

**Initiative on Science and Technology for Sustainability**  
**Interim Progress Report**  
**October 2001 – October 2003**

Submitted by Nancy Dickson and William Clark, Harvard University

This document constitutes an interim progress report for the *Initiative on Science and Technology for Sustainability (ISTS)*, covering the period from its inception in October of 2001 to October 2003. It reports on activities initiated under the initial two year grant from the Packard Foundation (2001-19235), plus a supplemental grant (2002-22081) to support a workshop on science and technology for sustainable development. Related work, funded through a number of smaller grants from other organizations leveraged to support the work initiated under the Packard awards, is also included. *Initiative* work that is continuing under a no-cost extension of the Packard grants will be covered in the final report to the Foundation.

The report is organized in five sections plus this introduction. The first three sections report work done in pursuit of the *Initiative's* three goals (see below). The fourth section deals with our evolving relations with other groups seeking to advance science and technology for sustainability, and our thinking about the future. A final section summarizes key documents produced by the *Initiative* and its members.

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The international *Initiative on Science and Technology for Sustainability (ISTS)* was founded in 2001 to pursue three broad and interrelated goals:

- **expanding and deepening the research and development agenda** of science and technology for sustainability;
- **strengthening the infrastructure and capacity** for conducting and applying science and technology for sustainability; and
- **connecting science and policy** more effectively in pursuit of a transition toward sustainability.

The Initiative is an open-ended network founded in response to the October 2000 Friibergh Workshop on Sustainability Science. Initial co-Conveners for the Initiative are Robert Kates (Independent Scholar, USA) and Akin Mabogunje (Development Policy Centre, Nigeria). The international Steering Group responsible for setting Initiative strategy includes:

William Clark, Harvard University  
Robert Corell, American Meteorological Society  
Gilberto Gallopín, Economic Commission for Latin America and the Caribbean  
Mohamed Hassan, Third World Academy of Sciences  
Jill Jäger, Consultant  
Narpat Jodha, International Centre for Integrated Mountain Development  
Robert Kates, Independent Scholar

Calestous Juma, Harvard University  
Louis Lebel, Chiang Mai University  
Jane Lubchenco, Oregon State University  
Akin Mabogunje, Development Policy Centre  
Pamela Matson, Stanford University  
James McCarthy, Harvard University  
Jose Sarukhán, Universidad Nacional Autónoma de México  
John Schellnhuber, Potsdam Institute for Climate Impact Research and the  
Tyndall Centre for Climate Change Research.

Day-to-day support for the Initiative is supplied by a small Secretariat based at the Third World Academy of Sciences and Harvard University. Funding for the Initiative has come from the David and Lucile Packard Foundation and the U.S. National Oceanic and Atmospheric Administration's Office of Global Programs, with additional support from numerous governments and institutions around the world.

## **1. Expanding and deepening the research and development agenda of science and technology for sustainability**

### **1.1 Regional Workshops**

In pursuit of its first goal, the Initiative pursued the Friibergh finding that existing global discussions on the challenges of harnessing science and technology to sustainability needed to be complemented with more localized, place-based perspectives. Each of these locally organized workshops brought together from their respective regions individuals involved in research, development, and environmental protection. Each asked participants to assess regional priorities for harnessing science and technology in efforts to promote sustainability, to characterize obstacles that impeded progress, and to identify priorities for action. A steering group under the leadership of Robert Corell and consisting of the workshop chairs provided for overall coordination of the workshop series. The five regional workshops engaged 235 participants from 39 countries.

- **Abuja, Nigeria:** 13-15 November 2001, organized locally by the Nigerian National Committee on Sustainability Science, chaired by Professor Akin L. Mabogunje, Development Policy Centre, Ibadan, Nigeria.
- **Chiang Mai, Thailand:** 4-6 February 2002, organized locally by Chiang Mai University and University Kebangsaan Malaysia, co-chaired by Louis Lebel, Faculty of Social Sciences, Chiang Mai University and Science Coordinator for the Southeast Asian Regional Committee (SARCS) for START, Bangkok, Thailand, and Mohd Nordin Hasan, Institute for Environment and Development (LESTARI), University Kebangsaan Malaysia, Bangi, Malaysia and a series of small working group meetings on Sustainability and Human Settlements in Asia held 29-30 July 2002, at the Rama Gardens Hotel, Bangkok, Thailand.

- **Bonn, Germany:** 27 February - 1 March 2002, organized locally by the International Human Dimensions Programme on Global Environmental Change (IHDP), chaired by Jill Jäger, Executive Director, International Human Dimensions Programme on Global Environmental Change, Bonn, Germany (workshop supported by the German Federal Ministry for Education and Research).
- **Santiago, Chile:** 5-7 March 2002, organized locally by the Economic Commission for Latin America and the Caribbean (ECLAC), chaired by Gilberto Gallopín, Regional Advisor on Environmental Policies, Division of Environment and Human Settlements, Economic Commission for Latin America and the Caribbean, UNESCO, Santiago, Chile.
- **Ottawa, Canada:** 25-26 March 2002, organized locally by Carleton University, co-chaired by Elizabeth Dowdeswell, University of Toronto, and Stuart Smith, Chair, National Roundtable on the Environment and the Economy (this workshop focused on regional-scale issues of science and technology for sustainability in Canada, Mexico, and the United States) (workshop supported by the Government of Canada).

A summary of the findings from the regional workshops is provided in Annex 2 of "Science and Technology for Sustainable Development: Consensus Report of the Mexico City Synthesis Workshop, 20-23 May 2002." Cambridge, MA: ISTS (report at [http://sustainabilityscience.org/ists/synthesis02/output/ists\\_mexico\\_consensus.pdf](http://sustainabilityscience.org/ists/synthesis02/output/ists_mexico_consensus.pdf); cited here as ISTS et al., 2002; described more fully immediately below). A consolidated record of the regional workshops is available at <http://sustainabilityscience.org/ists/events.htm>.

## **1.2 Mexico City Synthesis Workshop on Science and Technology for Sustainable Development**

It became clear during the Initiative's first intensive year of regional workshops that a synthesis effort would be required to bring the results together in a coherent and comparative whole. When we discussed the need for such an effort with our grant officer at the Packard Foundation, Helen Doyle, she urged us to collaborate with other groups exploring some of the same issues in setting up the workshop, thus producing an integrated perspective for use by the community and the upcoming World Summit on Sustainable Development (WSSD). The result was a joint proposal by the ISTS, TWAS and ICSU for supplementary funding to host what turned into the Mexico City Synthesis Workshop on Science and Technology for Sustainable Development. This was held 20-23 May 2002 and hosted by the National Autonomous University of Mexico on behalf of a joint Organizing Committee from ICSU, TWAS, and the ISTS.<sup>1</sup> The Workshop brought together leaders of, and participants in, more than a dozen fact-finding studies, discussions, conferences, and workshops conducted over the two years leading up to the WSSD by the international scientific and technology community. Each of these contributing sessions had addressed the question "How can science and technology contribute more effectively to achieving society's goals of sustainable development?" from a particular perspective. These perspectives included global views from international science organizations, regional views grounded in grass-roots efforts to

harness science and technology in support of sustainable development, assessments of potential contributions from global change science, and critical analyses of experience in designing institutions and financing for science and technology directed toward solutions to sustainability problems. 36 people from 18 countries attended the workshop. Findings of the individual sessions were summarized in a background paper for the Mexico City Workshop (see Annex 2 of ISTS et al., 2002). Participants in the Workshop reviewed the background paper and the individual contributing reports in addition to bringing their own rich backgrounds of experience to the table. They then formulated a consensus report (ISTS et al., 2002). This was presented to President Vicente Fox of Mexico at the close of the Workshop and tabled by ICSU at the 4<sup>th</sup> Preparatory Workshop for the WSSD, immediately following the Mexico City Workshop. It was subsequently published by ICSU in their Series on Science for Sustainable Development, No. 9 (see <http://www.icsu.org/Library/WSSD-Rep/Vol9.pdf>).

### **1.3 Core Science challenges**

Emerging from the workshops described above are a number of core conceptual challenges for sustainability science that are also beginning to appear on emerging agendas for other more established fields such as global environmental change:

- Models and Conceptualizations  
How can the dynamic interactions between nature and society – including lags and inertia – be better incorporated in emerging models and conceptualizations that integrate the Earth system, human development, and sustainability?
- Long-Term Trends and Transitions  
How are long-term trends in environment and development, including consumption and population, reshaping nature-society interactions in ways relevant to sustainability?
- Vulnerability and Resilience  
What determines the vulnerability or resilience of the nature-society system in particular kinds of places and for particular types of ecosystems and human livelihoods?
- Scientifically Meaningful Limits or Boundaries  
What determines the vulnerability or resilience of the nature-society system in particular kinds of places and for particular types of ecosystems and human livelihoods?
- Incentive Structures  
What systems of incentive structures – including markets, rules, norms and scientific information – can most effectively improve social capacity to guide interactions between nature and society toward more sustainable trajectories?
- Monitoring and Reporting  
How can today's operational systems for monitoring and reporting on environmental and social conditions be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?
- Institutions for Research, Observation, Assessment, and Decision Support  
How can today's relatively independent activities of research planning, observation, assessment, and decision support be better integrated into systems for adaptive management and societal learning?

Initial essays and bibliographies for most of these core issues have been developed and posted on the ISTS Forum (see <http://sustainabilityscience.org/questions.htm>). Activities to advance a program of sustainability science research focused on these questions are moving forward on a number of fronts and at scales from the global to the local. These are described in the following sections.

#### **1.4 Core document updating "Sustainability Science" article**

A paper updating the 2001 "Sustainability Science" article published in *Science* is being prepared by Jill Jäger, William Clark, and Robert Kates. The paper will address: societal goals for sustainable development and scientific contributions to date; knowledge systems for sustainable development; what needs to change; and a vision for 2010. A draft will be available in January 2004.

#### **1.5 Review paper on the sciences of sustainable development**

William Clark is writing a review paper for the *Annual Review of Environment and Resources* that focuses on "The Sciences of Sustainable Development." The paper will review a selection of the best work from around the world. A draft of this paper will be available in January 2004 with expected publication in January 2005.

#### **1.6 Book on science and technology for sustainable development**

A book manuscript on "Science and Technology for Sustainable Development: Nature, Foundations, and Experiences in Harnessing Science and Technology for Sustainable Development" is being edited by Gilberto Gallopín. The book will be a primer to guide the application of S&T for sustainable development from concept to operation. It is designed to be used in training courses and capacity-building efforts. It will provide a selection of case studies and "success stories" that demonstrate the promise of harnessing knowledge to solve practical and crucial problems of sustainable development. A partial draft will be completed by March 2004 and supplemental funds are being sought to complete the book.

#### **1.7 Values, attitudes and behaviors**

Relatively little is known about the long-term global trends in values, attitudes and behaviors that will both help and hinder a sustainability transition. A team composed of Robert Kates, Anthony Leiserowitz, Thomas Parris, and Paul Slovic are undertaking a review of what is known for three sets of values, attitudes, and behaviors that might impact a sustainability transition: trends in contextual values (e.g., modernization, globalization, democracy, etc.); values, attitudes and behavior specifically related to the environment and development and their nexus in sustainable development; and the subset of values, attitudes and behaviors related to material and energy production, distribution, and consumption, which are critical to a sustainability transition. The research work is jointly funded by ISTS and Decision Research. A draft paper supported by the grant will be available by January 2004.

### **1.8 Production-distribution-consumption systems**

A web-based electronic conference on consumption-production was organized by Louis Lebel (Thailand) from 15 September – 31 October 2003. The purpose was to discuss the concept of sustainable consumption to stimulate dialogue that will lead to better framing of research and suggest new important areas of inquiry. It began by looking at the "consumption" end of production-distribution-consumption systems because they have been relatively less well-studied in the sustainability context. Production-distribution-consumption systems vary from relatively simple chains of extraction and exchange of a basic commodity that is hardly processed and consumed locally to complex items arising from very large networks of inputs and multiple transformations into a product that is distributed to distant parts of the globe. 125 participants registered for the meeting that was organized into four week-long themes, each with their own moderator, and a final two weeks open to synthetic and forward-looking comments. The themes included:

- Sustainable Consumption (key concepts, terms and issues);
- Final Consumption (drivers of changes in consumption behavior of individuals, households, governments and corporations);
- Chains and Webs (effect of systems' structure and organization on sustainability, interaction of consumption with other parts of a commodity chain or web); and
- Leverage Points (making consumption-production systems more sustainable, trade-offs).

The e-conference will be followed up by a face-to-face workshop to be held in Chiang Mai, Thailand in early 2004 producing a set of papers targeted for publication as a special issue of an international journal.

### **1.9 Scale and cross-scale dynamics for research and management**

An effort to synthesize current practice and theory about scale and cross-scale dynamics in assessing and addressing sustainable development and environmental change has focused on three activities organized by David Cash at Harvard's Kennedy School of Government. A Workshop on Scale and Cross-Scale Dynamics for Research and Management was held as a side meeting at the Human Dimensions of Global Environmental Change Research Community Open Meeting from 19-20 October 2003 in Montreal, Canada. Participants presented six papers and drafted an outline for an overview paper that critically examines the state of the art of research on the implications of scale and cross-scale dynamics on environment-development issues focusing on management, institutions and the role of information/knowledge. Participants included Neil Adger (UK), Fikret Berkes (Canada), David Cash (USA), Po Garden (Thailand), Louis Lebel (Thailand), Per Olsson (Sweden), Lowell Pritchard (USA), and Oran Young (USA). *Conservation Ecology* has agreed to publish a special issue on scale and cross-scale dynamics that advances both theory and practice and takes stock of the last 10+ years of scale research that David Cash will edit. The papers will be presented at a panel on "Governance and Information in a Multi-Level World: Linking S&T and Decision Making for Ecosystem Assessment and Management" during the Millennium Ecosystem Assessment (MA) conference, "Bridging Scales and Epistemologies" to be held in Alexandria, Egypt in March 2004.

### **1.10 Sustainable development in Ijebu-Ode, Nigeria**

A paper on “Sustainable development in Ijebu-Ode, Nigeria: The role of social capital, participation, and science and technology” has been prepared by Akin Mabogunje and Robert Kates that will be published as a Harvard Center for International Development discussion paper. Ijebu-Ode is a small city of 200,000 inhabitants in south-west Nigeria, which, through a participatory city consultation process chose to reduce poverty through a set of local and sustainable livelihood activities. Now four years into the effort, they describe the setting, the participatory process, the poverty reduction activities, and the impressive results to date. They attribute the success to date to the large stock of social capital, the participatory process that drew upon this stock, and the scientific and technological community that both serve as boundary spanners to link Ijebu-Ode to the national and the global and as a resource for local technologies and advice.

### **1.11 Globalization and a transition toward sustainability**

In the “The Nexus and the Neem Tree: Globalization and a Transition toward Sustainability,” Robert Kates explores the transition to sustainability, the context in which it will take place, and the ways in which the new-old phenomenon of globalization affects it. Kates explores the conflicts between economy and environment and between the present and the future. In looking at the successes and failures of past and contemporary globalization, Kates concludes that while globalization has allowed the world community to attack certain problems effectively, to date its harms have overwhelmed its benefits. He argues too that those of us who aspire to a transition to sustainability cannot be against globalization and that our best hope now comes from the “bottom up,” through popular movements and groups working to “humanize” globalization.

### **1.12 Consultations and outreach to the scientific community**

Members of the Initiative have worked to shape the international agenda on the issue of science and technology for sustainable development via consultations with many organizations. Some of these are reported below:

#### *U.S. National Academy of Sciences*

The U.S. National Academy of Sciences has initiated a high-level Roundtable on Science and Technology for Sustainability. The NAS Roundtable serves as a high-level forum that brings together leaders from the business, government, NGO and academic communities to identify priority areas for research and action on sustainability. Though this Roundtable is not formally a function of the ISTS, it was created in response to a recommendation from a working group chaired by ISTS co-convenor Robert Kates, is co-chaired by ISTS Steering Group member Pamela Matson, and counts among its members two other ISTS Steering Group members (Calestous Juma and William Clark). (See <http://nrc58.nas.edu/pgasurvey/Sustainability/roundtable.html>).

Akin Mabogunje and Calestous Juma were members of the U.S. National Research Council’s Committee on Geographic Foundations of Agenda 21 that helped to guide the formulation of the position of the United States at WSSD on the role of geographical information sciences in the implementation of Agenda 21 in Africa. The results of this effort are reflected in the WSSD Plan of Implementation. The report on

Geographical Information for Sustainable Development in Africa is available at <http://www.nap.edu/books/0309084784/html/>.

Calestous Juma serves on a U.S. National Research Council's Committee that has prepared a "Survey and Analysis of Scientific Advice on Sustainable Development to International Organizations" (see <http://www4.nationalacademies.org/webcr.nsf/5c50571a75df494485256a95007a091e/6a2cd15812aae9e485256b120072937c?OpenDocument>).

### *Third World Academy of Sciences*

The Third World Academy of Sciences' General Conference was held 16-19 October 2004 in Beijing, China and attended by approximately 300 scientists from over 70 countries. The "Beijing Declaration" states that TWAS "should continue to expand its interaction with the social science and economic development communities as part of its larger effort to increase the impact of science on society." TWAS intends to do this by strengthening its partnership with ISTS and Leadership for Environment and Development (LEAD) to develop a broad-based training program to help diplomats and trade negotiators achieve a better understanding of science and its potential role in decision-making and to help scientists achieve a better understanding of the development challenge. As such it will initiate roundtable discussions between the developing world's leading scientists and ministries of science and finance, nonprofit organizations, and the private sector to explore ways for better integrating science into broad sectors of society that lie beyond the scientific community. It will also seek to prepare a series of reports for policymaking communities in the developing world that examine critical problems facing the South.

William Clark spoke on "Investment in S&T Capacity" at the TWNSO Ministerial Session on Government Investment in Science and Technology Capacity Building that was part of the Third World Academy of Sciences General Conference held in Beijing, China in October 2003, see <http://www.ictp.trieste.it/%7Etwas/Beijing.html>.

TWAS and the Third World Network of Scientific Organizations (TWNSO) have collaborated with a variety of partners, including the United Nations Development Programme (UNDP) Special Unit for Technical Cooperation (UNDP / TCDC), the Global Environment Facility (GEF), and the World Meteorological Organization (WMO) to produce a series of monographs under the collective title of *Sharing Innovative Experiences*. These monographs showcase best practices in the application of science and technology for sustainable development, focusing on the efforts of local and regional organizations, see <http://tcdc.undp.org/tcdcweb/experiences>. Among these monographs are:

- Examples of Successful Uses of Renewable Energy Sources in the South;
- Conservation and Wise Use of Indigenous and Medicinal Plants;
- Examples of Successful Initiatives in Science and Technology in the South; and
- Promoting Best Practices in the Conservation, Management and Sustainable Use of Water Resources in the South.

### *Sustainability Days Annual Conferences*

Steering Group members have initiated and been participants in a series of “Sustainability Days” annual conferences on sustainability science. The “Sustainability Days” conferences both celebrate institutions that have developed major commitments to the field, and serve as a forum for reporting on completed research. Steering Committee member John Schellnhuber organized the “First Sustainability Days” conference at the Potsdam Institute for Climate Impact Research in Germany in October 2001. Steering Committee members Jane Lubchenco and John Schellnhuber were keynote speakers at the “Second Sustainability Days: State of the Planet” Conference held at Columbia University’s Earth Institute in May 2002. William Clark was a keynote speaker at the “Third Sustainability Days” conference organized by the Tyndall Centre at the University of East Anglia, UK in September 2003. Steering Group member Pamela Matson will host the 4<sup>th</sup> Sustainability Days at Stanford’s new university-wide environment program in the fall of 2004.

### *Other conferences:*

American Association for the Advancement of Science: William Clark organized a Symposium on “Science and Technology for a Transition toward Sustainability” at the American Association for the Advancement of Science Annual Meeting held in February 2002. Speakers included: Robert Kates on “Globalization: Emerging Interactions Among Global Environmental Changes and Social Transformations,” B.L. Turner II on “Vulnerability in Human-Environment Relationships,” Gilberto Gallopín on “Epistemological Issues in Sustainability Science,” Robert Corell gave a “progress report on a series of regional workshops around the world designed to broaden and deepen an agenda for science and technology for sustainability,” and Jill Jäger on “Implementing a Sustainability Science Research System.” Their talks are available at <http://sustainabilityscience.org/events/aaas02.htm>.

ISTS is a collaborating partner of an international symposium addressing “Energy and Sustainability Science” that is being hosted by the Science Council of Japan 16-19 December 2003 and organized by the International Council for Science and the United Nations University Institute for Advanced Study. William Clark will be giving a keynote address, and Jill Jäger will also be participating.

### *Individual activities by Steering Group members:*

William Clark gave a presentation on, "Science and Technology for Sustainable Development: Strategic perspectives from an international dialogue" at a panel discussion on “Sustainable Development, Science, and Technology” held as part of the United Nations General Assembly “2nd Committee” meeting on 5 November 2003 at the United Nations Secretariat in New York.

Robert Corell briefed the Norwegian Research Council, the U.S. Congress (a briefing to address “Science for Sustainable Development: Policy and Practice” that was co-sponsored by the American Chemical Society and the National Council for Science and the Environment for about 120 staff members), the Arctic Council, and other domestic and international fora. During travels to the regional workshops, he held roundtable discussions with government officials in Sweden, Norway, Finland, Denmark, UK, and Japan.

Mohamed Hassan at TWAS had formal and informal contacts to discuss the sustainability science initiative with representatives of a long list of governments, intergovernmental organizations, nongovernmental organizations, academic institutions, scientific research organizations, the business community, Heads of UN agencies, and environmental conventions.<sup>2</sup>

Jill Jäger was the Coordinator of ISTS from December 2002-August 2003. She represented ISTS at the following events: Institute for Sustainable Development and International Relations Advisory Board meeting in January 2003; “Social Learning and Sustainability” meeting held at the University of Oldenburg, Germany in February 2003; Institute for Global Environmental Strategies in Shonan Village, Japan in February 2003; Science Council of Japan in February 2003; Sustainable Europe Research Institute in Vienna, Austria in March 2003; Workshop on Globalization and Sustainable Development held at the Wuppertal Institute, Germany in April 2003; and Steering Committee of “Global Change: Forward Look” meeting held at the European Science Foundation, The Hague, Netherlands in May 2003.

Robert Kates made presentations on sustainability science in public lectures at Salem State College, Acadia Senior College, Brown University, Clark University, and the University of Washington as well as presentations to the Abuja and Ottawa workshops and the National Academy of Sciences roundtable.

Jose Sarukhán has taken the lead in convincing the Mexican Academy of Sciences to establish a permanent committee to explore and draft a plan of action for S&T for Sustainable Development for Mexico.

## **2. Strengthening the infrastructure and capacity for conducting and applying science and technology for sustainability**

In pursuit of its second goal, the Initiative – in partnership with TWAS and the International Council for Science (ICSU) – undertook a critical evaluation of the capacity of existing international, regional, and national research and development systems (including private sector businesses and foundations) to support the more effective harnessing of science and technology for sustainability. ISTS conducted two workshops and is planning a third that address how the institutions that govern science and technology would need to be reformed as part of a larger process for realizing the potential of S&T to promote sustainable development around the world.

The first two workshops brought together a cross section of entrepreneurs who had been especially successful in building such linkages with a goal of sharing lessons and identifying common needs. A total of 68 participants from 34 countries attended the Trieste and Cambridge workshops.

- Trieste Workshop organized locally by the Third World Academy of Sciences under the auspices of the ISTS on *Science, Technology and Sustainability: Harnessing Institutional Synergies* (Trieste, Italy, 6-9 February 2002), co-chaired by Mohamed Hassan, Calestous Juma, and William Clark.

- Cambridge Workshop organized locally by Harvard University's Weatherhead Center for International Affairs under the auspices of the ISTS, ICSU, and TWAS on *Mobilizing Science and Technology for Sustainable Development* (Cambridge, Massachusetts, USA, 10-12 April 2002), co-chaired by William Clark, Mohamed Hassan, Gisbert Glaser, and Calestous Juma.

This continuing dialogue has enabled a good characterization of what is needed, and constitutes an audience of policy makers and practitioners for any insights that may emerge from serious analysis of the institutional design question. But it has not yet managed to engage much of the relevant social science community in its work. In the fall of 2003 William Clark is convening a research seminar on "Knowledge for Development" that is surveying the state of social science scholarship on research systems in a wide range of individual sectors including agriculture, energy, health, environment, manufacturing, and defense. In the spring of 2004 Clark will organize, with supplemental support from Harvard's Weatherhead Center for International Affairs, a conference with the goal of advancing understanding regarding the effectiveness of alternative institutions for harnessing science and technology to support environmentally sustainable human development around the world. The conference will consider three questions:

- As the international community seeks to achieve the goal of securing "the freedom of future generations to sustain their lives on this planet," what are the most important needs for knowledge and know-how that are not being met by existing research systems?
- What factors are responsible for these shortfalls? Of those factors, which are specific to particular problems and regions, and which are common across many?
- What are the most important roles for international (as opposed to local, national, or private) institutions in mitigating the shortcomings of the present system?

A modest number of background papers plus a synthesis report will be prepared with the intention of eventual publication in the peer-reviewed literature.

## **2.2 Fostering the careers of young scientists working on sustainability**

A major objective of ISTS is fostering the next generation of scientists working on sustainability.

The Young Scientists Summer Program (YSSP) at the International Institute for Applied Systems Analysis (IIASA) offers young scholars the opportunity to spend three months (June - August) at the Institute, working within the projects there to enhance their postgraduate skills. With the financial support of ISTS and in collaboration with the Third World Academy of Sciences, four young scholars from developing countries were selected from about 100 applicants to participate in the YSSP in June-August 2003. Unfortunately, one of the scholars (from Ghana) was unable to get a visa, so the core group was reduced to 3. The 3 scholars and their projects that were funded by ISTS were:

- Riziki Shemdoe, Sokoine University of Agriculture, Tanzania  
"Ecosystem Management Practices and Plague Problems in West Usambaras, Tanzania"

- Juan Bernardo Cruz, University de Los Andes, Colombia  
"Analysing New and Flexible Technologies for Electricity Generation in Colombia using Markal"
- Sharda Mahabir, The University of the West Indies, Trinidad and Tobago  
"Heavy Metals in Rivers of Trinidad and Tobago"

The students were supervised throughout the summer by Jill Jäger. Jäger organized and ran a seminar series in June-August 2003 on "Harnessing Science and Technology for Sustainable Development." Lecturers in the series included members of the ISTS Steering Group, IIASA staff, and invited speakers. Many of the 57 YSSP scholars picked up the issues of sustainable development in their work over the summer. The young scholars expanded their case studies to consider stakeholders and their linkages, the nature of the science/policy interface, and the challenges of interdisciplinary research on sustainable development issues.

The YSSP scholars were guided in their research by the ISTS case study research protocol developed by Harvard researchers David Cash and Vanessa Timmer. The case study protocol incorporated a series of testable hypotheses based on sustainability science research and based on discussions with Art Hanson of the International Institute for Sustainable Development and Tariq Banuri, Adil Najam and Nancy Odeh of the Boston office of the Stockholm Environment Institute.

On 16-17 July, the YSSP scholars presented their preliminary findings at the Midsummer Workshop held at IIASA. On 21-22 July the students visited TWAS in Trieste, Italy and presented their case studies. Each student produced a paper describing their case study and the work that they had completed during the summer. These will be published in the IIASA Interim Report Series by the end of November 2003. A preface to each of the reports, written by Jill Jäger, summarizes the results of the discussions over the course of the program and the importance of giving young scholars from developing countries the opportunity to expand their case studies by considering how their scientific studies can contribute to solutions of sustainable development problems.

ISTS also co-sponsored four summer internships for Harvard students in summer 2003:

- Sissu Lui  
"Tracing Strategic Typology of Natural Resource Management Impact Pathways: A Case Study of the Alternatives to Slash-and-Burn Program"  
Joint ISTS – Harvard Center for International Development internship with the Alternatives to Slash-and-Burn (ASB) Programme, World Agroforestry Centre, Consultative Group on International Agricultural Research in Kenya under the supervision of Tom Tomich.
- Inder Singh  
"Understanding the Knowledge System and Institutional Landscape Surrounding HIV/AIDS and Malaria in Uganda"  
Joint ISTS – Third World Academy of Sciences – Harvard Center for International Development internship with the Medical Biotech Laboratory in Uganda under the supervision of Thomas Egwang and Mohamed Hassan.

- Elta Smith  
“Upland Development Discourses: Sustainability in Northern Thailand”  
Joint ISTS – Knowledge Systems for Sustainable Development internship with the Unit for Social and Environmental Research at Chiang Mai University, Thailand under the supervision of Louis Lebel.
- Nicole Szlezak  
“International Health Research Systems”  
Joint ISTS – Harvard Center for International Development internship at Harvard University under the supervision of Bill Clark.

ISTS has supported Vanessa Timmer, a pre-doctoral fellow at Harvard’s Center for International Development and doctoral candidate at the University of British Columbia, Canada, from 2002-2003. Timmer is working to analyze the finalists for the Equator Initiative 2002 Awards under the supervision of Calestous Juma. The Equator Initiative finalists are 27 communities along the equator belt that have effectively combined the goals of poverty reduction with biological diversity conservation at the local level through innovative partnerships. These community initiatives represent successful local expressions of implementing sustainable development goals and translating them into action. A draft chapter for a book on social learning will be completed by December 2003.

To further support the development of young scientists, ISTS Steering Group member John Schellnhuber agreed to include presentations by young scientists in a session on “Governance and Sustainable Development” held as part of Sustainability Days in September 2003 at the University of East Anglia, UK. ISTS supported the participation of Sylvia Karlsson who presented a paper on “From Multi-level to Multilayered Governance of the Environment.”

### **3. Connecting science and policy more effectively in pursuit of a transition toward sustainability**

In pursuit of its third goal, the Initiative collaborated with a variety of other organizations in efforts to bring together knowledge and action in pursuit of sustainability.

#### **3.1 Moving toward solutions**

One of the strongest messages emerging from the ISTS workshops is that if science and technology is to make a greater contribution to sustainability, the research community will need to complement its historical role in *identifying problems* of sustainability with a greater willingness to join the development and conservation communities in *designing solutions* to those problems. This means bringing science and technology to bear on the highest priority goals of a sustainability transition, with those goals defined not by scientists alone but rather through a dialogue between scientists and the people engaged in the practice of “meeting human needs while conserving the earth’s life support systems and reducing hunger and poverty.” Such goals clearly relate to the core WEHAB areas (water, energy, health, agriculture, biodiversity) identified at the World Summit on

Sustainable Development, plus the longstanding challenges of providing adequate housing and transportation. It has become clear, however, that agenda setting at the global, continental, and even national scale will miss a lot of the most important needs. The transcendent challenge is to help promote the relatively “local” (place- or enterprise-based) dialogues from which meaningful priorities can emerge, and to put in place the local support systems that will allow solution-driven work on those priorities to be implemented.

To promote a closer engagement of private sector and development stakeholders in sustainability science, the ISTS has begun to foster “Roundtables” on science and technology for sustainable development. The most advanced of these is:

### **3.2 United States Roundtable on Science and Technology for Sustainability**

The U.S. National Academy of Sciences has initiated a high-level Roundtable on Science and Technology for Sustainability. The NAS Roundtable serves as a high-level forum that brings together leaders from the business, government, NGO and academic communities to identify priority areas for research and action on sustainability. Though this Roundtable is not formally a function of the ISTS, it was created in response to a recommendation from a working group chaired by ISTS co-convenor Robert Kates, is co-chaired by ISTS Steering Group member Pamela Matson, and counts among its members two other ISTS Steering Group members (Calestous Juma and William Clark). Some people are beginning to suspect a connection. (See <http://nrc58.nas.edu/pgasurvey/Sustainability/roundtable.html>).

In addition to the U.S. effort, an initial “Roundtable” planning meeting has been held for the Arab States; another will be held shortly in Africa:

### **3.3 Arab States Roundtable Planning Meeting**

A Planning Meeting for an Arab States Roundtable composed of experts from the region was held 12-13 June 2003 in Trieste, Italy, organized locally by the Third World Academy of Sciences and co-chaired by Mohamed Hassan (Sudan) and A. A. Al-Shamlan (Kuwait). Supplemental financial support was provided by the Kuwait Foundation for the Advancement of Sciences, in cooperation with the Middle East Initiative at Harvard’s Kennedy School of Government. The meeting agreed upon a set of objectives for the full meeting, the thematic priorities, the proposed format, the funding alternatives, and the possible list of participants, with the overall goal of assuring the success, broad participation, and legitimacy of the Roundtable. Formal letters inviting a host for the Roundtable have been sent to: Alexandria Library (Cairo), the Arabian Gulf University (Bahrein), the Zayed International Prize for the Environment (Dubai), and the National Council for Scientific Research of Lebanon (Beirut). Funding for the actual Roundtable will be sought elsewhere.

### **3.4 Pan-African Roundtable Planning Meeting**

A meeting organized by the Third World Academy of Sciences and chaired by Mohamed Hassan was held 20 October 2003 in Beijing, China at the TWAS General Conference with 40 African scientists and policy-makers. There was considerable interest in holding

a Roundtable on Science and Technology for Sustainability with broad participation from African scientists. Hassan is organizing a planning meeting for a Pan-African Roundtable that will be held in March 2004 and hosted by the African Academy of Sciences in Kenya.

### **3.5 Public-private partnerships**

Parallel to the national “Roundtable” efforts described above, ISTS has begun a pilot project to engage practitioners at the regional (i.e., subnational) level in sustainability science. In particular, it has developed a partnership with Novatlantis to draw on its experience with public-private partnerships to critique and enrich ISTS models of the role of boundary organizations in linking science and technology to sustainable development. Novatlantis is a joint activity of the Swiss ETH-Board and its four research institutes. It is the task of Novatlantis to facilitate collaborations between basic and applied research related to sustainability in the ETH-domain and practitioners from business and local administration. Novatlantis has formed an alliance with the authorities of the metropolitan region of Basel, Switzerland centered around the idea of the “2000-watt-society,” using the current global average of energy use as a rough yardstick for fairness in resource use between developing and developed countries. In the context of Novatlantis “2000 Watt pilot region Basel,” projects are conducted and planned ranging from mobility to renewable energy supply and construction.

Novatlantis is preparing a paper on lessons learned from the collaboration between universities and practitioners in the Novatlantis-pilot region of Basel. This will include lessons about the design and function of boundary organizations linking research and practice through public-private partnerships, and a critique and revision of the ISTS model. The paper will be co-authored by Roland Stulz, Executive Director of Novatlantis, together with his colleagues Bernd Kasemir and Stephan Lienin. The paper will emphasize the process of stakeholder participation and the development of public-private partnerships. A draft of this paper is expected by January 2004.

### **3.3 Activities related to the World Summit on Sustainable Development**

Members of the Initiative participated actively in the preparation of the ICSU-World Federation of Engineering Organizations (WFEO)-led effort to provide perspectives on science and technology for sustainability in the preparatory process for WSSD, in proposals for Summit-based partnerships, and at the Forum on Science, Technology and Innovation for Sustainable Development. Leadership was provided by Mohamed Hassan, a member of the Initiative Steering Group as well as Executive Director of TWAS, and by Calestous Juma of Harvard through his advisory work to the UN.

#### Preparatory Committee Meetings for WSSD

During the second Preparatory Committee meeting in the lead-up to the United Nation’s WSSD, Calestous Juma presented a side event seminar on “Science and Technology for Sustainable Development: Proposals for WSSD.” This event was highlighted in the *Earth Negotiations Bulletin* that is distributed widely amongst the UN WSSD Secretariat, government delegates, and stakeholder participants, and is said to

have had a substantial impact on framing the substantive agenda deliberations for the WSSD.<sup>3</sup>

Mohamed Hassan, the Executive Director of TWAS, and Calestous Juma from Harvard incorporated the results of the Mexico City Workshop in their statements and dialogue papers that were discussed at the meeting of the Fourth Preparatory Committee for the WSSD held in Bali in June 2002 and at the WSSD in August. Presentations were made both at the Plenary and at the High Level Roundtables with the Heads of State. Opinions and answers from the S&T community were conveyed in the six thematic Plenary Sessions of the Johannesburg Summit, in particular about the WEHAB areas (water, energy, health, agriculture, and biodiversity) highlighted by Secretary-General Kofi Annan.

#### Partnership Initiatives (Type II Agreements)

ISTS participated in the discussion and drafting of numerous partnership initiatives (Type II Agreements), including:

- “Science and Technology for Sustainable Development,” a proposal that was reviewed by participants in the Mexico City Synthesis Workshop and revised by ICSU and its partners (see [http://sustainabilityscience.org/ists/synthesis02/output/st4sd\\_type-II\\_icsu.pdf](http://sustainabilityscience.org/ists/synthesis02/output/st4sd_type-II_icsu.pdf));
- “Mobilizing the New Social Contract on S&T for Sustainable Development: the United Nations University/Institute for Advanced Study Higher Education Fellowship Initiative on Science for Sustainability” between TWAS and UN University; and
- “Connecting Communities: linking science and technology research to the needs of sustainable development” between TWAS and LEAD.

#### WSSD Forum on Science, Technology and Innovation for Sustainable Development

In cooperation with ICSU, WFEO, and the South African Ministry of Science and Technology, Mohamed Hassan of TWAS helped to organize the Forum on Science, Technology and Innovation for Sustainable Development (Science Forum) that took place at Ubuntu Village, South Africa as part of WSSD. TWAS organized panels on “Capacity Building in Science and Technology” and a “High Level Discussion on the Role of S&T for Sustainable Development in Africa.”<sup>4</sup> Jill Jäger presented the Mexico City Synthesis report on the opening day of the Forum. Robert Corell, Mohamed Hassan, Jill Jäger, Calestous Juma, and ISTS fellows Diego Malpede (TWAS) and Vanessa Timmer (Harvard) represented the Initiative at the Forum.

#### WSSD follow-up activities

Calestous Juma is currently assisting the United Nations systems in exploring how to effectively integrate science and technology in the implementation of the outcomes of WSSD. Juma serves as Chair of the United Nations Millennium Development Goals Task Force 10 on Science, Technology and Innovation. Its objective is to develop operational strategies on how science, technology and innovation can help achieve the Millennium Development Goals. He is also working with other UN agencies such as the United Nations Industrial Development Organization (UNIDO) in Vienna, the United Nations Conference on Trade and Development (UNCTAD) in Geneva, and the United Nations University (UNU) in Tokyo.

William Clark participated in a panel discussion on “Sustainable Development, Science, and Technology” held as part of the United Nations General Assembly “2<sup>nd</sup> Committee” meeting on 5 November 2003 at the United Nations Secretariat in New York.

### **3.4 Activities related to the World Summit on the Information Society**

The World Summit on the Information Society (WSIS) will be convened by the United Nations with the International Telecommunication Union taking the lead role in its preparation. WSIS will be held in two phases: in Geneva from 10-12 December 2003 and in Tunis in 2005. The Summit will address the broad range of questions concerning the Information Society and move towards a common vision and understanding of this societal transformation. The Summit is expected to adopt a Declaration of Principles and an Action Plan to facilitate the effective growth of the Information Society and to help bridge the Digital Divide. It aims to bring together representatives from the highest levels of government, the private sector, civil society and NGOs. It will offer a unique opportunity for the world community to discuss and give shape to the Information Society. More information can be obtained from <http://www.itu.int/wsis/>.

The Third World Academy of Sciences has worked closely with CERN – the European Organization for Nuclear Research – and other scientific organizations on the Draft Declaration of Principles and Draft Plan of Action for WSIS. TWAS has worked with CERN and other international scientific organizations in the planning of a side event on "The Role of Science in the Information Society" that will take place immediately before WSIS. The purpose of this event is to explore the potential contributions that the scientific community can make to today's information society - not just in terms of technical inputs but also in terms of economic development, education, environmental stewardship and healthcare, all of which are critical for sustainability. The WSIS side event is modelled after the week-long Science Forum held during the World Summit for Sustainable Development. TWAS plans to play an even larger role in the second phase of the WSIS scheduled to take place in Tunisia in 2005, where TWAS, working closely with other international scientific organizations, hopes to bring together policy makers and scientists to discuss ways of making information technologies an even more powerful force for sustainable development in developing countries.

### **3.5 Forum on Science and Technology for Sustainability**

The Initiative has devoted substantial attention to integrating its own multiple strands of work, and to facilitating the emergence of a mutually supportive network linking the many individuals and organizations involved in efforts to better harness science and technology to sustainability goals. In support of this goal, the Initiative operates the web-based *Forum on Science and Technology for Sustainability* (<http://sustainabilityscience.org/>). The Forum seeks to provide a common point of access to evolving discussions over the core questions and challenges facing the field, documents that chart the field's aims and progress, events of special interest to the community, and programs and institutions that are playing a special role in the evolution of the field. The *Network for Science and Technology for Sustainability* is an effort to help build a virtual community linking disparate scholars, managers, and decision

makers, and to promote the sharing of knowledge, ideas, and goals among a community working on science and technology for sustainability. Individuals interested in these issues may join the Network as a means of telling others about their work and interests.<sup>5</sup> The table below provides a synopsis of the sections currently found on the Forum.

***What's on the Forum on Science and Technology for Sustainability***

**Introduction:** Information and background on the Forum, the Initiative on Science and Technology for Sustainability (ISTS), and the Network for Science and Technology for Sustainability

**Core Questions:** Fundamental research questions about the dynamic interactions between nature and society (includes relevant essays, resources,\* and commentary)

**Integrated Studies\*:** Selection of multidisciplinary integrated studies of the dynamic interactions characterizing particular nature-society systems

**Education and Training\*:** Selection of courses and educational programs that go beyond the study of environment or development separately and deal with the interaction of environment and development and the contributions of S&T to sustainable development

**Documents:** A collection of papers with special significance for sustainability science; a half dozen that provide an essential overview of the current state of discussion as well as a longer list of additional documents that constitute particularly relevant contributions to deepening and broadening the debate

**Events:** Conferences, workshops, and meetings relevant to sustainability science

**Programs:** Institutions and programs doing research, study, and related activities that contribute significantly to the field of sustainability science

**Commentary:** Submitted comments on any aspect of S&T for sustainable development, including but not restricted to the documents, essays, and core questions found on the Forum

**Newsletter:** Monthly updates highlighting what's new on the Forum, available online or via email

**Network:** People and projects engaged in science and technology for sustainability

*\* New additions to the Forum since October 2002*

Over the last year the Forum has expanded to include in-depth resource pages for the initial set of core questions identified at the Friibergh Workshop on Sustainability Science (Sweden, October 2000) and new sections on Integrated Studies of Nature-Society Systems and Education and Training. In order to provide a more useful resource for those teaching and training the next generation of people engaged in this field, we would like to develop the Education section further by providing access to teaching materials and keynote lectures viewable as streaming video.

The Forum has a rapidly growing audience, with an average of 256 visits on any given weekday in October 2003 (up from 40 in December 2001 and 143 in December 2002). The Forum's email update bulletin has some 1,085 subscribers from 67 countries. And it supports a Network of more than 175 individuals representing 37 different countries who use the facilities of the Forum to exchange information on their respective efforts to harness science and technology to sustainability. Descriptions of 82 of their projects are available on the Forum. 57% of Network members are outside the United States, from

both developed and developing countries. More than 100 web sites in at least 17 countries link to the Forum.

The Forum is unique, because it is the only web site providing in-depth, selective content to a community working on science and technology for sustainability. While other web sites (e.g., SciDev.net) seek to provide access to ongoing research, and still others (e.g., the SD Gateway) focus on sustainable development in general, the Forum is the only one focusing strictly on science and technology for sustainable development, and engaging both the research and policy communities in this area.

#### **4. Reflections on the Initiative's niche and future**

The international ISTS is a direct outgrowth of the renewed interest around the world in implementing knowledge-based strategies for meeting human needs while preserving the life support systems of the planet. The Initiative had its origins in a range of activities including the program of the Scientific Committee on Problems of the Environment (SCOPE), several initiatives of the Third World Network of Scientific Organizations (TWNISO), the U.S. National Academy of Science report *Our Common Journey: A Transition Toward Sustainability*, the World's Scientific Academies' Conference on a *Transition to Sustainability in the 21<sup>st</sup> Century* (May 2000), the Friibergh Workshop on *Sustainability Science* (October 2000), and the Global Change Communities' Open Science Conference on *Challenges of a Changing Earth* (July 2001). Today the Initiative joins the active involvement of many organizations and groups including the Earth System Science Partnership projects on carbon, food and water; the Inter-Academy Council efforts on scientific capacity for development and food security in Africa; the Science and Technology for Sustainability program of the U.S. National Academies, the Leadership for Environment and Development (LEAD)-TWAS effort to develop scientists and technologists for environment and development; and the new program on Science for Sustainable Development adopted at the ICSU's General Assembly.

In the midst of such growing interest and involvement, what ought to be the role for the Initiative over the next several years? The Initiative was conceived as a means of complementing efforts, such as those listed above, through its roles as convener, facilitator, and advocate for sustainability science and technology. The aim was and remains:

- to serve as a boundary organization that facilitates the dialogue about science and technology needs for achieving the goals of sustainable development by bringing individuals working in science and technology, development, and environmental protection to the same table on an equal basis;
- to enable the rapid establishment of global-regional linkages;
- to encourage disparate scientific disciplines to come together in order to contribute solutions to the challenges of sustainable development; and
- to nurture the next generation of young sustainability scientists and technologists.

The Initiative was always intended to be just that, an *initiative*, with much flexibility but with limited life and function, supportive of – but not conducting – actual R&D. The two year duration of our initial proposal to the Packard Foundation was specified with this

limited mandate in mind. Over the second year of the project, we have engaged in a number of activities to explore what sort of a second incarnation, if any, the ISTS should consider. A crucial point in this process was our decision, prompted by the Packard Foundation, to collaborate closely with TWAS and ICSU in jointly hosting the Mexico City Synthesis Workshop on Science and Technology for Sustainability (described earlier in this report).

#### **4.1 Mid-term review by ISTS Steering Group**

The Initiative made an early commitment to reassessing its role in the wake of the WSSD. To this end, initial discussions were held among members of the Steering Group and with leaders of TWAS, ICSU, and the Global Change Programmes during the Mexico City Synthesis Workshop in May 2002. As a result of these discussions, Robert Kates in his capacity as Initiative co-convenor took the lead in drafting an option paper on possible futures for the Initiative. This paper was discussed at a meeting of the ISTS Steering Group held at Harvard on 5-6 November 2002. That meeting had two goals: 1) to determine what, if any, need exists for a follow up to ISTS after our existing Packard Foundation grant ends in October 2003; and 2) to discuss priority activities to be supported over the next year using the remaining funds of the existing grant and changes in the organization of the Secretariat function needed to support those activities.

The Initiative's Steering Group unanimously agreed that the Initiative needs a five-year life to complete its initial goals; to maintain its flexible services and opportunities for convening, facilitating, and sharing information; and to help create a decentralized, nodal infrastructure and partnerships for the long-term provision of science and technology for sustainability. Detailed terms of reference (goals, strategy, etc.) for this Phase-II effort are being worked out based on our discussions at the Steering Group meeting. Central to the Phase-II concept discussed by the SG is its desire to foster the evolution of the Initiative into a promoter and catalyst of an "action plan" for moving sustainability science into practice around the world. In this role, the Initiative would seek to catalyze and encourage, but not to undertake, needed research. It would seek to collaborate with, but to retain a voice independent of, the more formal organizations pursuing particular sustainability science efforts (e.g., ICSU, TWAS, InterAcademy Council, etc.)

The second goal of our November Steering Group meeting was to discuss priority activities to be supported over the next year using the remaining funds of the existing grant and changes in the organization of the Secretariat function needed to support those activities. The second year of the Initiative will continue to implement the activities outlined in the original proposal to the Packard Foundation, but put more emphasis on including the private sector and the technology, development, and policy communities in the various activities. In particular, we propose to focus future efforts on the development and technology side of the WEHAB (water, energy, health, agriculture, and biodiversity) framework of the UN Millennium Development Goals. Priority areas for work were discussed and William Clark was charged to discuss the appropriateness of rebudgeting the existing Packard award to make this happen with the Packard Foundation.

The Steering Group decided to move the Secretariat function outside of the United States to an international location. The Trieste complex anchored by the Third World Academy of Sciences was identified. Jill Jäger agreed to take on the role of “Coordinator;” the title is our effort to reflect the unconventional networking character of the Initiative. As Coordinator, she served as the head of the Secretariat of the Initiative for the period December 2002-August 2003. Diego Malpede, our fellow at TWAS, assumed the “Associate Coordinator” position. William Clark and Nancy Dickson at Harvard continue to put in substantial work in support of activities.

#### **4.2 The ISTS/TWAS/ICSU Consortium on S&T for Sustainable Development**

The sponsors of the Mexico City Synthesis Meeting (ISTS, ICSU, and TWAS) agreed to meet after the WSSD to review needs and opportunities for further collaboration in harnessing science and technology for sustainability. Results of the ISTS Steering Group review were carried forward to this larger meeting on overall strategies for advancing sustainability science that brought together leadership of the Initiative, ICSU, TWAS, and the Global Environmental Change programmes in Paris on 14-15 November 2002, under the chairmanship of Jane Lubchenco, President of ICSU. The participants agreed that further efforts to develop and implement the action agenda shaped at Mexico City were still needed in the wake of the Summit. They also agreed that great opportunities existed for pursuing that work through a Consortium on Science and Technology for Sustainable Development that would begin with the three organizations that had set up the Mexico City workshop (i.e., ISTS, TWAS and ICSU), and then expand to incorporate other groups from the sciences, engineering and development communities.

The Consortium members agreed to move forward on two parallel tracks. The first track would continue to pursue the short-term goals of the 3 founding organizations, with coordination provided through informal consultations and, when warranted, formal collaborations. As a second track, the partners agreed to set up an *ad hoc* Advisory Group to work over the following 24 months to help shape longer term goals and strategy for the Consortium and its members. Terms of Reference of the Advisory Group were agreed to in May 2003. The goal of the Advisory Group is to help the Consortium shape its long-term strategy, broaden its initial membership, and articulate priorities of a research and action agenda in support of sustainable development. Robert Corell (USA) and Hebe Vessuri (Venezuela) chair the Ad Hoc Advisory Group. The Advisory Group has begun its work, is reaching out to a wide potential constituency, and will report back to the Consortium with its recommendations in late 2004. The founding organizations will take those recommendations back to their memberships in early 2005, and by mid-2005 intend to have incorporated those recommendations into a longer-term strategic plan and funding strategy for the Consortium. Jill Jäger is the ex-officio representative of ISTS in the Advisory Group. She led a group from other Consortium partners to prepare a proposal to the U.S. National Science Foundation (Division of Social and Behavioral Sciences) for partial support of the activities of the Advisory Group. This was submitted via ICSU and approved by NSF in July 2003. Jill Jäger and Robert Corell have prepared a funding proposal to the European Union Commission, Directorate-General Research, for supplemental funding of the final workshop of the Advisory Group, to be held at TWAS in October 2004.

As the Advisory Group develops options for a long term strategy, members of the Consortium are committed to maintaining and building on the world-wide momentum on sustainability science that has built up over the last several years. Part of this ongoing agenda will be implemented through the individual activities of the Consortium's founding organizations and the increasing number of other groups now active in the field. See also <http://consortiumstsd.org>. Part will be through formal collaborations on specific tasks, such as contributions made by ISTS Steering Group members to the Third World Academy of Sciences Third Strategic Plan for 2004-2008.

## **5. Key documents produced by the Initiative and its members**

Most of these documents are available at <http://sustsci.harvard.edu/ists/pubs.htm>.

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## ENDNOTES

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<sup>1</sup> The Organizing Committee consisted of Jose Sarukhán, William Clark, Robert Corell, Gisbert Glaser, Mohamed Hassan, Calestous Juma, Robert Kates, Akin Mabogunje, and Thomas Rosswall. Further information on the Mexico City Workshop, including copies of the background papers prepared for it, and the material presented there, is available at <http://sustainabilityscience.org/ists/synthesis02.htm>.

<sup>2</sup> Sweden's Environmental Advisory Council; European Union DG XVI; African Centre for Technology Studies; International Environmental Resources (consulting firm); National Council for Science and the Environment; Foundation for Education Science and Technology, South Africa; Eskon Consulting South Africa; Division for Sustainable Development, DESA UN New York; Convention on Biological Diversity Secretariat; Framework Convention on Climate Change Secretariat; Convention to Combat Desertification; Department of Trade and Industry, United Kingdom; Earth Institute, Columbia University; UNEP Nairobi and Latin America; World Meteorological Organization; United Nations Industrial Development Organization; Division of Environment, Venezia, Italy; International Energy Agency, OECD; International Centre for Trade and Sustainable Development; International Foundation for Science; Monsanto, United States; Assobiotech, Italy; Foundation for International Environmental Law and Development; Sancroft, United Kingdom; Commonwealth Human Ecology Council; CISME, Nigeria; Energy Environment Consulting GMBH, Austria; Royal Institute of International Affairs, United Kingdom; Interdisciplinary Institute on Energy, Natural Resources and Sustainable Development, Mexico; World Resources Institute; World Trade Organization; United Nations Conference on Trade and Development; World Intellectual Property Organization; Fundacion Ambiente y Recursos Naturales, Argentina; Fundacion Ecologica Universal, Argentina; United Nations Institute for Training and Research; International Federation of Agricultural Producers; UNESCO; Indira Gandhi Institute of Development Research, India.

<sup>3</sup> This proposal to focus on a selected number of technology-related issues such as water and sanitation, energy, agriculture and information technology contributed to efforts in the UN to define the structure and organization of WSSD. A similar approach was later adopted by UN Secretary -General Kofi Annan of WEHAB (Water and sanitation, Energy, Health and the environment, Agriculture, and Biodiversity and ecosystem management) "to provide focus and impetus to action in the five key thematic areas" (The WEHAB Working Group, 2002). These areas were perceived to be "integral to a coherent international approach to the implementation of sustainable development" (The WEHAB Working Group, 2002). Kofi Annan placed emphasis on these five themes as he spoke during his awareness-raising campaign for the WSSD and he highlighted that it was in these areas that results must be found during the Summit. He stated that these were "areas in which progress is possible with the resources and technologies at our disposal today." In addition, Juma has assisted the Office of the UN Secretary -General to explore how best to raise the profile of global biodiversity conservation.

<sup>4</sup> See [http://sustainabilityscience.org/events/sti4sd\\_bg+agenda\\_icsu-twas-wfeo\\_020805.pdf](http://sustainabilityscience.org/events/sti4sd_bg+agenda_icsu-twas-wfeo_020805.pdf) and <http://www.ictp.trieste.it/~twas/WSSD.html>.

<sup>5</sup> The Network for Science and Technology for Sustainability is accessible at <http://sustainabilityscience.org/network.htm>