

EXTERNAL ASSESSMENT OF THE INTERNATIONAL HUMAN DIMENSIONS OF GLOBAL CHANGE PROGRAMME

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Executive Summary

In 1990 the International Social Science Council (ISSC) created the Human Dimensions of Global Environmental Change Programme (HDP). It was at a time when the sciences were changing rapidly, the effects of global change were becoming more visible and there was a growing realization that human societies both contributed to the generation of and were impacted by these changes. The International Council of Scientific Unions (ICSU) became a joint sponsor of HDP in 1996 in order to facilitate the integration of research across the social and natural sciences. This precipitated an expanded agenda, a name change to the International Human Dimensions of Global Change Programme (IHDP) and major funding from the German Government.

ICSU and ISSC requested this Assessment 10 years after the formation of IHDP. It was asked to address the following issues:

- Scientific and policy relevance and impact;
- Visibility;
- Organizational performance; and
- Interactions with others.

These issues are addressed along with two other questions, which are logical extensions of the other issues:

- Is the mission of IHDP, which was developed in the 20th Century, appropriate to the context and demands of the 21st Century?
- Does the organizational structure of IHDP reflect its mission for the 21st Century?

The IHDP Programme and Mission

The IHDP initiated its research Programme and Mission to help mobilize a community of scholars and resources at a time when few researchers and even fewer national and international policy actors were making an explicit link between societal relations and major changes in the global natural environment. Further, the interface of social and natural sciences with respect to these issues was weak and almost no research funding was available to sustain any momentum in the field.

In its first 10 years the IHDP has developed from one core scientific Programme to five, with two more being developed and four other projects being jointly administered within the frame of the Earth System Science Partnership (ESSP). IHDP's first core program, Land Use and Cover Change, is completing its 10-year term. It has been very successful and should provide a model for other IHDP core projects. In addition to its research activities IHDP has also developed a series of network and capacity building activities,

especially in the developing countries, and IHDP has attracted increasing funding from increasing numbers of countries and sources.

IHDP has been successful in developing an international research programme, enhancing the involvement of social sciences in global change issues, and contributing to heightened political and social awareness of the human dimensions of global change.

However, if the stimulation of research programmes has been the IHDP's strength, it has also brought to the fore the systemic research inequalities between north and south, and the impediments these inequities present to international understanding of the social-natural science interface of global change. As a consequence, and despite the absence of any mention of them in either its Constitution or its Mission statement, the IHDP has introduced several activities to respond to this challenge. Especially important have been initiatives to stimulate south-south and north-south networking and capacity development.

Given the disproportionate participation of scientists from developed countries in IHDP scientific activities the Assessment Panel believes that these activities are strongly warranted. Indeed it can be argued that even more strategic effort needs to be directed towards growing the capacity of researchers in the South to shape and direct global change research through their participation as equal and active partners.

In looking at the IHDP's research Programmes, it is apparent that there are two dimensions of international scientific research that are weakly developed. IHDP has been less than successful in its engagement with the scientific policy agenda than in developing its core research projects. While researchers often want to "get on" with their research, and indeed, that is a key component of IHDP objectives, the fact is that research in such a field as the human dimensions of global change needs to be focused on the contributions that it can make to the policy agenda. There are two avenues through which this can occur:

- Through international conventions, negotiations and protocols, where IHDP research and knowledge is linked to the international policy-development processes of the United Nations and through activities related to Convention.
- Through national linkages forged by National Committees of IHDP or Global Change Programmes where the National bodies can target international resources to the specific national needs.

This work in IHDP would be facilitated by a clearer articulation of the specific roles of IHDP in this regard,

by a communication strategy that, amongst other things, would take more advantage of the World Wide Web in making research accessible, and in translating the policy relevant research of the human dimensions community. The policy interface is a weakness of the IHDP that needs to be proactively corrected.

IHDP also needs to critically consider what part of the research enterprise can best be done at an international level. What are the key issues that cannot be well addressed through institutional and national attention alone? How to best promote knowledge generation is a fundamental question for international scientific programmes like IHDP.

It is the view of the Assessment Panel that a major contribution that the IHDP can and should make is to develop and provide the infrastructure tools for integrative research. The infrastructure that is both theoretically possible and needed for the 21st Century includes:

- Construction of methods that allow for data comparability
- Development, documentation, and distribution of data sets, and
- Creation of publicly available repositories of research on theoretical, methodological and empirical issues that can be made readily available to scientists across the knowledge spectrum.

Recommendations

- A new Vision statement should be developed for the next decade of work.
- The Mission statement should be an explicit extension of the Vision statement and supported by a carefully selected set of relatively broad Objectives that clearly articulate the intentions of the Programme.
- The Programme statement of the Constitution should be revised to be internally consistent with the Vision and Mission statements.
- The Vision, Mission, Objectives and Programme statements should include many of the activities that IHDP has already commenced and are relevant to the current scientific needs of the human dimensions of global change community. They should include:
 - current mission of IHDP to generate research,
 - application of research to policy,
 - and development of networks, human capacity building and research infrastructure.
- IHDP should also develop a Strategic Plan to address how to make decisions among competing relative priorities.
- Re-evaluation of the Vision, Mission, Programme statement, and Strategic Plan should be revisited on a periodic basis.

IHDP Organization

IHDP's organization should directly support its Vision, Mission, Objectives and Programme. The current IHDP organization reflects accurately the original programme that was written in the IHDP constitution. But since the IHDP has and needs to continue to realign itself to a changing context, the organization should be re-examined in light of the revised Programme and Mission.

IHDP is led by a Scientific Committee, which is responsible for providing "scientific guidance on all aspects of the Programme." Each of the research projects also has a Scientific Steering Committee, which provide scientific advice to the projects. The interaction between the different kinds of committees is more vertical than horizontal. This suggests that there is sufficient pressure from above or below to keep communication channels open while structurally there is little to encourage interactions across Core Projects.

As is true for so many activities, geographic, gender and intellectual diversity are important to the development of vibrant networks. And like most international organizations IHDP leadership is not as diverse as it would like. Men are currently 77% of the leadership; developed country scientists are currently 74% of the leadership. In the last 10 years 52% of the leaders have come from three academic disciplines, economist/environmental economist, geographers and political scientists.

Recommendations

- As IHDP revises its Mission and Programmes to reflect its changing scientific context, then it should also transform the Scientific Committee into a Steering Committee with responsibilities for all of IHDP's Objectives. This would require revising the composition of the Committee to reflect expertise in communication, networking, infrastructure development, etc.
- The operations of the new Steering Committee should be transparent, with their activities reflecting the demands of the revised Programme and the Strategic Plan, reflecting criteria for priority setting, and indicators for measuring progress in each activity.

1. Introduction

In 1990 the International Social Science Council (ISSC) created the Human Dimensions of Global Environmental Change Programme (HDP). It was initiated in response to growing scientific evidence of physical changes in the global natural environment. That year was the hottest year in recorded history up to that time. Furthermore in 1985 scientists first found significant damage to the ozone layer over Antarctica and carbon dioxide concentrations around the world were identified as increasing due to human emissions. Widespread deforestation was another sign that the global environment was clearly changing and these changes were strongly associated with how people lived and related to one another as well as how they interacted with the larger physical environment.

The International Council of Scientific Unions (ICSU) responded to the increasingly obvious changes in the global environment by establishing the World Climate Research Programme (WCRP in conjunction with the World Meteorological Organization) in 1980 and the International Geosphere-Biosphere Program (IGBP) in 1986. IGBP's mission was to "describe and understand the interactive physical, chemical and biological processes that regulate the total Earth System...and the manner in which they are influenced by human actions."¹ Two years later, in response to the need for scientific and technical underpinning of the United Nations Framework Convention on Climate change, the United Nations Environment Program (UNEP) with the World Meteorological Organization (WMO) established the Intergovernmental Panel on Climate Change (IPCC). IPCC's mission was to "...understand the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation."²

Since HDP's inception scientific research on global change activities has gained momentum. The IPCC has published three major synthesis reports. UNEP has sponsored two global conferences on environment and sustainable development. In 2005 the Millennium Ecosystem Assessment (MA) has published a report that found that: "Humans have made unprecedented changes to ecosystems in recent decades to meet

growing demands for food, fresh water, fiber, and energy."³ And in 2006 ICSU is coordinating a major international scientific program to study the "natural environmental and social change" of the Polar Regions (International Polar Year; <http://www.ipy.org/>).

The IPCC and MA reports included sections on the need for social science, which reflected the increasing realization in all global change research activities that the human dimension is critical to understanding natural global changes. However, the natural science paradigms that scientists in both IGBP and at IPCC use to explore the interaction of human dimensions with the physical changes of the global environment are inadequate for social scientific enquiry for a number of reasons. Not least among these are the frames of reference used, the rules of evidence applied, and the complexity of the interface between knowledge and agency that directly bears on the social scientific enterprise and its outcomes.

ICSU recognized that the predominance of natural science in the study of global change issues was inappropriate in the longer term and not likely to deliver the desired level of understanding for policy applications. As a consequence ICSU and ISSC became joint sponsors of HDP in 1996 in order to facilitate the integration of human and natural scientific global change research. With ICSU sponsorship the agenda expanded, the name of the initiative was changed to the International Human Dimensions of Global Change Programme (IHDP) and funding in support of the program from the German Government was increased.

Scope and Organization of the Assessment

ICSU (<http://www.icsu.org/>) and ISSC (<http://www.unesco.org/ngo/issc/>) initiated this external Assessment of IHDP at the end of its first decade. The Assessment takes place a year after the report of the ICSU Committee on Scientific Planning and Review of ICSU's environmental activities and at the end of the German government's current contract with the IHDP. Perhaps most importantly it is taking place

1 International Geosphere-Biosphere Programme. <http://www.igbp.kva.se/cgi-bin/php/frameset.php>.

2 Principles Governing IPCC Work Approved at the Fourteenth Session (Vienna, 1-3 October 1998) and amended at the 21st Session (Vienna, 3 and 6-7 November 2003). <http://www.ipcc.ch/>.

3 "Living Beyond Our Means: Natural Assets and Human Well-Being, Statement from the Board, Millennium Ecosystem Assessment, March, 2005. <http://www.millenniumassessment.org/en/index.aspx>.

after a decade of rapid changes in the global change research community itself. Today, the scientific consensus on climate change is that “The evidence for human modification of climate is compelling.”⁴ The Assessment is, therefore, timely for researchers, sponsors and stakeholders participating in IHDP. The human dimension has never been more important nor has an effective IHDP been more needed.

The Assessment Panel (List of Members in Appendix 1) met initially in December 2004 to organize its work. Panel members developed a survey questionnaire, described below, which was sent to

4 Naomi Oreskes, “The Scientific Consensus on Climate Change,” *Science*, 3 Dec. 2004 Vol. 306 p.1686.

IHDP participants and stakeholders. In March 2005 the Assessment Panel met in Bonn with the IHDP staff and Scientific Committee. The Panel attended presentations on the IHDP strategic vision, discussed specific research with project leaders, and met with ICSU and ISSC representatives. Based on these discussions and responses to the survey, the Panel completed a first draft of the Assessment that was then shared with IHDP, ISSC and ICSU staff for factual corrections. The Panel presented the draft final report to IHDP, ISSC and ICSU in June 2005. Some factual comments from these organizations have been taken into account.

The assessment report begins with a review of the IHDP programme in its first decade. It notes the rapid

QUESTIONNAIRE ON INTERNATIONAL HUMAN DIMENSIONS PROGRAMME ON GLOBAL ENVIRONMENTAL CHANGE

The external Assessment Panel developed a questionnaire to gather information from the broader community of researchers involved in the International Human Dimensions of Global Change work. It was structured around the five topics specified in the Terms of Reference for the Assessment:

- Scientific impact, balance and relevance
- Policy relevance and impact
- Visibility
- Organizational performance
- Interaction with others.

The survey was a non-random sample of people interested in the IHDP program. The questionnaire was electronically sent to all members of the IHDP Scientific Committee, the Scientific Steering Committees of each IHDP Program, the secretariat, members of national committees, and attendees to IHDP workshops and open meetings for whom e-mail addresses were available. In total 382 questionnaires were electronically sent out with a request for a response within 4 weeks. Sixty-five people responded. This was a response rate of 17%, not unreasonable for a commercial survey, but small for a research survey.

The average age of the respondents was 53 years old; 28% were female. The median length of time the respondents were involved in the IHDP was 3 years. Thirteen percent had been involved for 8-10 years. Many respondents said that they were involved with more than one core project. Approximately 64% of the IHDP Secretariat staff responded; 58 % of the Scientific Steering Committee; and a third of the international Project Office officials. Other respondents came from national committees, members of partner organizations and “other.” Therefore although the response rate was comparatively low the responses did come from the kinds of people whom we would have wanted to interview in more depth if we had had the time and resources to do so. Because of the non-random nature of the survey and the low response rate, the findings are not generalisable or definitive. Rather they should be treated as suggestive of the experiences and thinking of researchers and research managers who have been active in one or another aspect of the IHDP They also have been useful in helping the Assessment Panel engage with the issues under consideration. Examples of some of the responses are used in the rest of this report as illustrations of points rather than as evidence for recommendations. More information about the survey and responses to it can be obtained from ICSU and ISSC.

changes that are taking place in the global change research community, including IHDP, and in the sciences themselves. The assessment then addresses the questions raised in the Terms of Reference:

- Scientific impact, balance, and relevance;
- Policy relevance and impact;
- Visibility;
- Organizational performance; and
- Interactions with others.

The Panel considered two other questions that were logical extensions:

- Is the mission of IHDP, which was developed in the 20th Century, still appropriate for the 21st Century?
- Should the organizational structure be changed to reflect its mission for the 21st Century?

Findings, conclusions and recommendations appear throughout the text where relevant. A brief conclusion summarizes our recommendations.

2. Historical Development: 1996-2005

The Constitution of the IHDP (<http://www.ihdp.uni-bonn.de/>) states that the Programme of the new organization is an:

“International interdisciplinary social science research programme whose objectives are to describe, analyze and understand the two-way interactions between human beings and the planetary system of which they are a part....”¹

The Constitution of the new IHDP was more formal than the community of scholars that it was trying to organize. Its first Open Meeting was held in 1995 at Duke University in the United States with an attendance of less than 200 people. The international community of social science researchers interested in the topics of international global change at the time was very small. The funded research was even smaller. For a description of the Open Meetings see <http://openmeeting.homelinux.org/>.

Both the mission and governance structure of the new IHDP was similar to the IGBP, which had an earlier birth and a successful maturation. A Scientific Committee (SC) oversaw the research programs of the new IHDP. Planning groups developed in bottom-up mode science plans of core research projects. Scientific Steering Committees (SSC) implemented these scientific plans and monitored the development of specific research projects.

2.1 The First IHDP Success: Land Use and Cover Change

The first IHDP Project was an IGBP project that it shared with the new organization: Land Use and Cover Change (LUCC). After 10 productive years it is now coming to the end of its term after publishing a number of research syntheses on such topics as desertification, and land change in the tropics. It developed and published statistical methods for analysis of patterns of land use; it inventoried mapping activities of major crops in addition to publishing a number of case studies on critical zones in the world. And it built a worldwide community of interested scholars in issue of land use and cover change.

LUCC also experimented with new ways to develop a global community of scholars and other activities. These include:

- LUCC’s website (www.geo.ucl.ac.be/LUCC). It has a section asking people to become new members of their community, actively expanding their network. It asks for address, e-mail and specific interests and then puts them on an electronic newsletter about LUCC activities.
- LUCC’s policy communication intervention. It developed a newsletter in hard copy, which was sent to “policy makers” as one way to reach them systematically.
- LUCC’s proactive policy engagement. It held workshops directly with “policy makers”, such as the U.S. NASA programs.

¹ Constitution of the International Human Dimensions Programme on Global Environmental Change (IHDP), January 1999.

- LUCC's collaborative network. It is also the most collaborative of all of the IHDP Programmes, working with two other Programmes, two Earth System Science Partnerships (ESSP) projects and the Millennium Ecosystem Assessment in the recent past.

These are examples of "best practices" that could serve as models for other IHDP research projects.

2.2 The Development of Other Core Research Projects

The IHDP has developed four new Core Projects. These are:

- The Institutional Dimensions of Global Environmental Change (IDGEC) (1999-) to explore the role of institutions in causing, exacerbating and solving large scale environmental problems. (<http://www2.bren.ucsb.edu/~idgcec/>).
- The Global Environment Change and Human Security (GECHS) (1999-) to stimulate research on how environmental change can pose a threat to human security and to investigate means for reducing these insecurities. (www.gechs.org).
- Industrial Transformation (IT) (2000-) to explore pathways towards the decoupling of economic growth from the related degradation of the environment. (<http://130.37.129.100/ivm/research/ihdp-it/>).
- The Land Ocean Interactions in the Coastal Zones (LOICZ; www.loicz.org) (2004-). IGBP began LOICZ in 1993 to study the special environments of coastal areas and it became a joint project with IHDP in 2004.

Recently IHDP and ICSU established four more collaborations with the Earth System Science Partnership (ESSP):

- Global Land Project (GLP: www.glp.colostate.edu)
- Global Water (GWSP: www.gwsp.org)
- Global Carbon (GCP: www.globalcarbonproject.org)
- Global Environmental Change and Food Systems (GECAFS: www.gecafs.org).

A joint project on Human Health is currently under development.

Another two IHDP core research projects were launched in April 2005: The core research project on Urbanization and the Global Land Project, co-sponsored with IGBP. Together with DIVERSITAS, IGBP and WCRP IHDP is developing the Earth System Science Partnership. They have established three joint projects:

In all cases the Core Projects have received only a small part of their research funds from central IHDP resources (US \$25,000 a year per Core Project, approximately US \$ 15,000 a year per Joint Project). All of the Core Projects obtain between 2 to 15 times more funding from national research funding agencies and the universities where the International Project Offices (IPO) are located. The latter have also contributed in-kind contributions. Therefore, all of the original Core Projects have leveraged IHDP's scarce resources effectively.

2.3 Other IHDP Activities

Although the Programme described in the IHDP Constitution focused exclusively on research, in the last ten years IHDP has also performed a number of other activities to strengthen their primary research purpose. It has built regional networks around the world and invested in growing research capacity. The regional networks have expanded over time with the largest numbers now in developing countries. The networks include 31 National Committees (13 are Global Change Committees) and 31 National Contact Points. More than half of these 62 Committees are in developing countries.

IHDP also realized that capacity building in this growing research field is essential to the development of the knowledge base both in scale and in depth. Therefore, the IHDP has developed several vehicles to build research capacity, including:

- International Human Dimension Workshops. This initiative began in 1998 and takes place biannually. These workshops create a forum for young scientists from developing countries as well as from countries in transition to present and discuss their work and receive training. The wide acceptance of this forum as highly valuable is demonstrated by the diversity of sponsoring organizations that it attracts. Since its inception there have been 5 workshops, three in Germany and one in Costa Rica, with a sixth scheduled for 2006 in the Asia-Pacific Region. Since 2004 these workshops are jointly organized with one of the

regional capacity building organizations (2004: IAI, 2006: APN). START always sponsored the workshops¹.

- Seed grants for researchers in developing countries. Since 1998 19 grants have been awarded to researchers to inventory the human dimension of global change research in their countries; 16 grants have been awarded to plan workshops with 2 of these scheduled in 2005 this year.
- The Young Human Dimensions Researchers Initiative, which builds awareness and capability of younger scientists.
- The Open Meetings of the Human Dimensions of Global Environmental Change Research Community are used to both build capacity and networks. These meetings are bi-annual and attendance has grown significantly over the years.

One of the reasons that IHDP has been able to expand beyond its Core Projects in research is because it has increased its income quite substantially in recent years. Income of the Secretariat has increased 53% from 2002 to 2004 (Outlays have grown more slowly). Countries making annual contributions have increased from 5 to 9 during that time, not counting the two largest funders, Germany and the United States of America.

¹ IHDP has worked closely with other capacity building agencies, such as the System for Analysis, Research and Training (START), the Asia-Pacific Network for Global Change Research (APN), and the Inter-American Institute for Global Change Research (IAI). These events have been highly regarded and very successful. START, <http://www.start.org>; APN, <http://www.apn.gr.jp/en/indexe.html>; IAI, <http://www.iai.int>.

2.4 Conclusions

- IHDP has developed from one core scientific programme (Core Project) to five with two more in planning stage and four more jointly administered with Earth System Science Partnership.
- Its first Core Project, LUCC, is widely regarded as having been a significant success in the promotion of this area of research, the building of global knowledge and its outreach. It is now completing its term and is a model for other core projects.
- In addition to its research activities, IHDP has developed network and capacity building activities, especially in the developing countries.
- IHDP has attracted increasing amounts of resources from increasing numbers of
- countries reflecting, at least in part, its own successes.
- IHDP has been successful in growing its international research activities.
- It has acted as a successful catalyst for the incorporation of social sciences into issues of global change.
- It is now expanding into other kinds of activities to increase its relevance and influence in the broader global change community.
- The Assessment Panel was, by and large, impressed by these achievements, but was concerned about the rate at which new activities were being undertaken and the potential for IHDP to continue to deliver success on a wider front. It is recommended that the Scientific Committee and Secretariat note these concerns.

3. The IHDP Programme and Mission

IHDP's successes in its first ten years highlight how the Programme has outgrown its original Mission and, indeed, its organizational arrangements. This Section describes the original Mission for IHDP and its appropriateness in the rapidly changing world in the 21st Century. It offers recommendations for how to refocus the Programme and Mission for the next decade.

3.1 The Current Programme and Mission

The Programme of the IHDP as stated in its Constitution is to:

“... describe, analyze and understand the two-way interactions between human beings and the planetary system of which they are a part: the way in which human activities contribute to global environmental change, the consequences of global change for humankind, and possible human responses to mitigate and adapt to global change. While primary concern is with global environmental conditions and changes, the IHDP will also study variations in environmental conditions and changes as well as human interactions on different regional scales. Priority in the Programme will focus on research which deals with key interactions and significant emerging changes that must be conducted on an interdisciplinary and international basis.”¹

The Mission of IHDP is:

“to generate scientific knowledge on coupled human-environment systems, achieve comprehensive understanding of global environmental change processes and their consequences for sustainable development, and make contributions to explore (1) the anthropogenic drivers of global environmental change, (2) the impact of such change on society and human welfare, and (3) societal

responses to global environmental change.”²

The original Programme and Mission were developed in an environment when little human dimensions of global change research had been done, few researchers were working at the interface of the social and natural sciences and almost no research funding was available to sustain any momentum in the field. It was appropriate for the IHDP in 1995 to begin with a research programme to help mobilize a community of scholars and resources. Ten years later there is a healthy body of research available, national research organizations are funding the research and the number of researchers has grown considerably. Given the success of the IHDP Programme, it is an opportune time to consider other activities that IHDP could be expanding or initiating, cognizant of the realities of available funding and researchers interested in the field at this stage.

3.2 Activities to Support IHDP's Mission

In principle the IHDP Programme could encourage the growth in human dimensions in global change research through a combination of:

- *Engaging in scientific projects:* Undertaking global change research that expressly includes social science expertise in its conceptualization, planning and implementation. The results of this research need to be communicated in quality peer-reviewed publications and through profiled application of research outcomes in the development of policy.
- *Influencing the policies of international scientific organizations and activities such as ICSU and IPCC:* Building networks of scientists (social and natural) who bring the strengths of their particular expertise to bear on the human dimensions of global change research in a way that moves the knowledge field forward and addresses international science policy and policy research agendas.
- *Building global change research capacity:* Investing in research capacity building - in developing regions of the world and with young

1 Constitution of the International Human Dimensions Programme on Global Environmental Change (IHDP), January 1999.

2 Annual Report 2003/2004, International Human Dimensions Programme on Global Environmental Change, p.4. See http://www.ihdp.uni-bonn.de/Pdf_files/annual%20report/IHDP-Annual-Report03-04.pdf

scientists - where such investment is designed to broaden and strengthen the social scientific contribution to global change research.

- *Providing infrastructure tools for integrative research:* Working on data development and methodological approaches that position social scientists as equal partners in the conduct of global change research.

3.2.1 Engaging in Scientific Projects

The strategy of the original IHDP Programme was to concentrate on research as described above in Sections 2.1 and 2.2. IHDP selected Core (scientific) Projects that would crystallize a research community, serve as successful integrative research models, and demonstrate the strength of the social science contribution to the broader global change research community. This activity grew from one Core Project to five with two more being developed and four other projects being jointly administered with ESSP. IHDP was successful in meeting the research part of its Mission.

The value of the scientific work was reflected in the survey with the majority of respondents (69-75% indicating that the IHDP contributed significantly or highly significantly to their research activities, to teaching and knowledge dissemination and to interaction and collaboration with other researchers.

IHDP also responded appropriately to other gaps in an evolving science environment that were not specified in their Constitution or Mission. These are represented by the three activities in Sections 3.2.2, 3.2.3, and 3.2.4.

3.2.2 Influencing the Policies of National and International Organizations

Policy relevance is not well developed as a concept in the Constitution. In Article II.3 it says “The (Scientific) Committee, together with ICSU and ISSC, should also seek to ensure that adequate use is made of the results of the programme.” The Terms of Reference for the SSC members says: “Ensure outreach of the project, including the development of a respective publication and communication strategy.” And the Terms of Reference for an International Project Offices says: “Coordinating, facilitating and

initiating outreach and publication activities.”³

The IHDP 2003/2004 Annual Report says that IHDP is “a science-based channel that can inform policy-making processes and translate scientific knowledge into other arenas of action.” At the same time, however, the staff has self-critically said that they thought that they didn’t have enough resources for making the connections between science and policy making. Responses to the survey questionnaire also considered the policy relevance of the IHDP’s activities weak. A quarter of survey participants (26%) reported that they never interacted with local policy makers on IHDP issues; 54% of the survey participants thought that IHDP involvement in getting science into policy was insignificant; 30% thought that IHDP engaged key policy questions weakly or not at all; 60% of the respondents reported that they never or at best only sometimes interacted with policy makers at any level.

Although there is no formal recognition in the Constitution of the importance of policy relevance for IHDP activities, the imperatives of the research environment led IHDP into some policy activities. For example:

- IHDP has been active with ICSU in the preparation of the World Summit on Sustainable development (WSSD). ICSU and other scientific organizations, including IHDP, have presented science results to the WSSD Preparatory Committee on Bali in June 2002 and also co-organized sessions at WSSD in Johannesburg in August 2002.
- LUCC had also organized a workshop jointly with the National Aeronautical and Space Administration in Washington D.C.
- IHDP participated in the Subsidiary Body for Scientific and Technological Advice of the United Nations Framework Convention on Climate Change on “Research in Response to the IPCC Third Assessment Report” in 2004.

Of course, a number of social scientists from the IHDP networks have participated in IPCC and MA assessments because of their own expertise also.

IHDP’s participation in policy processes is consistent with the thinking of survey participants who believe that the presentation of research results in terms

³ Terms of Reference for International Project Offices (IPO) of IHDP science projects, p.1. For the IT Project see http://130.37.129.100/ivm/research/ihdp-it/endorsement/terms_of_reference.pdf

of policy related interactions was one of the most important activities of IHDP (91% of surveyed respondents). Ninety four percent also thought that it was important to make IHDP objectives and outputs visible (94%).

Since 1996 when IHDP was first established, the worldwide web has changed the way people around the world receive information and use it. Materials, such as graphics, data and IHDP papers, can be tailored for public consumption through the web. The recent redesign of the IHDP website is an important step in changing the way that IHDP becomes visible to the world. Such developments, however, need to be situated in an integrated communication strategy designed to support a sustained effort to make research findings accessible to policy makers. This is particularly important for a number of reasons, including inequality in access and usability of the worldwide web across the globe, generational and cultural practices that influence the use of information technology; and a complex knowledge, information and policy environment.

Conclusion

The IHDP Constitution and Mission statement are silent about expectations regarding policy relevance and policy outreach. Despite the silence, the IHDP program has engaged in some policy activities.

Recommendations

The Assessment Panel suggests that:

- The Constitution and Mission statements be revisited and rewritten to reflect that an important outcome of IHDP activities is the availability of research results for policy development processes; and in turn, these processes have some part to play in the direction and content of research activities.
- IHDP in conjunction with ICSU and ISSC explore the breadth of “policy” interface options that exist in “Science for Policy” (government and private, national and international) and Policy for Science with the view of developing an informed set of policies in this area.
- IHDP develops a communication strategy that reflects the priority goals of both making excellent science assessable and policy relevant.
- IHDP considers the following activities potential candidates for improved policy outreach:

- International Conventions. Global change issues are being addressed through international negotiations, international conventions, protocols and similar instruments. Multidisciplinary social science research can shed light on the processes of global change negotiations.
- International Assessments. Global change issues are frequently subject to international assessments. Recent and ongoing examples are the Intergovernmental Panel on Climate Change (IPCC), the Millennium Ecosystem Assessment, and ICSU’s International Polar Year (IPY). The IHDP network forms a valuable pool of expertise that can be used to improve the social science input in these assessments.
- Data Protocols. The need for data in global change research requires the development of agreements and protocols that are reflected in policy on the sharing and access to data. This is as important in the social aspects of global change research as the physical ones and IHDP may have a significant role to play here.

3.2.3 Building Global Networks and Human Capacity

The IHDP’s Programme as described in the Constitution does not mention network or human capacity building, but the IHDP Secretariat devoted 38% of its expenditures in 2004 to both activities. As with all new fields of science the number of people working in the human dimensions of global change was small when it began in the 1990’s. These numbers needed to be increased across the world, but in particular, there needs to be activities to increase involvement of research scientists in this field were from the developing world. Therefore, in addition to developing scientific programs IHDP also had to invest in both capacity building and networking around the world. Without these activities the Core Research Projects would have remained isolated from the larger social science community and starved for scientists who could develop the research agendas and the research itself.

The IHDP has developed several human capacity building activities (see Section 2.3) including the International Human Dimensions Workshops, the Young Human Dimensions Researchers Initiative, Open Meetings and seed grants for workshops.

Conclusion

IHDP is spending considerable resources on networking and human capacity building despite the fact that neither is mentioned in either the Programme as described in the Constitution or in the Mission statements of IHDP. These activities are and should continue to be a priority in the future to ensure that IHDP is inclusive of the best scientists, especially in the developing world. As an international scientific initiative, the IHDP is in an excellent position to ensure the expansion and strengthening of global scientific capacity in such a critical area of research.

Recommendations

- Human capacity building should be clearly established as a component of the IHDP Mission.
- That IHDP develops a clear set of capacity building priorities and methodologies.
- That IHDP work closely and collaboratively with bodies such as IAI, APN and START that have capacity building as their core objective.

3.2.4 Providing Infrastructure Tools for Integrative Research

In addition to the training of people, the development of new fields in science requires that appropriate research infrastructure is created. In poor countries research infrastructure is too costly; in wealthy countries investments are focused inwardly and on established research communities. Everywhere there is inequality across domains, disciplines and fields. Therefore, one of the comparative advantages of an international research programs like the IHDP, is the opportunity it creates to invest in research infrastructure – because it can be shared between rich and poor equally, because it can respond to domain and discipline inequality; and because it can be of benefit to the entire science system. Examples of the kind of infrastructure are:

- construction of methods of research that allow for data comparability;
- documentation and distribution of the data so that it can be freely used around the world;
- creation of publicly available repositories of research on theoretical, methodological and empirical issues that can be made readily available to natural and social scientists.

Three IHDP Core Projects have begun to provide some research infrastructure for their communities:

- IT has a reference manager that systematically collates references of published research on IT that is then available on their website for researchers.
- LUCC developed a systematic set of definitions of indicators of land use and land cover change, which is helping to standardize terms used in the research literature.
- Global Food Systems has an Endnote Library, which is available for the community of researchers who may not have access to all of the current research material.

IHDP is also collaborating with several infrastructure organizations:

- The Population-Environment Research Network (PERN; <http://www.populationenvironmentresearch.org/>) advances academic research on population and the environment by promoting on-line scientific exchanges among researchers from social and natural sciences worldwide.
- The Center for International Earth Science Information Network (CIESIN, <http://www.ciesin.org/>) works at the intersection of social, natural and information science. It specializes in on-line data and information management, spatial data integration and training and interdisciplinary research related to human interactions in the environment.

A recent ICSU workshop on socioeconomic data and the integrated global observing strategy partnership recommended more collaboration between social and bio-geophysical scientists to identify data integration issues and find practical ways to solve them. LUCC was used as one example of such collaboration. The workshop also concluded that “integrating natural and socioeconomic observations will be critical to advancing the scientific understanding of the Earth system.” It also recommended that “comprehensive socioeconomic metadata catalogues should be maintained and made publicly available”.⁴

4 Workshop Report on Socioeconomic Data in Relation to the Integrated Global Observing Strategy Partnership (IGOS-P), September 2004. http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/72_DD_FILE_Vol11.pdf

Conclusion

IHDP's Mission and Programme do not mention developing research infrastructure or data and research inventories, although IHDP is modestly involved in such activities. By its very nature, the IHDP is ideally situated to drive research infrastructure development in the future.

3.3 Recommendations About the IHDP Programme and Mission

The research environment in which the IHDP is situated continues to change. A decade after initiation, there has been a number of methodological advances. The issues are more complex and the analyses are more sophisticated. Policy on global change has changed from a questioning of whether there was a human dimension in bio-geophysical change to an understanding that human activity is an important contributor to global change. Funding from national research agencies is now available and in some cases (Germany, U.S. and the Netherlands) increasing. This means that at the beginning of the 21st Century that the science context within which IHDP is operating has changed, which should affect IHDP's future Programme and Mission.

IHDP needs to continually reflect on its focus and direction so that it can contribute additional value to the many national and international initiatives that exist. International scientific programmes like IHDP, which have a unique role not available to national or local researcher, need to lead processes that:

- Facilitate the addressing of both transboundary and shared national research questions.
- Influence and shape international science policy since national and local organizations do not always have the leverage on international policy that international organizations have.
- Contribute to human capacity building, especially in countries that are at an economic or geographic disadvantage in developing their own science capabilities.
- Develop research infrastructure.

The best ways to promote knowledge generation will change as the sciences mature. It requires models of research; it also requires the creation of capacity, which includes not only human capacity but also the research infrastructure.

Conclusions

- The majority of the current IHDP activities, such as policy applications, networking, capacity building, and infrastructure development are not mentioned in the Constitution or in the Mission statement. Consequently when they are undertaken they invariably are carried out in a somewhat *ad hoc* way.
- Policy work, networking and capacity building (human and infrastructure) activities of IHDP are critical to strengthening the contributions that international programs, such as the IHDP, can make.

Recommendations

- The IHDP should develop a Vision statement for their next decade of work.
- Then the current Mission statement and Programme statement of the Constitution should be revised to be internally consistent with this Vision. They should reflect the kinds of activities that are most relevant to the current scientific needs of the human dimensions of global change community.
- These should include the coordination of research, policy related to the conduct of research, applications of research to policy, and the development of networks, human capacity and research infrastructure.
- IHDP should develop a Strategic Plan for how to make decisions about relative priorities in this otherwise very broad set of needs.
- Re-evaluation of the Vision, Mission and Programme statements and the Strategic Plan should be done on a periodic basis.

4. Organization

The form of IHDP's organization should directly support its Programme and Mission. The original IHDP Programme was to generate science related to the human dimensions of global change. The current IHDP organizational arrangements reflect accurately the original Programme that was written in the IHDP constitution.

4.1 The Current Organization

The IHDP Constitution established the Scientific Committee to:

“provide scientific guidance on all aspects of the Programme. It will develop and prioritize specific plans for the Programme, guide their implementation and publicize their results.”

The Scientific Committee is composed of well-regarded researchers who have been involved in the human dimensions of global change research. As the Constitution assumes, they are expected to spend much of their time at the Annual Meeting reviewing the science of the IHDP projects and the science plans of proposed projects. The March 2005 agenda for the Annual Meeting confirmed that most of the time was spent on the science projects.

In addition to the Scientific Committee (SC) there are also Scientific Steering Committees (SSC) for the Core Projects, which provide scientific guidance to the specific Projects. The interaction between these two different levels of the organization appears to be more vertical than horizontal. The participants in the Assessment Panel Survey said that the communication between the SC and the SSCs in the IHDP is frequent through open meetings (95%), personal contacts (92%) and joint committee meetings (92%). However, half of the respondents said that the horizontal communication among the members of the SSCs is sporadic; 22% said it was weak.

LUCC had the most interaction across other core IHDP projects. This might be attributable to its greater longevity but it also might be because of the way its leadership has interpreted their place in the IHDP and the larger science system. Science plans of Core Projects articulate an intention to collaborate with other Projects, but there were few examples of actual collaboration other than with LUCC. This suggests that there is sufficient pressure within the IHDP from above or below to keep communication

channels open, but that structurally there is little to encourage interactions across Core Projects.

4.1.1 Diversity in the Leadership of the SC and SSC

As is true for so many activities, geographic, gender and intellectual diversity are important to the development of vibrant networks. Like most international organizations IHDP leadership is not as diverse as it should be or would like to be. The leadership of the IHDP is mostly made up of men (77%) and developed country scientists (74%). Furthermore, there are distinct academic disciplinary biases, with 42% of the leaders coming from just two academic disciplines, economists/environmental economists and geographers, in the last 10 years.

The ICSU's Report of the CSPR Assessment Panel “encouraged IHDP to strengthen the involvement of economists in its project.”¹ IHDP's recent assessment of the distribution of social science disciplines in its governing bodies (1996-2004) estimates that economics/environmental economics (22%; 24 out of 108) is the single largest disciplinary grouping represented in the IHDP. That suggests that ICSU's definition and IHDP's may be different. It also suggests, however, a heavy disciplinary concentration in IHDP. Three disciplines made up the majority of representatives (52% with economists/environmental economists, geographers and political scientists). Sociology, anthropology and law combined represented 15% of the representatives. Systems sciences, agricultural sciences and demography together were less than 10% of the total disciplines. So diversity concerns are not only about gender and geography; they are also about disciplines and fields of scientific expertise.

The members of the Science Committee and the Scientific Steering Committees are qualified and committed people. An estimated 67% of the Science Committee and the Scientific Steering Committees sit on more than one committee or in more than one Project in the IHDP Programme. While individual engagement in multiple facets and at multiple levels of a Programme contributes to the flow of information

1 Report of the CSPR Assessment Panel, “Environment and its Relation to Sustainable Development,” International Council for Science, Dec. 2003, p. 28. See http://www.icsu.org/2_resourcecentre/RESOURCE_list_base.php4?rub=35&PHPSESSID=c7ea7ebc239346c8344b3cf71b072591

and greater homogeneity in purpose, it may also lead to decision-making that is being done by the same people wearing different hats. It may also potentially lead to science that could otherwise be performed nationally and therefore be less appropriate for the attention of a truly international research programme. In addition, capacity and expertise are concentrated so that decision making may inadvertently be relying on an increasingly narrow perspective.

Conclusions

- It is critically important that IHDP develop strategies to address proactively gender, geographic and disciplinary bias.
- There is a critical need to review the way key personnel interlock across Committees of the IHDP to reduce workload, build diversity of disciplinary and world-view perspectives. This would ensure that the Programme develops leadership capacity across a broad base and reflects the priorities of an international research programme.

4.1.2 A Network of Networks

IHDP defines its organization as “Bottom up, drawing from the voluntary participation of researchers from different disciplines from all over the world” through a “network of networks.”² Networks are by definition informal associations among individuals around shared objectives. They are invariably idiosyncratic and serendipitous. They have an important place in scientific knowledge production and dissemination. Equally though, they are not always able to overcome the systemic inequalities in information flows and resources in the global science community.

A network of networks approach recognizes that there are researchers in different parts of the world who are interested in similar issues even if they work at different levels. It recognizes that IHDP is not the only player in the field of human dimensions studies of global change, and is best served by collaboration with and support of other players. Many researchers in the developing world work at local levels; those in developed countries often work at national and international levels. It is important to develop a synergistic analytical framework for work at all

levels. There is also a need and a value, however, to separately determine research issues and priorities. Without some overview from an international perspective there is a danger that research directions and foci are likely to be idiosyncratic, non-inclusive and duplicative and may well not be cutting edge. Therefore there is a need for a less passive and more proactive role for the IHDP in getting an understanding of knowledge needs and dynamics and sharing these with researchers. Given the existence of other international science initiatives as well as key non-scientific stakeholders in a knowledge-based global order, research agendas need to be responsive to multiple end user interests and needs that an international committee can provide.

4.1.3 Transparency in Operations

At present new Core projects depend on the interest of the current members of the Scientific Committee and their willingness to advocate for a new project. There do not appear to be criteria for Project identification and selection that extend beyond individual interest and advocacy. As a result, it is possible that such proposals do create new scientific research areas; or equally, are able to recast existing research areas in a different light. However, they can also simply be doing old science under a new hat without adding anything significant, and therefore they might not be the best strategic science intervention.

Where the decision-making is not transparent because there are no criteria for how proposed Core Projects will be judged, it is difficult to ensure that the outcomes are optimal for the field and the Programme. Given the scarce resources available to international research programs it is important to have clear criteria to guide the selection of scientific projects to ensure that both fairness and relevance determine outcomes.

It is also important for the oversight of the IHDP to develop a set of indicators of progress for each activity. (For example, in 2005 the Secretariat produced a list including all scientific papers by Core Program members as an indication of IHDP output; this oversells the IHDP activities. Guidelines for the listing of products should be drawn up.) Indicators help make clear goals and milestones and they showcase performance. At the same time they help ensure accountability and transparency, which in turn strengthens participants’ sense of ownership.

² Terms of Reference External Assessment of the International Human Dimensions Programme on Global Environmental Change (IHDP) p.1 29 July 2004.

Conclusion

Criteria for the allocation of IHDP resources and attention among the different functions should be developed as well as a set of indicators of progress for each activity. Transparency in decision-making becomes increasingly important as membership and networks grow throughout the world. If people from developing countries, who can use the web to participate in IHDP, but who may never be able to afford to attend an open meeting, cannot understand how the organization works they are unlikely to be enthusiastic participants.

4.2 Recommendations for the Future Organization

The Scientific Committee is well constituted to serve its original 1996 scientific function of providing advice and oversight to the Core Programs. The Scientific Steering Committees are currently appropriately constituted to do their scientific job. The 21st Century and the second decade of IHDP, however, will need a broader Vision, Programme and Mission statement and a reconstituted “Steering Committee” to oversee them.

- A new Vision statement and a revised Mission and Programme statement in the Constitution will require a revision in the duties and composition of the revised Scientific Committee. A new “Steering Committee” will be needed to provide oversight to the expanded activities that included not only the Core Projects, but also the policy activities of the IHDP, the communications strategy and the networking and capacity building activities. Therefore, the reconstituted “Steering Committee” would have members with a broader set of skills, including communication and outreach.
- In order to manage effectively, this new Steering Committee should rely on the Strategic Plan to set relative priorities among competing activities. It should also develop a set of criteria for choosing among research proposals, and a set of indicators for each activity that can be used to measure progress.
- A proposal for a new organization is shown in Appendix 3.

5. A Summary of Findings, Conclusions and Recommendations

5.1 Historical Development: 1996-2005

- IHDP has developed from one core scientific programme (Core Project) to five with two more in planning stage and four more jointly administered with Earth System Science Partnership.
- Its first Core Project, LUCC, is widely regarded as having been a significant success in the promotion of this area of research, the building of global knowledge and its outreach. It is now completing its term and is a model for other core projects.
- In addition to its research activities, IHDP has developed network and capacity building activities, especially in the developing countries.
- IHDP has attracted increasing amounts of resources from increasing numbers of countries reflecting, at least in part, its own successes.
- IHDP has been successful in growing its international research activities.
- It has acted as a successful catalyst for the incorporation of social sciences into issues of global change.
- It is now expanding into other kinds of activities to increase its relevance and influence in the broader global change community.
- The Assessment Panel was, by and large, impressed by these achievements, but was concerned about the rate at which new activities were being undertaken and the potential for IHDP to continue to deliver success on a wider front. It is recommended that the Scientific Committee and Secretariat note these concerns.

5.2 The IHDP Programme and Mission

The Assessment Panel suggests that:

- The Constitution and Mission statements be revisited and rewritten to reflect that an important outcome of IHDP activities is the availability of research results for policy development processes; and in turn, these processes have some part to play in the direction and content of research activities.
- IHDP in conjunction with ICSU and ISSC explore the breadth of “policy” interface options that exist in “Science for Policy” (government and private, national and international) and Policy for

Science with the view of developing an informed set of policies in this area.

- IHDP develops a communication strategy that reflects the priority goals of both making excellent science assessable and policy relevant.
- IHDP considers the following activities potential candidates for improved policy outreach:
 - International Conventions. Global change issues are being addressed through international negotiations, international conventions, protocols and similar instruments. Multidisciplinary social science research can shed light on the processes of global change negotiations.
 - International Assessments. Global change issues are frequently subject to international assessments. Recent and ongoing examples are the Intergovernmental Panel on Climate Change (IPCC), the Millennium Ecosystem Assessment, and ICSU’s International Polar Year (IPY). The IHDP network forms a valuable pool of expertise that can be used to improve the social science input in these assessments.
 - Data Protocols. The need for data in global change research requires the development of agreements and protocols that are reflected in policy on the sharing and access to data. This is as important in the social aspects of global change research as the physical ones and IHDP may have a significant role to play here.
- Human capacity building be clearly established as a component of the IHDP Mission.
- IHDP develops a clear set of capacity building priorities and methodologies.
- IHDP work closely and collaboratively with bodies such as IAI, APN and START that have capacity building as their core objective.
- The IHDP should develop a Vision statement for their next decade of work.
- The current Mission statement and Programme statement of the Constitution should be revised to be internally consistent with this Vision. They should reflect the kinds of activities that are most relevant to the current scientific needs of the human dimensions of global change community.
- These should include the coordination of research, policy related to the conduct of research, applications of research to policy, and the development of networks, human capacity

and research infrastructure.

- IHDP should develop a Strategic Plan for how to make decisions about relative priorities in this otherwise very broad set of needs.
- Re-evaluation of the Vision, Mission and Programme statements and the Strategic Plan should be done on a periodic basis.

5.3 Organization

- It is critically important that IHDP develop strategies to address proactively gender, geographic and disciplinary bias.
- There is a critical need to review the way key personnel interlock across Committees of the IHDP to reduce workload, build diversity of disciplinary and world-view perspectives. This would ensure that the Programme develops leadership capacity across a broad base and reflects the priorities of an international research programme.
- Criteria for the allocation of IHDP resources and attention among the different functions should be developed as well as a set of indicators of progress for each activity. Transparency in decision-making becomes increasingly important as membership and networks grow throughout the world. If people from developing countries, who can use the web to participate in IHDP, but who may never be able to afford to attend an open meeting, cannot understand how the organization works they are unlikely to be enthusiastic participants.
- A new Vision statement and a revised Mission and Programme statement in the Constitution will require a revision in the duties and composition of the revised Scientific Committee. A new “Steering Committee” will be needed to provide oversight to the expanded activities that included not only the Core Projects, but also the policy activities of the IHDP, the communications strategy and the networking and capacity building activities. Therefore, the reconstituted “Steering Committee” would have members with a broader set of skills, including communication and outreach.
- In order to manage effectively, this new Steering Committee should rely on the Strategic Plan to set relative priorities among competing activities. It should also develop a set of criteria for choosing among research proposals, and a set of indicators for each activity that can be used to measure progress.
- A proposal for a new organization is shown in Appendix 3.

Appendix 1: Members of the Assessment Panel

Chair: Leen Hordijk is currently Director of the International Institute for Applied Systems Analysis (IIASA), in Laxenburg, Austria. Prior to joining IIASA, he was Director of the Wageningen Institute for Environment and Climate Research (WIMEK) in the Netherlands and professor in Environmental Systems Analysis at Wageningen University. He was Chairman of the Social Science Research Council of the Netherlands Organization for Scientific Research (NWO) and of the Netherlands National Research Program on Climate Change and Global Air Pollution (NOP). Leen Hordijk pioneered the development of methods for linking environmental science and economics for integrated assessments of air pollution problems in Europe. His approaches are recognized as among the most effective ever developed for linking science and policy in international environmental affairs.

Tessa Marcus is an Executive Director at the National Research Foundation of South Africa. Prior to that Dr Marcus had a distinguished 11-year career as lecturer and researcher at the University of Natal, where she was Professor of Sociology. And she was advisor on HIV/AIDS to the Swedish aid organisation SIDA at the Embassy of Sweden in Pretoria. Marcus has extensive applied research and teaching experience. The first ten years of her research career focused on rural sociology. Subsequently, her research has concentrated on HIV/AIDS and its impacts on different segments of the population and sectors of society. She has published numerous books and monographs and peer reviewed journal articles and has written a number of research reports. In her capacity as Executive Director: Knowledge Fields Development in the National Research Foundation she is responsible for stimulating new directions in research and growing research capacity across the spectrum of science by engaging researchers with the development and knowledge challenges of South Africa in the 21st Century. Amongst other initiatives she is driving the Shifting Boundaries of Knowledge Project, a countrywide engagement with social science, law and humanities researchers to develop a national research agenda for SSLH.

Graeme I. Pearman, AM, FAA, FroySocVic, BSc(Hon), PhD. obtained his degrees from the University of Western Australia where he was trained as a biologist. He joined CSIRO, in 1971 where he was Chief of the CSIRO Division of Atmospheric Research for ten years 1992–2002. He contributed over 150 scientific journal papers primarily on aspects of the global carbon budget. In 2004 he left CSIRO to start a consultancy company. He is currently contracted to Monash University where he is establishing a new sustainability science program. Pearman was elected to Fellowship of the Australian Academy of Science in 1988 and to Fellowship of the Royal Society of Victoria in 1997. He was awarded a United Nation's Environment Program Global 500 Award in 1989, Australian Medal of the Order of Australia in 1999 and a Federation Medal in 2003. He was Brodie-Hall lecturer for 2003. His current interests and activities include Energy futures, Sustainability and sustainability science, Scientific capacity building; Public communication of science and Science policy.

Jai B. P. Sinha is a professor of Psychology and Management at the ASSERT Institute of Management Studies, Patna. He received his Ph.D. from Ohio State University, Columbus, Ohio, USA. He was a visiting professor at Hunter College of City University of New York, Wake Forest University, Winston-Salem (USA), McGill University, Montreal (Canada), and recently at the Copenhagen School of Business, Copenhagen (Denmark). Prof. Sinha was also a UGC National Lecturer, a National Fellow of the Indian Council of Social Sciences (ICSSR), a Senior Fulbright Fellow in the University of Illinois (USA), a member of the Executives of the International Association of Applied Psychology and International Association for Cross-Cultural Psychology, and a professor in A. N. Sinha Institute of Social Studies. Dr. Sinha is presently a Vice President of the World Association for Dynamic Psychiatry. Prof. Sinha has published over 160 research articles in national and international journals, and has authored eight books, the latest of which is *Multinationals in India*. His research activities have primarily been directed to examine the interface of culture and work organizations. His conceptualization of the Nurturant Task Leadership, Soft and Synergetic Work Cultures, and Dependence Proneness of Indian managers are recognized as unique Indian contributions to the Organizational Behaviour literature in India. Currently Prof. Sinha is participating in a four countries project on the domestic use of fresh water sponsored by the International union of Psychological Sciences.

Barbara Boyle Torrey is currently a visiting scholar at the Population Reference Bureau in Washington D.C. For nine years she was the executive director of the Commission on Behavioral and Social Science at the U.S. National Academy of Sciences. She has also been the Chief of the Center for International Research at the U.S. Census Bureau, the Deputy Assistant Secretary at the Department of Health and Human Services, and a fiscal economist at the Office of Management and Budget. She has edited two books on population and land use and on welfare policies in the United States. She has published a number of articles on the economics of aging, and international comparative studies of industrial countries and Eastern Europe. And she has published articles on population and environment issues. She is a fellow of the American Association for the Advancement of Science.

Appendix 2: List of Abbreviations and Acronyms

APN	Asia-Pacific Network
CIESIN	Center for International Earth Science Information Network
DIVERSITAS	International Programme of Biodiversity Science
EESP	Earth System Science Partnership
GCP	Global Carbon Project
GECAFS	Global Environmental Change and Food Systems
GECHS	Global Environmental Change and Human Security
GWSP	Global Water System Project
HDP	Human Dimensions of Global Environmental Change Programme
IAI	Inter-American Institute
ICSU	International Council for Science
IDGEC	Institutional Dimensions of Global Environmental Change
IGBP	International Geosphere-Biosphere Programme
IGOS-P	Integrated Global Observing Strategy Partnership
IHDP	International Human Dimensions Programme
IHDPW	International Human Dimensions Programme Workshop
IPCC	Intergovernmental Panel on Climate Change
IPO	International Project Office
IPY	International Polar Year
ISSC	International Social Science Council
IT	Industrial Transformation
LOICZ	Land-Ocean Interactions in the Coastal Zones
LUCC	Land-Use and Land-Cover Change
MEA	Millennium Ecosystem Assessment
MRI	Mountain Research Initiative
PERN	Population-Environment Research Network
SC	Scientific Committee
SSC	Scientific Steering Committee
SEED	Capacity Building Grants for National Human Dimensions Committee
START	Global Change System for Analysis, Research and Training
UNEP	United Nations Environment Program
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
YHDR	Young Human Dimensions Researcher

Appendix 3: Proposed International Human Dimensions of Global Change Organization

