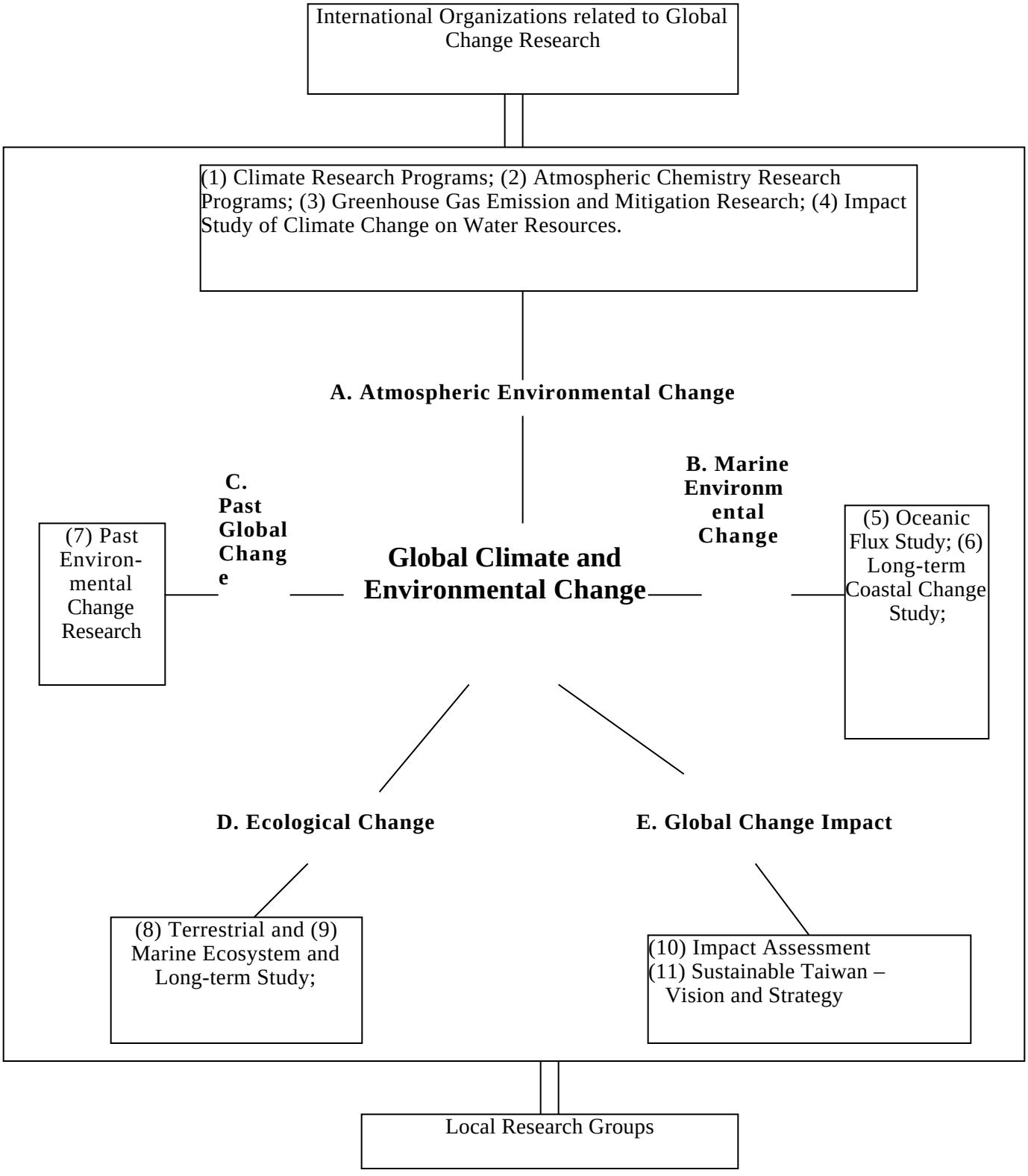
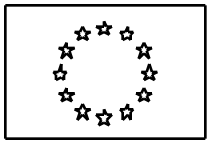


Fig 2: An on-going integration of the global change research programs in Taiwan

EUROPEAN UNION



EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL

Directorate D.I - Preserving the Ecosystem I
Biodiversity and global change

National Update
on
EC Research on Global Change, Climate and Biodiversity
on behalf of the IGFA Plenary Meeting, 24-28 Oct. 1999, Beijing

The main task of the EC Directorate Research during the last years has been the drafting, and the negotiation of the Fifth Framework Programme. In spring this year the implementation phase of the Fifth Framework Programme has been started with the first call for proposals with its deadline on 15 June 1999. Key Action 2 'Global Change, Climate and Biodiversity' is endowed with 70 Mio _ for this call. The budget for the whole Fifth Framework Programme adds up to 301 Mio _ for Key Action 2. Research relevant to Global Change is also carried out under other Key Actions like 'Sustainable Marine Ecosystems', 'Sustainable Management and Quality of Water', 'Economic and Efficient Energy for a Competitive Europe' or areas under Generic Activities such as 'Socio-economic aspects of energy within the perspective of sustainable development' which are not covered by the figures given above.

1. Overview of proposals retained for immediate negotiation

A total number of 307 proposals were evaluated, out of which 159 were found eligible to be considered for funding.

Given that the available budget for the year 1999 is about _ of the total requested, stringent choice has to be made considering the ratings of the proposals, available budget for each topic and the balanced financial and topical coverage of the work programme of the Call.

The distribution of research projects is as follows:

Atmospheric composition: 12 projects provide a good coverage of this sub-theme and are intended to be grouped in three components i.e. aerosol research, tropospheric ozone and climatic impacts of tropospheric zones (Kyoto Protocol).

Stratospheric ozone: Both modelling and observational aspects are represented by 10 projects on the list and address policy relevant issues (e.g. Montreal Protocol) and aviation impacts of aircraft emissions (ICAO). In addition to research projects, this area includes a concerted action which aims to co-ordinate European stratospheric research.

Climate prediction: This area is also well covered by 8 projects which deal with aspects of seasonal interannual to decadal climate change prediction, climate change detection and processes.

Interaction between carbon and nitrogen cycles: This sub-theme is well represented in the area of carbon budget. In particular, there are 6 projects which could form a comprehensive cluster of carbon research (Kyoto Protocol) mainly dealing with forests, its integration on European scale and ocean carbon cycling.

Assessing and conserving biodiversity: This newly opened area received very high attention by the science community and is well covered by 9 projects.

Mitigation of and adaptation to global change: Albeit 11 projects had passed the threshold only 2 could be accommodated because of unsatisfactory rating. Therefore, this sub-theme is not well covered. In particular, Post Kyoto strategies are not properly addressed and will be open in the next call again.

European component of global observing systems: With 9 projects this new area in Key Action 2 of the Fifth Framework Programme received a good response and both ground based and satellite observations are to be addressed in the projects which cover a wide spectrum of observational component. It also inludes a concerted action with a view to co-ordinated experimental site networks observing the effect of global change on terrestrial ecosystems.

2. Clustering of proposals

Potential clustering within Key Action 2 is foreseen for the projects dealing with the topics Carbon cycle (Kyoto relevance), Atmospheric composition (aerosols, ozone budget and climatic impact), and Stratospheric ozone (e.g. aircraft emissions).

3. Participation from associated and third countries

Several associated countries (Iceland, Norway, Israel, Slovenia, Hungary, Poland, Czech Republic, Estonia) and USA, Russia and Switzerland are participants of the short list proposals with USA participating with their own funds.

4. Rejected proposals

Within Key Action 2 out of 336 proposals received 307 were eligible, 159 proposals were considered for funding, the highest ranking 56 projects are being funded, and 5 were put on the reserve list. About 50% of the proposals had failed step 1 of the evaluation, mainly due to the lack of problem-solving approach.
Among the proposals funded the number of EU partners in total is 436, the number of partners from non-EU countries is 72.

5. Conclusions

The seven sub-themes open for proposals under Key Action 2 are all well covered except for mitigation and adaptation in the socio-economic field. This area will be open again along with others in the next call coming up on 15 November this year with its deadline on 15 February 2000. The budget for this call will slightly increase.

FINLAND

National Update/Finland
Professor Seppo Kellomäki,
Research Council for the Environment and Natural Resources, Academy of Finland

Finnish Global Change Research Programme FIGARE 1999 - 2002

The Finnish Global Change Research Group (FIGSU) initially launched the idea to start a Finnish Global Change Research Programme (FIGARE). The Research Council for the Environment and Natural Resources submitted a proposal for the start-up in 1999. The proposal was approved by the Board of the Academy of Finland.

FIGARE is coordinated by the Academy of Finland, which is also providing part of the funding. Other funding organizations are the National Technology Agency Tekes, the Ministry of the Environment, the Ministry for Foreign Affairs, the Ministry of Agriculture and Forestry and the Ministry of Transport and Communications. Total funding over a three year period will be approximately 40 million FIM (7 million USD). FIGARE will be evaluated by a team of international experts during 2002. The Programme Director is Dr. Jukka Käyhkö, University of Turku. More information about the programme can be found at its home pages http://figare.utu.fi/.

The overriding objective of FIGARE is to analyse and understand the changes taking place in the global system and the underlying causes and impacts of those changes, and on the other hand to explore strategies of prevention and adaptation. In addition, a proper understanding of the natural processes requires a close knowledge of the social, economic, political, cultural and technological processes and impacts involved in global change. The research programme's main objectives are:

- to analyse the process of global change and its underlying causes and impacts at different temporal and regional levels
- to analyse and predict the environmental and socio-economic impacts of global change using methods such as scenario analysis
- to try and find social, economic and technological solutions that could help to intervene in the process of global change or adapt to the changes
- to train researchers and experts in the field

It is expected that the research programme will generate useful information for both national and international decision-making. Therefore the exchange of information among researchers and the various agents using the research results is of paramount importance.

The Global Change Research Programme encourages the formation of multidisciplinary and international research teams and networks, and aims to promote the participation of Finnish scientists in international research work. The purpose is to complement this work most particularly in such issues and areas that have special significance to Finland in terms of their impacts or planning implications: these will include questions relevant to the northern dimension, Arctic issues, Finnish technological knowhow and global change questions relating to developing countries. Combining as it does information from many different specialisms, the programme will also cover the various interfaces between different disciplines and aim to develop a systemic synergism.

The two main themes are:

- Causes and effects of global change: The aim is to reach a deeper understanding of the natural processes and human activities that lie behind global change, to analyse the changes taking place in ecosystems and societies and to predict the short-and long-term socio-economic effects of the changes.
- Prevention, control and adaptation. The aim is to find ways in which to minimize man-made global change, to apply the scenario method to see how societies can adapt to the ongoing changes and to explore different social, economic and technological strategies of adaptation and their impacts on global change

Finnish Biodiversity Research Programme FIBRE (1997 – 2002) Second Phase 2000 – 2002

The Finnish Biodiversity Research Programme (FIBRE) is implementing the international Convention on Biological Diversity (CBD) on a national level. The implementation of FIBRE is also included in the National Action Plan for Biodiversity in Finland 1997-2005.

A call for proposals for the first phase of FIBRE 1997-1999 was organised in 1996. FIBRE has been divided into two phases. Towards the end of the first phase (1997-1999) the Academy of Finland organised a mid-term evaluation. After the mid-term evaluation the second phase will start and subsequently projects will be accepted for the second three-year-period in 2000-2002.

FIBRE is funded by the Academy of Finland, are the National Technology Agency Tekes, Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, Maj and Tor Nessling Foundation, Finnish Forest Industries Federation and the Central Union of Agricultural Producers and Forest Owners, MTK ry. The total budget for the first phase of FIBRE has been approximately 62 million FIM (11 million USD). The funding agencies mentioned above have all made a commitment to participate in funding for the second phase 2000-2002. The Programme Director is Dr. Mari Walls, University of Turku. More information about the programme can be found at its home pages http://fibre.utu.fi/

The mid-term evaluation was finalised on March 10. The Panel Report is available at FIBRE home pages http://fibre.utu.fi/.

The research programme is expected to bring new information that cannot be achieved through traditional research limited within a scope of a specific discipline on issues related to biological diversity. The programme aims at establishing connections with knowledge on biodiversity and

- economic questions; research will answer questions on the costs and benefits of biodiversity conservation as well as regulatory instruments and possibilities to sustain biological diversity
- ethical and juridical questions related to the exploitation of biodiversity
- technological questions; research will focus on the technological instruments and techniques to conserve and exploit biodiversity
- social questions; research will identify different relationships between man and nature, man´s possibilities to conserve biodiversity, and those national and international mechanisms involved in biodiversity conservation
- questions related to developing countries; the research programme aims at producing information and at training experts in order to support and launch local initiatives for the conservation and sustainable use of biological diversity
- theoretical knowledge, which will lead to wider applicability and generalisations

In the first phase of FIBRE (1997-1999) not all the central research themes were satisfactorily represented. Research areas that call for further research input in the second phase include e.g. the diversity of the Baltic Sea and inland waters, mechanisms that maintain biodiversity, factors that threaten biological diversity, research on agriculture and traditional rural landscapes combining both biological and socio-economic approaches, and biodiversity research of urban and other densely populated areas. Furthermore, socio-economic, legal and humanistic research need to be strengthened in the second phase.

FRANCE

REPORT from FRANCE

1. New initiatives in Climate Research

The National Climate programme has been restructured last year and is now composed of 3 major components:

- Research programmes to study basic processes including those relevant of GEWEX/BAHC, SPARC/IGAC, JGOFS, LOICZ and PAGES.
- Climate Variability: This newly set-up programme leans on the results of the precedent one (PNEDC) but focuses more specifically on climate variability at all time and space scales and constitutes the French component of CLIVAR.
- Management and Impacts of Climate Change (in French: Gestion et Impacts du Changement Climatique GICC)

The objectives of GICC is to develop scientific knowledge on which to base and optimise mitigation and adaptation strategies with respect to additional greenhouse warming and global climatic change. It includes 4 main topics:

- setting up the scene for international negociations (equity vs. efficiency, prospective tools, legal aspects) ;
- reduction strategies for emissions in France and in the European Union (France vs. European Union, integrating the tools for reducing greenhouse effect, technical evolutions, synergies and/or conflicts in environmental policies, land-use change, forests and agriculture) ;
- evaluation, impacts and adaptation strategies to climate risks (regionalisation of climate change scenarios, agriculture, water cycle and hydrosystems, biodiversity and management of protected zones, forests, sustainable development and land-use, health, insurance) ;
- methodological developments (reliable inventories of GHG emissions and C-sinks, scenarios for the future).

GICC had its first call for proposal in 1999: 23 full proposals were received, 11 to 13 will be funded over a two-year period (1999 and 2000). The large number of declarations of intention (49) led to the organisation of ad-hoc seminars to regroup laboratories and prepare larger-scale, more integrated proposals for 2000

Furthermore a French contribution to LUCC is being organised; the identification of several groups with the right scientific expertise has been done and is encouraging. What is needed to create a LUCC community is a selection of priorities based on LUCC Implementation Plan and some financial support. Both should be existing within the next 2 years.

The French contribution to IHDP is not yet structured, but CNRS/INSU has organised with this purpose in mind a One-Week Seminar at Les Houches on this issue (18 -23 October 1999).

2. France-Diversitas.

The French National Biodiversity Programme as described last year is being pursued.

In this Programme and within the department of Life Sciences at CNRS, the priority has been given to the theme "Biodiversity et Ecosystem Functioning", a joint project of Diversitas and GCTE and the Scientific Secretariat of this Core-project is being set-up in Paris. This priority is developed in synergy with the ESF Programme "Linking Community and Ecosystem Ecology" to be

3. Regional approaches to global change research

L'Institut de Recherche et Developpement (IRD, ex-ORSTOM) is the principal French institution to carry out research in foreign countries in co-operation with DC scientists. The support for this programme involves 500 to 600 people and an annual budget of about 30 MF/year (not including salaries). One example of such cooperation is Med HyCOS in the Mediterranean region as a IRD contribution to the WMO Project WHyCOS .

France is also supporting MEDIAS-France which aims at helping research and capacity building in the Mediterranean and sub-sahelian Africa.

One should also mention the contribution of the Ministry of Cooperation through FIRMA (Fond Incitatif de Recherche Meteorologique en Afrique) with about 1MF/year, and the contribution of the Ministery of Foreign Affairs to GEF with the Fond Francais à l'Environnement Mondial (FEM) which amounts to several 1000 MF/year.

4. The Global Observing System

Participation in CEOS, IGOS and the different components of GCOS including GODAE is going-on.

Continuation of the contribution to the ground-based networks (CO2, NDSC) and to the observation from space which includes in a non exhaustive list:

SPOT-Végétation 1 (co-financed by EC, France, Belgium Sweden and Italy) which is producing operationnal daily data since March 1999.

SPOT-Végétation 2 which has been recently decided.

JASON 1 (CNES-NASA) will be launched in 2000 and JASON 2 is being discussed as a pre-operational satellite involving also NOAA and EUMETSAT.

PICASSO-CENA has been decided by CNES and NASA to explore clouds and aerosols

And obviously the participation in ENVISAT (GOMOS) and METOP (IASI)

5. The Funding issue

The seed money for basic climate research has decreased during the last few years and is now at a level of about 7 MF/year (excluding salary, satellites and ships). In comparison, the French CLIVAR component has evaluated the need for a consolidated budget of 500 MF/3 years starting in 2001-2002 (including salary, but not space).The way to satisfy this need has not yet been found.

With GICC the funding of interdisciplinary science is in much better shape. The annual seed funding is 8 MF (in 1999, 2000 and 2001), which amounts annually to about 40 MF if one includes the salaries .

LUCC-France is going to be launched in the next year. Its budget is not yet defined.

When speaking of funding, one cannot ignore the space component which funding is not in the same order of magnitude.

6. Glue Money

France provides funding for the infrastructure of WCRP 120 000 FF and for IGBP 300 000 FF and supports 3 international Project Offices:

- IGBP-DIS in Toulouse with about 1.5 MF/year
- SPARC in Paris with about O.5 MF/year and 1 scientific officer position
- Medias-France as a contribution to START with about 3 MF/year

Furthermore France is in the process of setting up a scientific secretariat for the core Project "Biodiversity et Ecosystem Functioning". It should be noted that the Scientific Office of Diversitas is supported by UNESCO in Paris.

7. Publications

France is publishing :

- The French IGBP-WCRP Letter
- The Medias-France Newsletter
- The SPARC Newsletter
- and since October 1999, The IGOS Bulletin.

GERMANY

Plenary Meeting of IGFA, 24 – 28 October 1999, Beijing

Global-Change-Research in Germany
- Update for 1999 -

Global change research in Germany is mainly funded by the Federal Ministry of Education and Research (BMBF), the Deutsche Forschungsgemeinschaft (DFG), and other funding institutions; in addition there are numerous research institutes with long-term financial commitments for global change research.

With all funding agencies, total funds for global change research have remained stable or have increased. Despite budgetary constraints further slight increases are expected.

Many of the activities mentioned in the last report given at Ispra are still under way. The majority of those activities is directly or indirectly connected with research foci as defined by WCRP, IGBP and IHDP.

BMBF has started several new research programms in 1999:

Global change in the hydrological cycle (GLOWA):Development of integrated strategies for sustainable management of water, lakes and rivers on a regional scale. The research will focus on selected river basin systems, taking account of ecosystem contexts and the socio-economic framework.

Biodiversity of global change (BIOLOG):The program will focus on the functional role, change, and sustainable use of biodiversity. Biodiversity informatics (e.g. establishing a data base) will be supported as well.

Atmospheric research (AFO 2000):
The program will contribute to the basic understanding of the atmospheric system giving priority to integrated approaches. Development of instruments for environmental policy and support of young scientists will be additional goals.

Climate research:
The German climate-research-program will focus on the variability and predictability of climate, process studies on a regional scale and the effects of climate change.
Geotechnologies:
This is a joint program of BMBF and DFG. Contributions to global-change-research will concentrate on natural climate variations and the global carbon cycle (gashydrates).

Integration and interdisciplinarity are common aspects of these programs; socio-economics will play an increasing role. Based on these principles research projects dealing with peace- and conflict-research have also been initiated in 1999. (Environment and security in international context; integrated analysis of conflicts based on methods which have been developed by syndrom-research). This can be seen as a further step towards an integrated concept of science for sustainability.

In 1999 the decision was made that BMBF will continue it‘s financial support of the IHDP-secretariat in Bonn for another 3 years (until 31.12.2002). In the funding period 1996 – 2002 4,2 Mio. DM (approx. 2,35 Mio. US $) will be provided in total.

In order to narrow the gap between Global Change research and policy the German government increasingly supports IPCC activities through direct and “in kind” (workshop, author meetings) contributions. In addition assistance is given to a growing number of scientists being involved in writing IPCC reports.

The DFG has established a new programme on “Soils as source and sink for CO2”. In line with the National Committee’s recommendation to support the integration of the global change research programmes the DFG has started a series of workshops on integration methods. In November 1999 an international conference will be devoted to “Understanding the Earth System” focussing on cross-cutting issues within the field of Earth System Analysis.

One third of DFG’s total funds are specifically allocated to interdisciplinary research. For global change research this amounts to more than 90 %. There are a number of specific funding instruments for interdisciplinary research ranging from transregional networking to local centres of excellence. The overall experience is positive. In accordance with the results of an international evaluation of the DFG funding system some instruments will be modified.

Most of global change research funded by the DFG is located outside Germany and carried out in close co-operation with foreign partners on a person to person base or within the framework of MoUs and agreements. Although foreign scientists cannot directly apply to DFG for funds there are a number of ways to allocate funds to them (e.g. by employment, invitations to visits). Capacity building in developing countries can be funded by a bilateral agreement with the Federal Ministry for Economic Co-operation.

ICELAND

Iceland

National update on Global Change Research
IGFA meeting, Beijing,
October, 1999

Background

- Climatic variations on decadal and century time scales are well known to Icelanders and the country and its economy is highly vulnarable to the impact of such variations due to its dependance on natural resources, both of the land and the sea.
- Much proxy data information exists on previous climatic changes and their effects on natural resources and the life of Icelanders.
- In recent years a substantial part of the national efforts in natural (physical and life sciences) and environmental sciences, fisheries and agricultural research has direct and indirect implication for global change research. This effort, however, is scattered between a number of national institutions and has depended on the initiative and interest of individual scientists more than concerted national efforts.
- Recognizing the increasing importance of understanding man's impact on and interaction with the environment the Icelandic Research Council took the initiative a few years ago to evaluate the need and formulate an overall strategy in the field of global change research. The recommendations called for a coordinated and cross disciplinary effort by a number of institutions. However, the limitation of financial resources for R&D in the small economy of Iceland presents a problem in pursuing a concerted strategy. It has taken some time to implement the recommendations.

Recent developments

- In its new vision and strategy for the new millennium the IRC has designated " the dynamic nature, global change and the co-existence of land and people" as one of its priority areas for research in the future.
- The IRC has taken initiatives to encourage participation of Icelandic scientists in international research cooperation in this field, i.e. through the EU framework program and Nordic Cooperation.
- In 1998 the IRC organized an international workshop on ,,Environmental and Climate Variations and their Impact in the North Atlantic Region". The workshop was supported by the European Commission and The National Science Foundation of the US. The report of the Ad-hoc Groups of the workshop representing the outcome of the meeting is available on the Internet and to the IGFA meeting.
- Partly in follow-up of the workshop the IRC has received earmarked national funds to finance increased research efforts into this area. The Government of Iceland has provided a total of 580 MIKR (about 8 M$) for 6 years to fund research into information technology (60%) and environmental research (40%). Important parts of these fresh funds are directed at research themes relevant to global change research. Earlier this year the first call for proposals went out and applications have been evaluated and the grants announced. Directly related to global change issues and natural variability 13 applications were received and 5 grants were awarded to the total tune of 15.2 MIKR. Furthermore 2 applications indirectly related to global change issues were awarded a total of 14.2 MIKR.
- The IRC is presently preparing recommendations to the Government of Iceland on the establishment of Virtual Centers (networks) of Excellence in an effort to increase synergies between research units. Some of the areas being discussed for such networks would be centered around research themes related to global change and natural variability or its effects on the life and economy of Iceland, such as physical and biological processes of the ocean environment and its interaction with the atmosphere, impact on desertification and ecological changes. The existence of long time series of observations and monitoring form a basis for future research and modeling efforts.
- The IRC and NSF are currently discussing forms of closer bilateral cooperation with particular

- The IRC will through its participation in the Nordic Science Policy Council encourage strengthened regional cooperation between the Nordic countries for research related to climate change and its socio-economic impact in the area. A new research policy strategy of the Nordic Science Policy Council accepted by the Nordic Council and the Ministerial Council should improve the prospects for initiatives in this field of research cooperation.
- The Arctic Council in cooperation with the International Arctic Science Committee and IPCC will be undertaking a scientific assessment of consequences of climate variability and change in the Arctic region (Arctic Climate Impact Assessment - ACIA). This major effort is designed to meet the urgent need for regional assessments.

Financing external work – "Glue money"

While many of the above developments will certainly enhance the possibilities of Icelandic participation in regional and global research efforts for understanding of Earth's physical and biological process, climate variability and interaction with human activity the Icelandic national resources are very small in international terms and in relation to the size of the problem. Iceland has difficulty in directly financing events and research work outside its own boarders. It can to some extent finance international scientific workshops and similar events in Iceland and can possibly on a case by case basis find means to fund participants from countries outside Europe in such events. Iceland through IRC and other national institutions is willing to host and co-sponsor such events on a case by case basis when the location in Iceland seems particularly relevant. Iceland will host a CAPE (Circum-Arctic Paleo Environments) workshop in June 2000.

JAPAN

Global Change Research

Activities in the Environment Agency of Japan

1 Global Environment Research Fund
Trend of Global Environment Research Fund

(million dollar)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
10.9	15.5	17.3	19.1	20.1	22.3	23.6	24.1	24.1	24.1

Research Area
1) Depletion of ozone layer
2) Global warming
3) Acid precipitation
4) Marine pollution
5) Tropical deforestation
6) Loss of biological diversity
7) Desertification
8) Human dimensions of global environment problems
9) Other global environmental problems

In fiscal year 1999, 41 research projects by 10 agencies/ministries including 36 national institutes and 64 universities were funded.

2 EFF(Eco-Frontier Fellowship program)

1999EF Fellow(total 21)

By nationality	By research field
China (10) Russia (3) Germany (2) France (1) India (1) Romania (1) England (1) Philippine (1) Thailand (1)	1) Depletion of ozone layer 5 2) Global warming 6 3) Acid precipitation 1 4) Marine pollution 1 5) Tropical deforestation 1 6) Loss of biological diversity 3 7) Desertification 2 8) Human dimensions of global Environment problems 2

3 APN(Asia-Pacific Network for Global Change Research)
The Environment Agency of Japan also supports the activities of the Asia-Pacific Network for Global Change Research (APN), which is an inter-governmental network created to support research on global environment change ,and provides the core funds for the staffing and operations of the APN secretariat.

Activities in Ministry of Education, Science, Sports and Culture, JAPAN (MESSC, Monbusho)

MESSC, JAPAN promotes the basic studies relating to the international research programme such as WCRP, IGBP, DIVERSITAS and HDP under the global environmental issue. At present, four research programmes are being undertaken up to the fiscal year of 2001 (Table 1).

GAME-MESSC

In 1998-1999, x-band triple-Doppler observation was performed in Huaihe River Basin in China. In Thailand, continuous flux and radiation measurements were conducted. In Siberia heat budget measurements were also performed.

IGBP-GCTE-MESSC

The question is how do terrestrial ecosystems function as carbon pool under global change? Two focal stations are selected in Japan in this program. The following research subjects have been conducted until today. Weekly or monthly measurements of carbon cyclings in two ecosystems are now in progress at a watershed level.

DIVERSITAS-MESSC

The field station in a temperate deciduous forest at Tomakomai Research Station of Hokkaido University forest has been well established by building a canopy crane system. The same system is now under construction in a tropical rain forest in Kubah, Sarawak, Malaysia.

JSPS-Future Programme

The primary focus of this project concerns the establishment of a sustainable human society that can coexist with natural ecosystems. The final goal is to provide 'Series of Comprehensive Research Manual' through a multi-disciplinary study of a catchment area. The main field is a human dominated river basin of Lake Biwa-Yodo River watershed in Japan. Details of these projects are compiled in the Report of Monbusho – 1998 to 1999.

Table 1

1) WCRP: GAME-MESSC, Japan
GEWEX Asian Monsoon Experiment
1999-2001
Scientific Research of Priority Areas
Title: Energy and Water Cycle in ASEAN Monsoon Region

2) IGBP-MESSC, Japan
1999-2001
Scientific Research of Priority Areas
Title: Response of Terrestrial Watershed Ecosystems to Global Change

3) DIVERSITAS-MESSC, Japan
1997-2001
Creative Basic Research
Title: An Integrated Study on Biodiversity Conservation under Global Change and Bioinventory Management System

4) JSPS-Research for the Future Programme
1997-2001
Title: Developing the Standards for Global Watch through a Multi-Disciplinary Catchment Study

THE NETHERLANDS

Report from The Netherlands to the IGFA plenary meeting 1999

Hans de Boois and John Marks,
Netherlands Organization for Scientific Research NWO, 22 October 1999

According to current knowledge, The Netherlands can become a little bit warmer under a 2xCO2 scenario, which could be nice. However, another 2xCO2 scenario may open the door for a new ice age. There is still a lot to be learned. As we reported last year, Dutch policy on reduction of emissions of greenhouse gases has become careful. Still the funding of emission reduction activities is at least twenty times higher than the funding of research on global change.

Over the last couple of years, the level of public funding of scientific research at large is slowly declining and becomes low compared to other OECD countries. This applies to global change research as well. The prospects for the future are uncertain in so far that if there are no changes, the GCR funding level will decline faster.

A major part of the present Dutch funding for GCR goes via the National Research Programme Phase 2, funded by the Ministry of Environment and NWO. This programme expires in 2001. There is a tendency to create a follow up with separate programming and funding by the Ministry of Environment for research which is policy-relevant on the short term on the one hand, and on the other hand strategic and fundamental research programmed and selected according the procedures of NWO, funded by both NWO and the Ministry of Environment.

Meanwhile, the NWO Research Council on Earth and Life Sciences moves from funding a general GCR programme towards more specific Dutch contributions to Core Projects, like CLIVAR and LOICZ, at levels of 2-4 million USD for 5-6 years. Not a bad thing, but it will need a firm pressure from the science community itself to avoid a decline of funding levels.

Following earlier recommendations by the IGFA plenary, the concept of ***Glue Money*** was successfully advocated at the Ministry of Education and Science and the NWO Research Council for Earth and Life Sciences. A separate budget of USD 50k per year is available for Inter-Core Project activities. Proposals can only be submitted via the Executive Directors of the international programmes in order to solve the problem of prioritizing.

The Dutch science community is honored that it may host the IGBP-millennium conference July 2001 in Amsterdam. From Dutch public funds USD 250k has been pledged as sponsoring.

A couple of years ago Paul Cruzten was awarded the Nobel Prize for chemistry. All at a sudden several authorities remembered that Paul Crutzen is a Dutchman. This provided the small Dutch atmospheric science community half a million USD per year extra for collaboration with the German MPIs on atmospheric chemistry and on meteorology for a suite years. The total benefit is far more than the amount Crutzen got with the Nobel prize.
Two weeks ago two Dutchmen received the Nobel prize for physics for what they did almost thirty years ago.

Funding of inter- and multidisciplinary research

In a relatively small research community as the Dutch is, scientists from different disciplines meet each other more frequently than in large science communities. As a result, collaboration between scientists from related disciplines to solve scientific questions occurs frequently. This is also fostered by the funding of relatively open research programmes on issues which are relevant for society on the short term, e.g. biodiversity and ecotoxicology. It should be stressed that this applies to disciplines in the natural sciences. GCR and in particular IGBP triggers such collaboration .

Real collaboration (not working parallel to each other) between natural sciences and social or economical sciences proves to be much more difficult. In particular it is a problem to achieve mutual benefits which makes the partners equal and make each component of the research innovative. Nevertheless, in Dutch global change research we see successful examples in e.g. LOICZ and LUCC.

Regional approaches to global change research

In The Netherlands, regional collaboration in research is quite common. There are two reason for regional collaboration.
The first reason is to join strength and capacity of several countries to investigate an issue of ***regional interest***, e.g. the North Sea, the River Rhine, atmospheric pollution. There are many examples of successful collaboration; in the area of global change research the ECMWF is an important example.
The second reason for joining research activities is because of scientific reasons, e.g. complementarity of capabilities. Such collaboration can be ***bilateral***. Examples in the field of GCR are the Dutch-German collaboration in atmospheric chemistry and physics (COACh) and in oceanography (NEBROC). NWO has an agreement on cooperation with the German DFG, but GCR activities have not yet been developed in this framework.
Multilateral collaboration is quite common too, much of which is being fostered by funding from the EU Framework Programme. Also the European Science Foundation has an important role: e.g. the funding of European participation in ODP is coordinated by ESF; also EPICA is an ESF activity. ESF is considering to develop a new mechanism called EUROCORES in which its role will increase, almost acting as a super-funding agency.

A different form of a regional approach is the focus of NWO-WOTRO (the Netherlands Foundation for the Advancement of Tropical Research) on LOICZ research in SE Asia. WOTRO funds the SARCS/WOTRO/LOICZ programme in which primarily regional scientists are involved. Additionally, there are bilateral Dutch-Indonesian and Dutch-Vietnamese LOICZ programmes. A considerable part of the budget of WOTRO comes from the Ministry of Development Cooperation.
During oceanographic cruises in EEZ-areas collaboration with coastline countries is a must. For the planned cruise of the Dutch RV Pelagia around Africa which will contribute to CLIVAR and GLOBEC; local scientist will be invited to participate.
Usually, funding of foreign (local) scientists is included in such oversea programmes.

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NORWAY

IGFA-Updates 1999
National presentations Norway

1. New National Initiatives

We do not have a separate Global Change Programme, but several of our research programmes includes projects focussing on global change problems. Programmes organised by the Research Council of Norway are encouraged to have a plan for international collaboration. Programmes of relevance for Global Change research encourage project leaders to participate in the international global change programmes; WCRP, IGBP, IHDP and DIVERSITAS.

The Human Dimensions Programme

We hope that Norwegian scientists in the future will play a more active role towards the activities related to the IHDP. In order to secure greater involvement in IHDP-related activities, and also to inform about ongoing activities, the science plans of IDGEC and GECHS have been circulated to the relevant programme boards and scientists involved in activities related to the projects. We have asked them to comment on the plans and give ideas on how to implement this in the Norwegian research. We have had positive answers from several research groups.

New Norwegian Global Change committee

The Research Council of Norway has recently appointed a new national Global Change Committee. The Global Change committee is composed with the purpose to act as a NHDP-committee for Norway and also to be advisory group for the Norwegian IIASA membership and to be a contact point and a reference group for the IGBP-activities.

2. Funding of inter- and multidisciplinary science

We try to promote inter- and multidisciplinary research through organising the research in large thematic programmes. To achieve the goals of the programmes it is necessary with collaboration between different disciplines. The programme boards are charged with the task of defining specific targets on the volume of interdisciplinary projects.

In collaboration with the Universities we have organised interdisciplinary research centres at the universities, and some of these are quite successful.

3. Funding trend

The total amount allocated to global change research is approximately the same as last year. Some programmes have been reorganised, which might effect some global change projects. The research budget for the year 2000 tells us that there will be an increased focus on regional climate studies.

4. Regional approaches to global change research

Mechanisms in the science funding sphere to support research in foreign countries. Norwegian researchers can do research/take a Ph.D. in a foreign country and have these activities funded as part of the ordinary science funding system. Except for Ph.D. students who stay in a foreign country during the entire study period the researchers should have a Norwegian institution as their home institution even if they stay abroad during their research work.

Is there any difference between supporting own scientists and foreign scientists?
Foreign scientists may obtain support to research carried out outside Norway. In general it is expected that the foreign scientist collaborates with Norwegian researchers in a collaborative project and that the application is forwarded by a Norwegian institution. Ph.D. students from foreign countries may obtain a Ph.D. grant provided he/she has been accepted by a Norwegian institution that is willing to take on the required responsibility for the student.

Aid agency support

Research as aid. The Norwegian Agency for Development Co-operation – NORAD supports universities and other relevant institution within the research and higher education sector in the South (research as aid). The main objective is to build research capacity and competence in developing countries so as to enable them to conduct research on the basis of their own needs and to draw on the existing research results. Support is given to South-South co-operation and to regional and international co-operation, and to international diploma- and master degree programs at Norwegian universities for candidates from developing countries.

Support through research collaboration between research institutions in Norway and institutions in the South. The main objective is to build research capacity in the south; promote South-South collaboration; promote dialogue with research communities in the South, as part of an integrated Norwegian south policy. Support is mainly given through the NUFU-programme (Norwegian Council of Universities`committee for Development Research and Education.

Ministry of Foreign Affairs

Support to international development research with the main objective i) to help strengthen research performed by international and multilateral organisations of special relevance to developing countries, poverty alleviation and global issues and ii) to stimulate international research institutions to give higher priority to collaboration with countries in the South.

Collaboration between science funding agencies and aid agencies

There is a constructive dialogue between the Ministry of Foreign Affairs, NORAD and the Research Council system in matters relating to funding of development research in Norway, research as aid, research collaboration and support to international development research. There is however a need for better co-ordination and more flexibility between the various funding channels in this area.

SPAIN

The New Spanish Office for Science and Technology and the structure of the New National Plan for Scientific Research, Development and Technological Innovation (2000 - 2003) in supporting Global Change Research activities

The Office for Science and Technology (OCYT) was created in January 1998 and is directly attached to the Presidency of the Spanish Government. It constitutes the support unit of the Interministerial Commission for Science and Technology (CICYT) for the planning, co-ordination, monitoring and evaluation of the science and technology activities of the relevant Ministerial Departments and public bodies. It is also entrusted with the co-ordination with the Regional Governments of the Autonomous Communities and with the co-ordination and follow-up of the international programmes with Spanish participation.

OCYT provides assistance to CICYT in the development of the competencies attributed to it by the Law 13/1986, (Law for the Promotion and General Co-ordination of Scientific and Technical Research), and, in particular, in the execution of the following functions:

- **Planning, monitoring and evaluation** of the priority lines of the research, technology and innovation policy financed by the General State Budgets.
- **Design** of the mechanisms to achieve the participation and co-ordination of the agents of the Spanish Science-Technology-Industry system.
- **Promote** the elaboration of scientific and technological prospective studies.
- **Co-ordinate and prioritise** of the actions regarding the State's scientific and technological large-scale facilities.
- **Co-ordination** of its activities with those of the Advisory Council for Science and Technology with the objectives set out in the Law 13/86.
- **Planning, co-ordination, promotion, follow-up and evaluation** of the participation of Spain in international science and technology co-operation organisations and programmes.
- **Propose** the distribution of the budgetary credits derived from international scientific research and technological development programmes.
- **Collaborate** with the National Statistics Institute (INE) in the elaboration of the statistics and indicators of the Spanish science and technology system.
- **Co-operate** with the Regional Governments of the Autonomous Communities, through the General Council for Science and Technology, with regard to the matters stipulated in the Law 13/86.
- **Co-ordinate** its activities with those of other public and private entities in the field of research and development.
- **Elaboration** of the Annual Report on the research and development activities financed

The new Spanish National Plan for Scientific Research, Development and Technological Innovation (2000-2003)

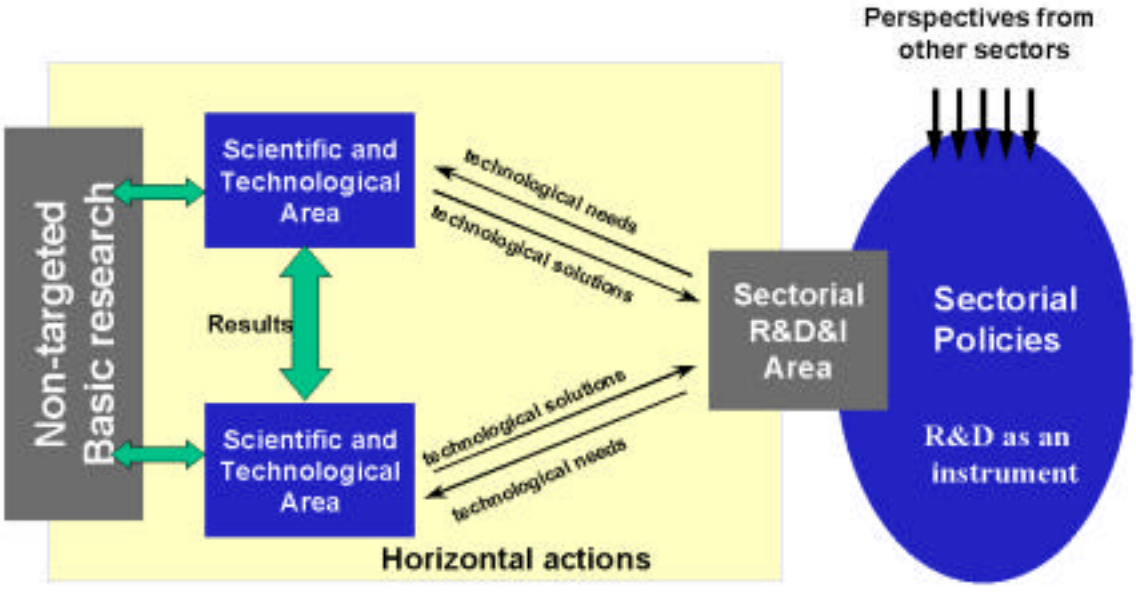
CICYT believes that the public effort in scientific research and technological innovation should be geared towards **three main general objectives**:

- R&D at the service of the citizen and of the improvement of the social well-being
- R&D in support of industrial competitiveness
- R&D in support of the generation and diffusion of knowledge

Strategic objectives

1. Increment the level of the Spanish science and the technology, in quantity and quality
2. Increase the competitiveness of the Spanish enterprises and their innovation capacity
3. Improve the exploitation of R+D results in the enterprises and in the Spanish society in general
4. Strength the internationalisation processes of the Spanish science and technology
5. Increase the human resources
6. Increase the level of the scientific and technological knowledge of the Spanish society
7. Improve the procedures for co-ordination, evaluation and follow-up of the **NP**

Structure of the National Plan



Levels of activity:

A. Scientific and technological research areas

1. Scientific and technological areas: defined bottom-up, including targeted basic research in selected scientific areas

- Biomedicine
- Biotechnology
- Information technologies and communication
- Materials
- Chemical processes and products
- Industrial design and production
- **Natural resources**
- Agro-food resources and technology
- Socio-economy

1. Sectorial areas: problem solution oriented and basic targeted research

- Aeronautics
- Food
- Automotive
- Civil construction and preservation of cultural heritage
- Defence
- Energy
- Space
- **Environment**
- Health and social services
- Information society
- **Transports and land planning**
- **Tourism, leisure and sports**

1. Basic non-targeted research

- All other areas not included in the previous ones, specially
- Astronomy and astrophysics
- Physics of elemental particles and big accelerators
- Thermonuclear fusion

B. Strategic actions

Co-ordinated activities of R+D and innovation. These are multi-sectorial or multi-technological and multi-disciplinary activities to develop co-ordinated research oriented to solve strategic problems to implement sectorial policies, e.g.:

- Natural resources
  - ***Natural protected spaces***
- Energy
  - ***New more efficient and less contaminant energetic systems***
- Environment
  - ***Wastes***
  - ***Water***
- Space
- ***Earth observation systems***

B. Horizontal actions

- Strengthen the human potential: training and mobility of researchers
- International co-operation: European, Latin American, Mediterranean and other developed countries
- Technological innovation, transfer and diffusion of results

C. Competence centres

- Centres of excellence in emergent areas
- Technological centres in areas with interest for industrial sectors
- Centres distributed in network

D. Large infrastructure for research

The National Research and Technological Programme on Natural Resources

The scientific goals of this NP are:

- Atmosphere and climate
  - Improving the observing capacity and atmospheric data
  - Climate variability and prediction
  - Processes and interactions that co-occur in the climate change at regional scale
  - Physic-chemistry processes and contamination in the atmosphere
  - New scenarios to evaluate the impact of climate change
  - Meteorogical techniques and methods to support resource management, and forecasting and prevention of natural risks
- Marine resources
  - Global change and oceanographic research
  - Functioning of marine ecosystems
  - Sustainable fishing activities
  - Integrated studies in the coastal zone and continental platform
  - Risks related to marine resources
  - Development of new and competitive marine technologies
- Water resources
  - Evaluation of water resources
  - Prediction of effects of global change on water stocks and availability
  - Water quality and diffuse contamination
  - Conservation and integral management of water resources
  - Application of new technologies to control the quantity and quality
- Global change and biodiversity
  - Flora and fauna
  - Matter and energy fluxes in terrestrial and aquatic ecosystems
  - Effects of climate variability and changes in land uses on biodiversity
  - Land degradation and desertification
  - Technologies and methods for sustainable use, conservation and restoration
- Antarctic research
  - Geology, geophysics and geodesy
  - Atmospheric sciences
  - Integrated studies on ecosystems
  - Polar technologies
- Technologies to prevent and treatment of pollution
  - Sustainable technologies
  - Technologies to reduce pollution
  - New restoration technologies
  - Analysis and control of environmental quality

New Centres of competence will be created:

- Information Centre for Earth and Atmosphere sciences
- Information Centre in Biodiversity
- Information Centre in Oceanography

A new Strategic Action will be implemented where multidisciplinary approach is required

- Integrated studies on natural protected spaces

Spanish National Updates

· **Funding of inter- and multidisciplinary science**

In Spain It is specially supported those research projects co-ordinating several groups from different disciplines to solve a specific problem. This has been in this way since the creation of the Spanish National Plan (1986)
The actual National Plan reinforces this procedure and promotes this not only within the Strategic Actions but also in all the scientific areas that require a multidiscipliry approach.

· **Regional approaches to global change research**

In Spain we do not have a special mechanism to support research in foreign countries. Actually we are trying to do this in parallel to the ARAUCARIA Programme of the Ministry of Foreign Affairs for Latin America, and only to support national scientists. Nevertheless the AECI maintain a very successful programme to improve human potential in Latin America through sponsoring research fellowships to postgraduate students that should like to make a PhD in Spanish institutions (Universities, Rsearch Institutions, etc.)
The agency sphere is more focused to aids for helping the developmental but not scientific research.
The collaboration between both kinds of agencies is quite good, collaborating actively in the implementation of international conventions and agreements, like Desertification convention, Biological Diversity Convention, Climate Change Convention, ect.
At bilateral level, the Ministry of Foreign Affairs maintain bilateral agreements no research with a multitude of countries.

SWEDEN

IGFA Plenary Meeting
Beijing, China, October 24-28, 1999

National updates
SWEDEN
(prepared by prof. Uno Svedin)

1. General RaD-Policy Overview

The general RaD-policy situation is characterised by preliminary moves for structural reforms in the funding system. The private research foundations that were established in the beginning of the 90's by state decision and transferring of considerable economic resources have now been active for a couple of years. They include foundations for strategic (industrially oriented) research, environment, social sciences and humanities, information-technology, internationalisation etc. The key issue has been the linkage between these entities and the state research system. A research Bill in the spring of 1999 clearified some overriding principles as the special role of the state in RaD-policy emphasising among other things basic research. Another Bill is expected in the autumn of 2000 when more details will be given and also the organisational and structural platforms will be defined.

As part of this work all agencies but also entities like universities have been required to deliver "research strategies" as suggestions for the next 4-10 years and to be dealt with in the forthcoming year 2000 Bill. Here also the relationship to the research done in the European Union is expected to be dealt with.

2. General outline of the areas concerned with the Environment, Global Change and Sustainable Development

The Swedish interest in issues about the "green dimensions" of policy continues. In the annual presentation to the Parliament by the Prime Minister about the next years highlights the sustainable development issue was still distinctly on the priority list. Components of the global change agenda are also included in this category e.g. the interest for the climate change. An ongoing parliamentary investigation concerned with environmental goal setting and their breakdown into sub-clusters of goals is midterm and is expected to deliver a position the year 2000. That year it is also expected that the arrangements of environmental research and research for sustainable development will be dealt with in the research Bill described above. An emerging discussion is concerned with conflicts inside some global change relevant domains, i.e.

- The carbon cycle
- The climate issue
- The nitrogen and phosphor issue
- The acidification topic

1. *Funding of inter- and multidisciplinary science*

The issue has raised considerable interest in the Swedish system. A special cross-going

some two years ago dealing with interdisciplinarity, gender issues and equity issues in the research funding system. A specially assigned expert workgroups for interdisciplinarity issues has after one year finalised a report on policies for this field as an input to the further debate.

In the general research Bill of spring 99 the issue of interdisciplinary work has been highlighted among several other issues at the level of principles. Discussions on new thematic fields for environmental research in Sweden also include discussions on integrative topics.

2. Regional approaches to global change research

Sweden has since long established mechanisms in the science-funding sphere through the department of SAREC (Swedish Agency for Research Co-operation with Developing Countries) inside the SIDA (Swedish International Development Agency) overall structure.

Within that realm support is given partly to Swedes and partly (major part) to projects of a more bilateral or multilateral character within which researches from developing countries participate as important actors. In the more “conventional” research council system the dominant financing goes to domestic activities, some of which have international connections. There are contacts within the research funding system, but the efforts directed to developing countries are more or less separate from other funding. At the level of individual researching institutions there are quite some co-operation across issues of “the North” and “those of the South”. One field of universal attention in this regard concerns water issues.

SWITZERLAND

Plenary meeting of IGFA, October 1999, Beijing, China

Recent trends in Global Change Research in Switzerland

Funding of inter- and multidisciplinary science

The Swiss National Science Foundation (SNSF) has the following major instruments to support and promote multidisciplinary science:

· The **National Research Programmes (NRP)** support research projects, mostly interdisciplinary, which contribute to the solution of current problems. Their average duration is 4 to 5 years, with a budget varying from 5 to 20 million Swiss francs (CHF);

· the **Swiss Priority Programmes (SPP)**: usual duration of 8 to 10 years, budget from 60 to 110 million CHF. The SPP Environment, a programme with a strong focus on multidisciplinary and global issues, is organising an ***"International Transdisciplinary Conference"*** involving science, technology and society. (Venue: 27.2.-1.3.2000, Zurich.) The SPP are now being progressively phased out, to be replaced by a new programme:

· the **National Centres of Competence in Research (NCCR)**, which have a particular focus on interdisciplinary and innovative approaches and shall promote international co-operation. Approximately 20 NCCR will be established in research areas of strategic importance to Switzerland. They consist of a "Leading House" and a network of partners both from academic and non-academic institutions. Their annual budget will range from 2 to 6 million CHF, for a duration of ten years. A first series of 8 NCCR will be established by January 2001.

The basic research projects supported by the SNSF are traditionally more discipline oriented. Since 1995, a small budget line for interdivisional research projects has been established to promote multidisciplinary research projects.

Multidisciplinary research is further conducted at many Swiss universities, especially at the two federal institutes of technology (ETH) in Lausanne and Zurich, which have a stronger focus on problem oriented research. It appears that in Switzerland problem oriented research is generally multidisciplinary, whereas basic research is usually more discipline oriented. In the field of environmental research there are, however, various collaborations among scientists of different disciplines. Some examples are: the ***MGU ("Mensch Gesellschaft Umwelt"***– Man Society Environment) in Basle, a foundation promoting multidisciplinarity in environmental research and teaching; the ***CENAT (Natural Hazards Competence Centre)*** at the ETH Zurich, for the interdisciplinary research on the causes of natural hazards.

The Swiss Scientific Academies further encourage interdisciplinary research activities through round table discussions, synthesis reports, as well as through their long term projects such as: the Alpine Initiative, the ***Swiss Commission for Research Partnerships with Developing Countries*** (the overall aim of the ***KFPE*** is to contribute to sustainable development at global level through research partnerships with developing countries) and ***ProClim (Forum for Climate and Global Change)***, which serves as a major information platform to the international programmes (IGBP, WCRP, IHDP), and maintains an up to date project database on the Web.

Regional approaches to global change research

The ***Swiss Priority Programme "Environment" (SPPE)***, which has a major GCR component as well as a regional approach including research co-operation with developing countries, is progressively phasing out and will at maximum by extended to 2002.

This gap will soon be filled by the new ***National Centres of Competence in Research (NCCR)*** starting in January 2001, since ***"Sustainable Development and Environment"*** is one of the four priority research topics defined by the Swiss Federal Council (and 13 out of 84 pre-proposals were submitted for this field during the first call).

The ***National Research Programme "Transport and Environment, Interactions Switzerland/Europe" (NRP 41)***, with a total budget of 10 million CHF for 5 years (1997-2002), has established several links with EU research projects. It encompasses some GCR relevant projects, dealing with the reduction of greenhouse gases such as CO2 and human health problems (linked to particle emission).

On June 1999, the Federal Council has approved a budget of 15 million CHF to launch a new ***National Research Programme: "Landscapes and Ecosystems of the Alps"***. This NRP will be closely linked to research projects of other Alpine countries and is expected to contribute towards enhanced understanding of fundamental processes, in order to achieve sustainable development.

The ***"Co-operation in Science and Research with Eastern Europe"*** programme, implemented by the SNSF and financed by the Swiss Agency for Development and Co-operation (SDC) is coming to a new phase (1999-2003), with a total budget of 14 million CHF. About 80% of these funds will be allocated to the eastern European partners. This programme, which is open to any scientific discipline, has supported several environmental research projects during its previous phases.

In June 1999, the first call for proposals of a new instrument: ***"Research Partnership with Developing Countries"*** was launched. The SDC provided a total budget of 3 million CHF (for a 3-year phase) for the southern partners, the Swiss partners being funded through the SNSF. The programme is open to researchers from all disciplines.

Switzerland is further actively participating in the ***European RTD Framework Programmes (FP)***, under the so-called European third country status, which allows Swiss researchers to participate on a project-by-project basis, but without EU funding. Since 1992, funding is assured through the Federal Office for Education and Science, by a special credit adopted by the Swiss Federal Parliament. After ratification of the bilateral agreement with the European Union (which is expected for January 2001), Switzerland will be fully associated to the 5th FP. During the 4th FP (1994-98), the field of environmental research (environment and climate, marine science and technology) counted Swiss participation in 153 projects, corresponding to a financial support of 35 million CHF.

Switzerland also supplies data and develops instruments for the ***international surveillance programmes (GCOS, GTOS, GAW, GEMS***, etc.) and further contributes to several Core Projects of the ***World Climate Research Programme (WCRP)*** and to the ***International Geosphere-Biosphere Programme (IGBP)***. The SNSF supports, on an equal basis with the National Science Foundations of the USA, the PAGES Core Project Office located in Bern, Switzerland.

UNITED KINGDOM

UNITED KINGDOM

NATIONAL UPDATE

FOR

THE INTERNATIONAL GROUP OF FUNDING AGENCIES FOR GLOBAL CHANGE RESEARCH (IGFA), BEIJING 1999

General funding situation

The UK Government claims to place great importance on the issues of sustainability and climate change. Scientific research received a funding boost last year and in particular the Natural Environment Research Council (NERC) received extra money to spend on three priority issues, one of which is interdisciplinary research in climate change. The new climate change centre mentioned below is one of the results of this extra funding.

A new interdisciplinary climate change centre for the UK (contact Ian Dwyer, NERC)

A new, interdisciplinary climate change centre is planned which will integrate environmental science, technology development, and socio-economics. The purpose is to enhance our understanding of the integrated system to provide research that underpins solutions to the climate change problem.

Three UK Research Councils – the Natural Environment Research Council (NERC), the Engineering and Physical Sciences Research Council (EPSRC), and the Economic and Social Research Council (ESRC) - have pledged £10M over five years for the centre. DTI has pledged additional support for a business contact point.

The centre could include a mix of core research, visiting scientists, networking and other activities. Some very impressive outline bids to run the centre have been received from the academic community. A multidisciplinary and international panel has been specially formed to assess the bids. The final decision on the winner will be announced March/April 2000.

Among other things, the centre is expected to: attract an internationally renowned scientist to be overall Research Director; achieve first class integrated research; draw upon relevant expertise in the UK research community; collaborate with research groups abroad; produce strategic research results relevant to the needs of government and business; attract additional funding (eg from business and government departments).

A new environment and health initiative (www.nerc.ac.uk/science/mrc.html)

The ***Environment and Health Initiative*** aims to stimulate interdisciplinary research into the human health impacts of environmental exposures. It is a joint programme between the Medical Research Council (MRC) and Natural Environment Research Council (NERC). Proposals are welcomed in all areas of Environment & Health, including the health impacts of climate change.

Indeed, the first proposal to be reviewed later this year will be on climate change, ozone depletion and health.

The initiative will make use of a particular mechanism for funding interdisciplinary research whereby different parts of the project are peer reviewed separately by different research communities. An overarching case also has to be made which demonstrates the added value of bringing the parts together.

UK Climate change programme, and climate scenarios under emissions reduction

The UK government is planning to launch a new climate change programme to help us meet our legally-binding target to reduce GHG emissions by 12.5% below 1990 levels by 2008-2012, and move towards our domestic goal of a 20% reduction in CO_2 emissions by 2010. In 1999 the Department of Environment Transport and the Regions (DETR) completed a nation-wide consultation on such a programme. A draft programme is due to published later this year.

Also, The Meteorological Office published an update to its previously published climate change scenarios, this time taking in account possible global emissions reduction scenarios. Results are promising, showing that emission reductions can significantly affect the impacts of climate change. (www.met-office.gov.uk/sec5/CR_div/CoP5)

Climate Change Levy announced by the UK government

(www.hm-treasury.gov.uk/budget/1999/nr/htm6.txt)

In March 1999, the UK Government announced a new 'Climate Change Levy' on the business use of energy. This is effectively a tax on energy use, designed to encourage industry to be more energy efficient, thereby reducing UK GHG emissions. Discounts are available for business sectors that enter into agreement with government to implement energy reduction and efficiency measures.

The tax will become effective from 1 April 2001. Some of the revenue at least will be hypothecated into schemes and programmes aimed at promoting cleaner energy consumption. One proposal, from a business advisory group to the government, is to fund a business-led Climate Change Technology Centre focusing on research for applied and near-market technology for reducing GHG emissions. It is envisaged that such a technology centre would work closely with the cross research council climate change centre mentioned above.

New UK Global Environment Research Committee

A Royal Society, Global Environment Research Committee (GERC) has been set up in the UK. It aims to promote and coordinate UK participation in the activities of the global environmental research programmes and committees organised by ICSU and its component bodies. It is chaired by Professor Brian Hoskins of Reading University. Roland Fuchs has been invited to make a START presentation at the next meeting of the committee (November 1999).

UNITED STATES

United States Report to IGFA
Beijing, China
25-28 October, 1999

I. Interdisciplinary and Multidisciplinary Research

Significantly enhanced interagency collaboration will be featured in the implementation of the US Global Change Research Program (USGCRP). By FY 2000, joint announcements of opportunity will be issued in the area of climate research in which representative agencies: 1) share overarching research goals; 2) participate in one collaborative merit-review process; 3) coordinate funding support; and 4) convene regular interagency workshops to document progress and propose changes in the integrated climate research agenda, with workshop outputs to be reflected in future budget requests. Such joint funding arrangements follow successful joint announcements in areas such as terrestrial ecosystems and paleoclimate research. In the development of new programs, such as carbon cycle research, agencies are collaborating in seeking scientific guidance in common from a single scientific advisory panel. In this way, programs are integrated at their inception. Some of the major areas of inter- and multi-disciplinary focus include biology and biogeochemistry of ecosystems, the global water cycle, and carbon cycle science.

USGCRP agencies are continuing efforts to build a strong interagency focus on global change impacts on managed and natural ecosystems, and to understand the relationship between a changing biosphere and a changing climate. The primary goal of the ecosystems program element is to provide a stronger scientific basis for understanding, predicting, and responding to the consequences of global environmental changes, of both natural and human origin, in terrestrial, aquatic, coastal, and marine ecosystems. Also under study is how these changes affect ecosystems' ability to provide goods and services and support sustained use. USGCRP ecosystems research activities will be closely coordinated with the research that is being undertaken by the CENR Subcommittee on Ecological Systems, including the newly emerging efforts under the Administration's Integrated Science for Ecosystem Challenges (ISEC) initiative. Cooperation in the development and implementation of USGCRP and ISEC research strategies is particularly important for investigating the effects of multiple stresses on U.S. ecosystems, which is a priority for each.

Study of the global water cycle is the unifying theme that can bridge the gap in the spatial-scale spectrum between atmospheric and hydrological sciences. This issue is in its first year and will be implemented through coordinated U.S. and international programs. Planning is underway to develop joint interagency programs in the U.S. and coordination with international programs [e.g., the Global Energy and Water Cycle Experiment (GEWEX), the Program on Climate Variability and Predictability (CLIVAR), Biological Aspects of the Hydrologic Cycle (BAHC), and potentially a more fully coordinated international Hydrology and Water Cycle Program].

The USGCRP is also establishing a Carbon Cycle Science Initiative. The U.S Department of Agriculture (USDA), Department of Energy (DOE), Department of the Interior (DOI), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), Department of Commerce/National Oceanographic and Atmospheric Administration (DOC/NOAA), and the Smithsonian Institution (SI) will take part in this initiative. The new program is poised to provide critical unbiased scientific information on the fate of carbon dioxide in the environment to contribute to the ongoing public dialogue.

Individual agencies have also been working towards a more interdisciplinary approach. Environmental health research at the National Institute of Environmental Health Sciences (NIEHS)

might draw upon biology, chemistry, and even physics. To move beyond these areas to fund programs that incorporate biomedical research to look at health effects of environmental exposures, technology development to mitigate environmental problems, environmental science to explore effects on the environment, and the geosciences to study fate and transport took vision and leadership of the NIEHS director and a legislative mandate from the Congress to extend authorization beyond the original mandate to do research on the health effects of environmental exposures.

The National Institute of Allergy and Infectious Disease (NIAID) and NASA have a memoranda of understanding to develop cooperative, multidisciplinary programs in the application of remote sensing and geographic information systems (RS/GIS) to human infectious diseases. A number of ongoing and completed NIAID studies have received supplemental funds from NASA to develop RS/GIS project components. Some of these projects have looked at: Lyme disease and Hantavirus in specific regions of the US; vector-borne diseases associated with irrigation, agriculture, and environmental change in Southeast Turkey; and, malaria in Mexico, California, and parts of Africa.

The Office of Global Programs at NOAA (NOAA-OGP) is aiming to change traditional research approaches through funding of its Regional Assessment, Research Applications, and Human Dimensions of Global Environmental Change programs. OGP supports research, for example, on vulnerability, opportunities, response options, variability, change, and surprise results from a wide variety of climatological, social, economic and ecological circumstances and interactions. The purpose of these programs is to increase understanding of the impacts of climate variability and change as conditioned by ongoing processes of decision-making and socio-economic transformation. The suite of efforts is intended to further research-based integration between studies of the whole of the climate system, including human components, such as health, and evolving informational and educational needs of decision-makers in climate sensitive sectors. The goal is to provide the basis for more effective application of climate information, including climate forecasts, for purposes of adaptation. The intent of this program is to encourage overlapping research approaches to integrate knowledge for problem solving.

The Human Dimensions of Global Change Research program is aimed at understanding how social and economic systems are currently influenced by fluctuations in climate, and how human behavior can be (or why it may not be) affected based on information about variability in the climate system. NOAA's present program of Regional Integrated Assessments possesses three distinct qualities (1) Interdisciplinarity, (2) Bridging the gap between climate forcings and societal interactions on different temporal and spatial scales, and (3) Decision support and services. It requires innovative partnerships among a spectrum of interests (Federal, State, local and private) to enable regional organizational capacity to develop accurate (i.e. identifying risks, uncertainties, indeterminacies), balanced syntheses and services on an ongoing basis. As such the program relies heavily on consolidating the results and data from ongoing NOAA-OGP disciplinary program elements, already funded in a region, into an integrated framework.

II. Regional Approaches To Global Change Research

The United States is involved in a wide variety of regional global change research activities including El Niño studies and Arctic research projects such as SHEBA (The Surface Heat Budget of the Arctic Ocean) and ARCSS (Arctic System Science). NOAA has worked cooperatively with the United States Agency for International Development (USAID) and the World Bank on a variety of projects seeking to apply seasonal climate forecasts in the area of disaster preparedness and food security, with underlying focus on issues of health, water, and agricultural management. The main vehicle for these projects is the International Research Institute for climate prediction (IRI), whose mission is to continually assess and develop seasonal-to-interannual climate forecasts, and to foster the application of such climate forecasts to the explicit benefit of societies. Goals of the IRI are to address all aspects of end-to-end prediction, including model and forecast system development, experimental prediction, climate monitoring and dissemination, applications research, and training, in coordination and collaboration with the international climate research and applications community.

NIAID's International Centers for Tropical Disease Research (ICTDR) program incorporates Institute-supported intramural and extramural tropical disease research centers into an interactive network focused on tropical disease problems. The network fosters partnerships between domestic and foreign scientists; NIAID and other U.S. government, private and international agencies; and individual investigators, funding organizations and industry to encourage the application of recent scientific advances to international health problems. NIEHS also supports a number of projects by foreign scientists and a number of projects in which U.S. scientists and grantees collaborate with foreign scientists.

The Inter-American Institute for Global Change Research (IAI) was designed to reflect the interests and capabilities of the Member States and to build the scientific and technical means to implement scientifically sound environmental policy plans. In order to assure the initiative is an effective partnership with a tangible global change science return, the IAI has worked to develop a sense of regional ownership of the Institute and to promote the development of a program which enhances the scientific capacity of the region. One of the IAI's objectives, established by the IAI Agreement, is to promote regional cooperation for interdisciplinary research on global change in areas such as earth, ocean, and atmospheric sciences as well as the social sciences. To achieve the above, IAI funded research focuses on global change impacts on ecosystems and biodiversity, socio-economic issues, and on the economies of the region. To date, the United States has invested over USD$18 million in the region through five peer-reviewed calls for proposals carried out by the IAI.

The United States' Government participates actively in IAI governance. The United States played a leading role in the creation of the IAI and has been an active participant in the IAI since its creation. Senior US Government officials from the National Science Foundation, NASA, NOAA and the Department of State have served on the Executive Council and held other responsible positions related to IAI activities.