

# **Sustainability Science and Technology: Linking Knowledge with Action**

Interim Progress Report  
to the David and Lucile Packard Foundation  
Covering Activities from December 2004 – November 2005

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The Sustainability Science and Technology project seeks to move the sustainability science agenda from its origins in the science community more fully and formally into a symmetrically driven scientist/practitioner program of activities linking knowledge with action in support of sustainability.

This interim progress report provides an overview of the project, Sustainability Science and Technology: Linking Knowledge with Action<sup>1</sup> and a brief history of the project's background. It then describes the two partnership teams for linking knowledge with action: Sustainable Production and Consumption Systems (SPACES)<sup>2</sup> and Vulnerability and Resilience in Practice (VARIP)<sup>3</sup> and the International Dialogue on Science and Practice in Sustainable Development.<sup>4</sup> It concludes with a description of some of the major challenges the project has faced.

## **I. Overview**

The project, Sustainability Science and Technology: Linking Knowledge with Action, is developing partnerships and dialogues to link sectors and regions in science-based, action-oriented initiatives to promote sustainability. The project contains two closely related elements: a set of focused partnership team efforts to link knowledge with action in emerging areas of sustainability science, and a larger scientist-practitioner Dialogue to catalyze significant increases in the quantity and effectiveness of knowledge/action partnerships for sustainable development.

The two partnership teams working to articulate key science needed to facilitate solutions to sustainability problems are Sustainable Production and Consumption Systems (SPACES) and Vulnerability and Resilience in Practice (VARIP). The teams are working to illustrate the potential for creation and application of science through focused case studies and to prepare implementation guidelines to facilitate action. They are differentiated from other ongoing studies in related arenas by their focus on shaping solution-driven research and applications projects and their use of a balanced

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<sup>1</sup> <http://www.ksg.harvard.edu/sed/sustsci>

<sup>2</sup> <http://www.sea-user.org/spaces>

<sup>3</sup> <http://www.clarku.edu/departments/marsh/vulnerability>

<sup>4</sup> <http://www.sustdialogue.org>

membership from the science/technology, development, and environmental protection communities. Each team will produce a solution-oriented, scientific synthesis/action plan.

An international Dialogue on Science and Practice in Sustainable Development aims to expand and deepen active collaborations between researchers and practitioners in harnessing science and technology for sustainable development. In particular, it seeks to provide an opportunity for deep and extended dialogue among members of the two communities for the purpose of jointly shaping cooperative projects; articulating R&D priorities; analyzing barriers to collaboration; and identifying the practices, procedures and institutions most likely to be effective in overcoming those barriers. These goals, as stated in the proposal, have been confirmed by the International Planning Committee and adopted in further fund-raising efforts. Building on the Mexico City Synthesis Workshop<sup>5</sup> held in May 2002 and the Ad hoc Advisory Group report to the Consortium on Science and Technology for Sustainability (ISTS, TWAS and ICSU)<sup>6</sup> it was agreed that the Dialogue should focus on four areas:

- integrated management of production/ consumption systems;
- enhancing resilience and reducing vulnerability of coupled human-environment systems;
- harnessing changes in values and norms to promote sustainability; and
- reforming governance institutions to foster transitions toward sustainability.

The Dialogue aims to bring together participants from all over the world. Equal numbers will be drawn from the communities of sustainability "science" (including scholars, engineers, and health experts) and the communities of sustainability "practice" (including policy-makers, resource managers, development specialists, educators, and a wide array of other relevant stakeholders). The Dialogue emphasizes bringing together senior leaders in the field with a large number of relevant young scientists and practitioners from developing countries. The Dialogue will be held 23-27 January 2007 in Chiang Mai, Thailand.

The project is a collaborative endeavor involving scholars and practitioners, with leadership from Harvard Univ. (USA), TWAS – the Academy of Sciences for the Developing World (Italy), the American Association for the Advancement of Science (USA), Chiang Mai Univ. (Thailand), Clark Univ. (USA), the Sustainable Europe Research Institute (Austria), and the Technology Information Forecasting and Assessment Council (India). It is based at Harvard's Center for International Development with an Oversight Committee consisting of William Clark representing the Initiative on Science and Technology for Sustainability (Chair); Mohamed Hassan representing TWAS; Shere Abbott as Executive Editor of the Forum on Science and Innovation for Sustainable Development; Jill Jaeger as Chair of the Dialogue; Roger Kasperson as Co-chair of VARIP, the vulnerability team; Louis Lebel as Co-chair of SPACES, the production-consumption team; and Nancy Dickson (Executive Director, Ex

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<sup>5</sup> Science and Technology for Sustainable Development. 2002. Consensus Report and Background Document. Mexico City Synthesis Conference. May 20 -23, 2002 ([www.icsu.org](http://www.icsu.org); [www.sustainabilityscience.org](http://www.sustainabilityscience.org)).

<sup>6</sup> International Council for Science. 2005. Harnessing Science, Technology, and Innovation for Sustainable Development: A report from the ICSU-ISTS-TWAS Consortium ad hoc Advisory Group. Paris: ICSU.

Officio). The Oversight Committee meets by teleconference once a month to discuss progress and strategy.

The project's support is from a core grant from the David and Lucile Packard Foundation given to Harvard University, grant #2004-26318. The project period is December 2004 - November 2006. For more information see <http://www.ksg.harvard.edu/sed/sustsci>.

## **II. Background**

Discussions between the Initiative on Science and Technology for Sustainability (ISTS), the Third World Academy of Sciences (TWAS), and the International Council for Science (ICSU) about the formation of the Consortium on Science and Technology for Sustainable Development began in early 2002 in connection with the Mexico City Conference. The Mexico City Synthesis Conference on Science and Technology for Sustainable Development (May, 2002) was funded principally by the Packard Foundation. The consensus report of the Mexico City conference fed into the World Summit on Sustainable Development (WSSD) in Johannesburg (August – September, 2002). The Consortium's founding organizations moved forward by taking the research and action agenda on sustainability science that emerged from the conference in Mexico City and the WSSD back to their respective general assemblies (or equivalent) for discussion and endorsement. The ICSU General Assembly (September 2002) endorsed an initiative on Science for Sustainable Development, the TWAS General Assembly (October 2002) also approved the idea of moving ahead with a Consortium, as did the meeting of the ISTS Steering Group (November 2002). At an informal meeting of the Consortium partners in November 2002, it was agreed to set up an ad hoc Advisory Group to guide the development of the Consortium. This Advisory Group, chaired by Robert Corell (USA) and Hebe Vessuri (Venezuela) produced a report in January 2005 that provided perspective and guidance on how a partnership of international organizations could help to integrate a broader set of perspectives into the workings of the S&T communities, and could help these community not only to generate new knowledge, but also to implement robust solutions to society's most pressing development challenges. Meetings and staffing were supported by discretionary money from ICSU, as well as a grant from the US National Science Foundation. In December 2004, ICSU's Executive Board decided that it no longer wanted to continue as a partner in the Consortium on Science and Technology for Sustainability. Our understanding is that in so doing, ICSU adopted one of the options for 'organizing future programs on sustainability science' outlined in the draft report of the ad hoc Advisory Group on S&T for Sustainability set up by the Consortium. The option argues that in light of the breadth of activities and approaches relating to sustainability science being pursued around the world, more is to be gained by fostering multiple agendas than by prematurely seeking to arrive at a common (and potentially 'lowest common') set of shared goals. ICSU as an organization has its agenda in support of sustainability science, while other organizations (including TWAS and ISTS) develop theirs. ISTS and TWAS have continued to work together.

The last several years of consultations and work in sustainability science have done an impressive job of initiating the process of defining priority areas for research and action. Some of these areas are beginning to mature as vibrant programs with growing impact on action, e.g., on how human-environment interactions shape patterns of land use change. Others, however, appear to need a period of intense collaborative work to crystallize issues and opportunities, identify barriers to application of what is known, and to provide examples of what is both needed and possible. The Consortium and its Advisory Group identified four areas in which both the need and potential for strengthening the scientific foundations for effective action programs are particularly acute:

- integrated management of production/consumption systems;
- enhancing resilience and reducing vulnerability of coupled human-environment systems;
- harnessing changes in values and norms to promote sustainability; and
- reforming governance institutions to foster transitions toward sustainability.

The Sustainability Science project is one effort to develop science-based, action-oriented partnerships for sustainability in these areas, plus others of comparable priority that may emerge from its continuing deliberations.

### **III. Partnerships for linking knowledge with action in emerging areas of sustainability science**

Within this broad strategic approach, two partnership teams will work over a two-year period to articulate key science needed to facilitate solutions to sustainability problems in the areas of Sustainable Production and Consumption Systems (SPACES) and Vulnerability and Resilience in Practice (VARIP). They are working to illustrate the potential for development and application of that science through focused case studies and will prepare implementation guidelines to facilitate action. Each team will produce a solution-oriented, scientific synthesis/action plan that will:

- assess what knowledge is most needed to facilitate solutions to sustainability problems in its respective area;
- evaluate which of those needs can be met by bringing into application in specific contexts knowledge that already exists somewhere else, versus which needs require new research and innovation;
- explore what is needed to facilitate the lowering of barriers to use of existing knowledge and the raising of incentives to produce needed new discoveries;
- illustrate the potential for better linking knowledge to action through one or more relevant case studies;
- prepare implementation guidelines to facilitate such linkages by WSSD-like partnerships around the world; and
- disseminate its results widely through the peer-reviewed literature, government advisory processes, and the world-wide web.

Accomplishments include:

- naming of chairs and members of working groups. Co-chairs were selected to bring perspectives from the richer and poorer parts of the world, as well as from the perspectives of research and action. The working groups have balanced

- membership from the science/technology, development, and environmental protection communities, as well as gender and regional balance.
- recruitment of doctoral students and post-doctoral research fellows;
- convening meetings and conference calls of the working groups
- selecting cases;
- creating a protocol with core questions;
- creating public and private project web sites; and
- creating a work plan.

### **Sustainable Production and Consumption Systems**

The goal in the Sustainable Production and Consumption Systems (SPACES) working group is to help create an improved conceptual framework and agenda for actionable research on the sustainability of production-consumption systems that increasingly stretch across disparate parts of the globe. There are two key reasons for framing the challenge as one of sustainability of “production-consumption” systems rather than the more conventional focus on production technologies and regulation. The first is the need to bring attention to the processes closer to the decisions and actions of final consumer when undertaking analyses of the underlying reasons for environmental impacts at remote, more primary, “production”, parts of commodity chains. The second is that a commodity chain itself can be thought of a series or network of many production-consumption relationships. For each linkage questions are asked from both a production perspective (How could this industrial process be more resource efficient?) and a consumption perspective (What are the underlying drivers of downstream demands in the network or value chain?). These perspectives are complimentary but not alternatives.

The project addresses both over- and under-consumption. The split does not fall neatly into south-north, or developed – developing categories. Elites and wealthy of cities in the developing world have life styles that parallel those of the majority in the developed, and conversely, the homeless in the big cities of the U.S. may be no better off than many slum dwellers in the mega-cities of Asia. Ultimately, questions about sustainability of production-consumption systems under the transformations wrought by globalization lead to questions about justice, rights and responsibilities. Which innovations in governance mechanisms and institutional arrangements are needed to drive production-consumption systems along more sustainable trajectories that are also fair?

After consulting with the project’s Oversight Committee, candidates for the SPACES team were selected. Co-chairs are Louis Lebel and Sylvia Lorek. The list of members follows below:

- **Louis Lebel**, Unit for Social and Environmental Research, Chiang Mai Univ., Thailand - Co-chair
- **Sylvia Lorek**, Sustainable Europe Research Institute, Germany - Co-chair
- **Michael Maniates**, Depts. of Political Science and Environmental Science, Allegheny College, USA
- **Ooi Giok Ling**, National Institute of Education, Singapore

- **Kersty Hobson**, Dept. of Human Geography, Australian National Univ., Australia
- **Robert Kates**, Independent Scholar, USA
- **John Manoochehri**, Centre for Environmental Strategy, Univ. of Surrey, UK
- **Uchita de Zoysa**, Centre for Environment and Development, Sri Lanka
- **Fritz Reusswig**, Potsdam Institute for Climate Impact Research, Germany
- **Yok-Shiu Lee**, Dept. of Geography, Univ. of Hong Kong, Hong Kong
- **Ligia Noronha**, Energy and Resources Institute, TERI, India
- **Olga Ponizova**, Eco-Accord, Russia

Two post-doctoral fellows are working with the SPACES team based at the Unit for Social and Environmental Research, Chiang Mai University: Hannarong Shamsub and Dao Huy Giap.

The SPACES working group met in Siegburg, Germany, on 15-16 October 2005 as a side event to the Open Meeting of the Human Dimensions Research Community. The purpose of the meeting was to debate and come to agreement on the scope, purpose and priority activities for the next 15 months. This included discussion of potential case studies, the need for better articulation of key concepts and review of earlier efforts, ways to engage practice and what that meant, and ideas for preparation and communication of findings. A substantial part of the meeting was spent on discussing the ways knowledge and action were (and were not) related and on the merits and drawbacks of different ways to think about and influence production and consumption systems. Although full consensus was not achieved significant progress was made in better articulating the different approaches. These conversations also underlined that there is substantial body of theory in existing disciplines that could be drawn on. Reviewing this information and better articulating key concepts in sustainable production and consumption systems was identified as an immediate priority. This should lead to a more widely accepted and practical definition of “sustainable production-consumption systems”.

The working group agreed upon a work plan with key milestones in the lead up to the Dialogue. The team will prepare a state-of-the-art review of the knowledge with action issues associated with managing production-consumption systems in an integrated way. It will also carry out a small number of in-depth case studies building on interactions with practitioners and other stakeholders that are already in place and through which the practitioners can be meaningfully engaged. The knowledge-action paper will shed light on the theory and practices underlining sustainable production-consumption systems. It will cover nine aspects of the issue: a proper working definition of integrated sustainable production-consumption systems, national strategies and policies toward SPACES, behavior and practices, local participation, market and globalization, impact analysis, governance, knowledge systems, and driving forces and barriers to the SPACES. The case studies will include investigation of knowledge with action issues in 5-7 production-consumption systems drawn from:

- shrimp aquaculture;
- tourism in developing countries;
- housing and urban planning;
- mobility and car ownership; and

- low-material intensity cultural products

Final selection of the cases will be made by the end of the year. At that time there will be detailed outlines. The case study working papers will follow a common protocol that addresses these core questions about production and consumption systems:

- What are the main energy and material flows and who are the main actors involved?
- What research- and practice-based knowledge already exists, and, what knowledge is still needed, for their integrated management?
- If relevant knowledge already exists how can it be harnessed, and, if needed knowledge is missing, how could it be sought?

The final report will draw on the knowledge-action paper and case study materials. The team also expects to publish its major review findings in the *Annual Review of Environment and Resources*, whose editors have requested a manuscript in January 2007.

Team members will continue to communicate with one another via conference calls and meetings. SPACES has a dedicated web site with public and private pages, <http://www.sea-user.org/spaces>. A second working group meeting will be held in Chiang Mai, Thailand 15-16 October 2006 where the draft final report will be critiqued. The aim is to distribute the report just prior to the 23-27 January 2007 Dialogue where it will be the focus of deliberation of some of the panels. In addition SPACES will be reporting preliminary findings at various venues, including: Thailand Environment Institute's Annual Meeting on Sustainable Consumption and Production (November 2005); and the American Association for the Advancement of Sciences' Annual Meeting (February 2006 in St. Louis, USA) panel on "Making Production-Consumption Systems Sustainable."

### **Vulnerability and Resilience in Practice**

The Vulnerability and Resilience in Practice (VARIP) team directs attention to the interacting parts of the coupled socio-ecological systems and helps identify gaps in information and understanding relevant to reducing vulnerability in the systems as a whole. Vulnerability assessment is aimed at determining the risk of specific adverse outcomes for a particular group or unit of concern, in the face of a variety of stresses, and identifying factors that may reduce the response capacity and adaptation to stressors. Resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks. Building resilience of a desired system regime requires enhancing the social, ecological, and economic processes that enable it to reorganize following a disturbance. The concepts of resilience and vulnerability are closely connected, since the vulnerability of a social-ecological system to stresses and perturbations depends on its resilience. The project also gives attention to building adaptive capacity, which strengthens the long-term resilience of a community or productive system. These issues are examined in the context of improved means for bridging the worlds of science and practice.

After consulting with the project's Oversight Committee, candidates for the VARIP team were selected. Co-chairs are Roger Kasperson and Anand Patwardhan. The list of members follows below:

- **Roger Kasperson**, George Perkins Marsh Institute, Clark Univ., USA – Co-chair
- **Anand Patwardhan**, Technology Information, Forecasting & Assessment Council, Indian Institute of Technology, India – Co-chair
- **Lilibeth Acosta-Michlik**, Dept. of Geography, Catholic Univ. of Louvain, Belgium
- **Amy Luers**, Union of Concerned Scientists, USA
- **Ulisses Confalonieri**, National School of Public Health (FIOCRUZ), Brazilian Ministry of Health and Federal Univ. in Rio de Janeiro, Brazil
- **AJ (Ton) Dietz**, Human Geography, Planning and International Development Studies, Univ. of Amsterdam, NL
- **Tom Downing**, School of Geography and Environment, Univ. of Oxford, UK
- **Elena Nikitina**, Institute of World Economy and International Relations, Russian Academy of Sciences, Russia
- **Roberto Sanchez-Rodriguez**, Institute for Mexico and the United States, Univ. of California, USA
- **Barry Smit**, Dept. of Geography, Univ. of Guelph, Canada
- **Coleen Vogel**, School of Geography, Archaeology, and Environmental Studies, Univ. of the Witwatersrand, South Africa

Four graduate student research assistants are working with the VARIP team based at Clark University: Rebecca Brenner, Zach Christman, Elia Machado, and Rima Wahab-Twibell.

The VARIP working group met in Bonn, Germany, on the 8-9 October 2005 as a side event to the Open Meeting of the Human Dimensions Research Community. The purpose of the meeting was to debate and come to agreement on the scope, purpose and priority activities for the next 15 months. This included discussion of core questions to focus the case studies on, the need for better articulation of key concepts and review of earlier efforts, ways to engage practice and what that meant, and ideas for preparation and communication of findings. The team agreed to produce a knowledge-action paper that will focus on efforts to bridge science and practice addressing vulnerability, resilience, and adaptation. It builds on an ongoing meta-analysis in progress in the a joint Stockholm Environment Institute – Clark University – Potsdam Institute for Climate Impacts Research effort. The cases studies will draw from existing work and include prescriptions on practice at the conclusion of each. Practitioners will collaborate with the case study teams. Five case studies will be selected from the following candidates with a final determination to be made by January 2006:

- European Program for Food Aid and Food Security in Nicaragua;
- Vulnerability and Adaptation in the US Global Change Research Program and Climate Change Science Program;
- Responding to Hurricane Katrina and Social Justice Issues in New Orleans;
- Early warning systems at the village level in India;
- South African climate change study;

- Land use planning in the Philippines;
- Uplands areas of Thailand;
- Climate change policy in Russia;
- Regional responses to climate change in the US;
- Use of indigenous knowledge by the Inuit population of Canada; and
- Emergency preparedness to earthquakes and typhoons in rural areas of Taiwan.

A set of 11 core questions has been developed to guide the literature review and the case studies:

1. How adequate is the knowledge base to support efforts for vulnerability reduction and building resilience and adaptation? How is that knowledge distributed among actors?
2. How may the science–practice interface best be structured and characterized? Who are the principal actors? What are their roles and interests?
3. To what extent do the actors make use of the knowledge available to them? How do the actors structure the vulnerability and resilience discussion in the transfer of knowledge? How relevant and pertinent is the knowledge to the needs of decision-makers and other actors?
4. What barriers and failures limit the transfer of knowledge and feedbacks in the science–practice interface? Do the barriers and failures occur in the transfer of knowledge principally from science to practice or from practice to science? How important are the intermediaries between science and practice and who are they?
5. How does the nature of institutions shape the science–practice interface? To what extent is institutional fragmentation a problem? How permeable are the boundaries of institutions to new information?
6. What major conflicts exist among actors and institutions in the interactions between science and practice? To what extent are the conflicts primarily about values or facts? Does social justice enter into the decision-making process?
7. What is the role of consensus in the science–practice interface? How is consensus built? How are conflicts resolved? Who are the consensus builders and mediators and what are the major processes they use?
8. What factors contribute most to adaptive capacity? How large is the gap between the capacity to adapt and the adaptation that actually occurs? What causes this gap and how can it be reduced? What new elements of enlarged capacity would contribute most to greater resilience in the face of environmental change over the short run, the longer term?
9. To what extent has social learning evolved among the principal actors? To what extent has social learning ameliorated or exacerbated vulnerability? What most limits or facilitates the ability to learn from one’s own experience and the experience of others?
10. Where is the science–practice interface vulnerable to failure? Where is the science–practice interface most vulnerable to failure to future risks?
11. How can the science–practice interface be best improved?

VARIP will produce a report containing a synthesis of the knowledge-action paper and the case studies. An action plan will be geared to the case studies in which each case study will prepare prescriptions for improving the science/practice interface. A

determination will be made as to whether more generic and cross-cutting action initiatives are possible or whether they should be restricted to case domains.

Team members will continue to communicate with one another via conference calls and meetings. VARIP has a dedicated web site with public and private pages, <http://www.clarku.edu/departments/marsh/vulnerability>. A second working group meeting will be held in September 2006 where the draft final report will be critiqued. The aim is to distribute the report just prior to the 23-27 January 2007 Dialogue where it will be the focus of deliberation of some of the panels. In addition, VARIP will be reporting preliminary findings in such venues as meetings of the International Human Dimensions Programme on Global Environmental Change, the American Association for the Advancement of Sciences, the Society for Risk Analysis, the Society for Risk Analysis-Europe, the Association of American Geographers, and the International Geographical Union.

#### **IV. International Dialogue on Science and Practice in Sustainable Development**

The project is reaching out beyond the work of its focused partnership teams to engage a much wider group of researchers and practitioners in a continuing "Dialogue" about how to harness science and technology more effectively in support of sustainable development. ISTS, TWAS and ICSU ran a number of researcher-practitioner dialogues under Packard Foundation sponsorship as part of the process of preparing for the WSSD. We drew the results of these regional dialogues together at our international dialogue in Mexico City in 2002, which produced as input to the WSSD a consensus position on the needs and potential for sustainability science. Building on this record of success, we plan a follow-up International Dialogue on Science and Practice in Sustainable Development. Our goals are both to catalyze significant increases in the quantity and effectiveness of knowledge-action partnerships for sustainability being pursued around the world, and to develop the capacity to establish and implement such partnerships. The core priority areas for knowledge-action partnerships described above will define the focus of the 2007 Dialogue. The reports on needs and opportunities in these areas that will be prepared by the partnership teams will assure a high-level point of departure for the Dialogue. The Packard Foundation grant has allowed us to launch the process of organizing and funding the Dialogue.

The Dialogue aims to foster effective collaborations between scientists and practitioners to advance the practice of sustainable development, through knowledge sharing and promoting national, regional, and international actions and implementation. It will do so by featuring practical examples of successful collaborations, critical analyses of what has not worked, and structured discussion fora to compare and consider experiences from around the world. Participants from developing and developed countries worldwide are expected to engage in dialogues on how to best link knowledge with actions to achieve sustainable development. The expected outcome of the Dialogue is a comprehensive, timetabled International Action Plan to strengthen existing sustainable development networks of collaboration between science and practice and create new alliances.

There has been considerable progress in planning for the Dialogue. Accomplishments include:

- forming an International Planning Committee (IPC);
- convening a meeting of the IPC;
- selecting a date and location for the Dialogue;
- deciding upon a preliminary program and structure for the Dialogue;
- designing a procedure for the call for proposals of session and posters and their evaluations;
- devising a strategy for soliciting patrons and endorsements;
- designing and beginning implementation of a funding strategy, and
- crafting a communications strategy, including a web page.

Candidates for the IPC were selected according to the following criteria: representatives from social and natural science and the field of “practice” in several areas with expertise in the topics to be addressed in the Dialogue; and balanced geographical and gender distribution. The IPC now includes 9 members and 5 ex-officio members (Bill Clark, Nancy Dickson, Mohamed Hassan, Roger Kasperson, and Louis Lebel). Co-chairs of the IPC are Jill Jäger (who also serves as Executive Director of the Dialogue) and Simon Tay of Singapore. Elisabeth Dyck serves as the Executive Secretary. The list of IPC members follows below.

- **Jill Jaeger**, Sustainable Europe Research Institute, Austria - Co-chair
- **Simon Tay**, National Environment Agency; Law School, National Univ. of Singapore, Singapore - Co-chair
- **Inez Fung**, Dept. of Earth & Planetary Science, Univ. of California at Berkeley, USA
- **Stephen Karekezi**, African Energy Policy Research Network, Kenya
- **Ma Zhongyu**, Deputy Director, Ningxia Provincial Commission on Development and Reform; Environmental School of Renmin, Univ. of China
- **Chris Pomfret**, Programme for Industry, University of Cambridge, UK
- **Márcia Régis**, LEAD, Brazil
- **Mahendra Shah**, International Institute for Applied Systems Analysis, Austria
- **Lorrae van Kerkhoff**, National Centre for Epidemiology and Population Health, Australian National Univ., Australia

The IPC met in Vienna, Austria from 24-25 May 2005 and there have been several teleconferences resulting in a planning strategy. After discussions with potential hosts in Costa Rica, Malaysia, Thailand and India, the IPC agreed that the Dialogue will be held in Chiang Mai, Thailand, from 23-27 January 2007 and hosted by the Unit of Social and Environmental Research of Chiang Mai University. The venue will be the Lotus Hotel Pang Suan Kaew in Chiang Mai. The Plenary sessions will focus on the topics of:

- The role, relevance, credibility, and utility of research and traditional knowledge for sustainability, from the perspective of both scientists and practitioners.
- Education and learning for science and practice in the context of sustainable development
- Production/Consumption Systems – the Food and Agricultural System.

- Production/Consumption Systems and the Energy Sector
- Resilience/Vulnerability: The science and practice of understanding the vulnerability of the human-environment system in particular places
- Resilience/Vulnerability: Linking science and practice in the Health Sector
- The Way Forward - An International Action Plan.

These plenary topics were selected on the basis of the discussions of the IPC. Four sessions are devoted to the themes of the partnership teams (VARIP, SPACES) and it is expected that the plenary debates on these topics will also address other cross-cutting issues, such as the role of governance and institutions, and the harnessing of values and norms. The first two topics in the list above highlight the need to have a wider debate about linking knowledge and action, as well as the important role of education, training and learning. The final session will take reports from all dialogue sessions (plenaries and invited parallel sessions) and incorporate relevant points into an International Action Plan.

The announcement for the Dialogue has been widely disseminated via websites, emails and in international sustainability conference calendars. A call for session and poster proposals was issued in October 2005. The Call is available on the Dialogue and partner organization websites, <http://www.sustdialogue.org/call-for-sessions.php>. The Dialogue's website includes on-line functions for proposal submissions and registration. The plans for the Dialogue have been presented, *inter alia*, at a symposium at the University of East Anglia, UK, the World Science Forum in Budapest (November 2005), and the International Institute for Sustainable Development in Canada.

In an effort to draw attention to the Dialogue the planning committee has sought endorsements from distinguished patrons and eminent institutions. To date Walter Lichem, Former Ambassador of Austria, Austrian Foreign Ministry; Julia Marton-Lefevre, Rector, UN University of Peace, Costa Rica; José Sarukhán, Former Special Advisor for Social Development to the President of Mexico and Professor, Instituto de Ecología, Universidad Nacional Autónoma de México (UNAM), Mexico; and Klaus Töpfer, Executive Director, United Nations Environment Programme have agreed to be Patrons. Responses from other potential patrons are pending. The Science Council of Japan has endorsed the Dialogue and other endorsements are pending.

A funding raising campaign for the Dialogue includes approaches to national and international institutions, development banks, and industry foundations. The following institutions have been approached for funding: Asian Development Bank; Austrian Control Bank; Austrian National Bank; Austrian Foreign Ministry; Austrian Ministry of Environment; Austrian Ministry of Science; Canadian International Development Agency; International Development Research Center; Japanese International Cooperation Agency; MacArthur Foundation; Rockefeller Foundation; Science Council of Japan; Swedish Environmental Secretariat in Asia; US Agency of International Development; US National Science Foundation; and Volkswagen Foundation. Appeals to the Austrian Control Bank, Austrian Foreign Ministry, MacArthur Foundation, Rockefeller Foundation, USAID, and Volkswagen were declined.

Efforts in the coming year will focus on: fund raising; peer review of proposals for sessions and posters; identifying plenary speakers and moderators; convening a second meeting of the IPC in Chiang Mai; convening the Dialogue in Chiang Mai, Thailand in January 2007, media briefings; and post conference activities, including web-site documentation, producing CD-ROMs with papers; issuing reports for funders, disseminating International Action Plan widely within the international communities of science/research and practice, and publicizing success stories.

## **V. Challenges to the project**

There have been numerous challenges to launching this project. These include:

- withdrawal of ICSU from project;
- venues for publishing articles on sustainability science and technology;
- fund raising for the Dialogue;
- engagement of practitioners; and
- migration of the Forum to AAAS.

### Withdrawal of ICSU

In December 2004 ICSU's President Jane Lubchenco notified Bill Clark that ICSU's Executive Board decided that it did not want to continue as a partner in the Consortium on Science and Technology for Sustainability and that it would withdraw as a partner in this project. Our understanding is that in so doing, ICSU adopted one of the options for 'organizing future programs on sustainability science' outlined in the report of the ad hoc Advisory Group on S&T for Sustainability set up by the Consortium on S&T for Sustainability. This option argues that in light of the breadth of activities and approaches relating to sustainability science being pursued around the world, more is to be gained by fostering multiple agendas than by prematurely seeking to arrive at a common (and potentially 'lowest common') set of shared goals. We did have an informal consultation with ICSU's Executive Director, Thomas Rosswall, about candidates for the partnership team working groups and the IPC.

### Venues for publishing articles on sustainability science and technology

A challenge facing the sustainability science community was the need for an interdisciplinary venue for publishing high-quality research in sustainability science. Building on the success of ISTS, the *Proceedings of the National Academy of Sciences* (PNAS), <http://www.pnas.org>, has launched a new permanent section on sustainability science. PNAS seeks original research contributions for this new section on both the fundamental character of interactions among humans, their technologies, and the environment, and on the utilization of such knowledge to advance sustainability goals relevant to water, energy, health, habitation, agriculture and ecosystem services. It will cover research addressing spatial scales from the global to the local, and drawing on a wide range of both disciplinary and multidisciplinary approaches. The new section will be shaped by Associate Editor Bill Clark and editorial board members Robert Kates, Pamela Matson, and John Schellnhuber (all ISTS Steering Group members) and Barry Bloom, Partha Dasgupta, and Elinor Ostrom. PNAS will begin to populate the new

section with one or more special features in the coming year, aiming to achieve a regular publication rate of 50-100 articles per year within several years. Electronic versions of the articles are available immediately at no cost to readers in developing countries.

#### Funding for the Dialogue

The initial timeline of June to September 2005 for fundraising activities for the Dialogue proved unrealistic. More time is needed to secure funding; fundraising will be an evolving process over the next 9-12 months. The primary fundraising responsibility has been carried out by the Dialogue Executive Director Jill Jaeger and Executive Secretary Elisabeth Dyck. Raising funds to support the organizational activities (Secretariats; web-site maintenance; proposal review; seeking endorsements; organizing plenary dialogues) has been difficult. A mixed-method approach, combining organizational work with other costs, is being taken where possible. Costs for organising the Dialogue, including sponsoring about 100 participants from developing countries and young scientists and practitioners, are estimated at \$500,000.

#### Engagement of practitioners

A major challenge for the partnership teams has been how to effectively engage with the practitioners. The teams decided to move to case studies as a way to engage practitioners. Each of the in-depth case studies builds on interactions with practitioners and other stakeholders that are already in place and through which they can be meaningfully engaged because the subject matter is of immediate interest to them. Some of the practitioners will be drawn together to participate in the Dialogue to carry specific knowledge with action issues in individual sectors forward as well as to look for opportunities for learning from other case group experiences.

#### Migration of the Forum on Science and Innovation for Sustainable Development to AAAS

The web-based Forum on Science and Technology for Sustainability has successfully migrated from Harvard's server to the American Academy of the Advancement of Science (AAAS), <http://sustsci.aaas.org>. The transition to the site will be completed in January 2006. This effort has been led by Shere Abbott, Director of the Center for Science, Innovation and Sustainable Development at AAAS. Shere Abbott will be moving to the University of Texas at Austin as Director of their Center for Science and Practice of Sustainability. Bill Clark and Robert Kates have been working with Shere Abbott and AAAS to develop a strategic plan to ensure that support for the Forum is ongoing. As ever, the Forum continues to be a good place to get a broad sampling of the research, action and capacity building underway around the world.