Science and Sustainability:

The role of the scientific community in work of the Commission on Sustainable Development

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This study was prepared for the United Nations Department of Economic and Social Affairs. The opinions expressed here are those of the author only and do not represent the United Nations Secretariat. Questions or comments are welcomed and should be directed to the author at <james.slezak@cornell.edu>.

Acknowledgements

This study draws on the experience of a number of experts within the United Nations system and those involved with its activities. I would like to thank the following people who were interviewed or consulted during the preparation of this research: Kathleen Abdalla, Zehra Aydin-Sipos, Ghazal Badiozamani, Lowell Flanders, Rod Holesgrove, Hiroko Morita-Lou, Gerald Morvell, Dirk Pilari, Sangeeta Sharma and Walter Shearer from the United Nations Department of Economic and Social Affairs, Division for Sustainable Development; Jan-Stefan Fritz from the German Ministry of Education and Research; Gisbert Glaser and Thomas Rosswall from the International Council for Science; and Jeremy Heimans and Calestous Juma from the Kennedy School of Government at Harvard University. I am especially grateful to Juwang Zhu from the Division for Sustainable Development for his encouragement, supervision and intellectual input throughout the preparation of this study.

I would also like to thank the New South Wales (Australia) Sustainable Energy Development Authority, the MacArthur Foundation and the Cornell University Department of Peace Studies for their financial support.

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August 2002

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1. Executive Summary

As a result of its mandate, the Commission on Sustainable Development has a number of basic scientific requirements:

- Early warning
- Expert assessment
- Authoritative statements
- Impact on the agenda of scientific research.

The current framework for the involvement of the scientific community in the work of the CSD is through the Multi-Stakeholder Dialog process and on an informal level through the personal contacts of Secretariat staff. While the level and success of cooperation with scientists has been increasing in recent years, additional measures should be considered in order to fully meet the needs that have been identified.

The trend in academia towards greater international cooperation and interdisciplinarity makes greater involvement with international agencies desirable and more likely to succeed. There is an increasing urgency to meet the above needs in part because of the accelerating social and environmental impact of science, as well as the rapid development of new fields with significant implications for sustainability.

In considering the most appropriate response to these needs, four key success factors for scientific advisory mechanisms can be identified:

- Independence
- Credibility
- Accountability and clear mandate
- Interagency inclusiveness.

With these in mind, three proposals are discussed that would enhance the role of science in the work of the CSD. The first is the appointment of a Science Advisor, whose role would be to set up and manage scientific advisory mechanisms and would be closely involved with the implementation of either of the other two proposals. The second proposal is the establishment of an informal Science and Sustainability Network, using seminars and a flagship publication to foster closer links between the Secretariat branches and the scientific experts in each field. The third proposal is the formation of a standing Expert Advisory Group on Science for Sustainability.

2. Introduction and background

Science as a discipline is in the unique position of being a foundation both for setting the goals of sustainable development as well as finding the means to achieve them. Scientific assessments of the impact of human activity on the environment provide the basis for the aims of sustainability, while applied science and technology promise less destructive alternatives to current practices as means to reach these ends. The scientific community consequently plays a fundamental role in the enterprise of sustainable development, and this raises the important question of what role they should play in the work of the UN Commission on Sustainable Development.

The Commission's policy functions and its role in monitoring and implementing Agenda 21 require both scientific input and influence over the agenda of the scientific community. Since the formation of the CSD after the 1992 UN Conference on Environment and Development, these requirements have been acknowledged by the Commission, and have more recently begun to be translated into action. This report makes the case for supporting this process of increasing involvement of the scientific community in the work of the CSD, and presents a number of policy recommendations through which this can be taken to a new level.

Agenda 21 deals with the issue of science in two ways. First, it identifies the Science and Technological (S&T) Community as a major group, laying down the basis on which this community should be involved in the UN's work on sustainable development[1]. Second, Chapter 35 deals with the process of science, with emphasis on national capacity building and the advances needed in global assessment and understanding in support of sustainability[2]. Ten years after the document was negotiated, the question arises as to whether this support and involvement has been sufficient to create the "interactive process between the sciences and policy-making"[3] called for in Rio, or whether more can be done.

Answering this question involves an analysis of the structures that have been established to facilitate this process. The historical evolution of the UN system has resulted in a number of bodies with related, if not overlapping, mandates in the areas of science and sustainability – including DESA, UNDP, UNEP, UNESCO, UNCTAD, UNU, the World Bank, WMO, WHO, FAO, and the secretariats to the various multilateral environmental agreements. In many cases, expert scientific advisory bodies have been formed around specific issues, such as the Intergovernmental Panel on Climate Change and the Committee on Science and Technology of the UN Convention to Combat Desertification. This is not the case for the CSD, largely because of the wider range of issues it deals with. Involvement of the S&T Community in the work of the CSD occurs primarily through the Multi-Stakeholder Dialog process in years when the issues before the Commission are considered to have a particular dependence on scientific understanding.

The Economic and Social Council, the parent body to the CSD, has tried a number of approaches to scientific advice since the UN Conference on Science and Technology for Development in Vienna in 1979. An outcome of this conference was the formation of the Intergovernmental Committee on Science and Technology for Development, which was then abolished in 1992 to be replaced by the Commission on Science and Technology for Development. The CSTD is now serviced by the UN Conference on Trade and Development in Geneva, a body whose focus on trade, investment and technology is somewhat removed from sustainability. Despite the original

[1] Agenda 21 / Strengthening the role of major groups / Chapter 31: "Scientific and Technological Community"
[2] Agenda 21 / Means of implementation / Chapter 35: "Science for Sustainable Development"
[3] Agenda 21, Paragraph 35.3

intention for the CSTD to serve the UN system as a whole[4], and in particular for its secretariat to communicate regularly with the CSD secretariat[5], the location and modalities of the body make this impractical, and the CSTD does not in fact have this level of involvement. With this brief historical background, discussion of the current role played by science in the CSD is presented below in Section 3.

This study was conducted between June and August of 2002 through interviews of experts both internal and external to the UN system, and documentary research at the UN Headquarters. The conclusion reached was that closer, more substantive involvement of the Science and Technology Community in the work of the CSD is warranted. This is motivated by the mandate of the Commission in the areas of monitoring and assessment and by significant trends in the nature and impact of science on society and on the environment. As a means to bring about this greater involvement, it is recommended that a Science Advisor be appointed to manage the Commission's scientific advisory processes. Two further proposals are also presented as specific mechanisms that such an Advisor could implement: the establishment of an informal network of scientific institutions, and the formation of a formal expert advisory group. It is envisaged that broader discussion and debate would make it clearer which of these proposals would be most acceptable to member states and the Secretariat in the context of new mandates following from this month's World Summit on Sustainable Development.

[4] Reiterated in the Report of the Secretary-General, *Renewing the United Nations: A programme for reform / Rationalization of the subsidiary machinery of the Economic and Social Council* (1997), Paragraph 7

[5] See for example ECOSOC Resolution 1998/46, Annex I, Paragraphs A3(b) and A5

3. The Case for Closer Involvement with the Scientific Community

To address the question of the role of the scientific community in the CSD process, it is first necessary to consider the needs of the Commission in the context of current scientific trends, and then to look at the extent to which these needs are being met by current arrangements. The Commission's policy functions and its work in monitoring and reporting on the implementation of Agenda 21 make it significantly dependent on science to fulfill its mandate. This is primarily due to the scientific nature of monitoring and assessment, as well as the need for policy discussions to be well informed about the underlying issues. It should be noted that the need for scientific expertise does not automatically mean that this expertise must be internal to the UN, or even coordinated by it. Nonetheless it must be available, accessible and appropriate to the organization's requirements.

Scientific needs of the Commission on Sustainable Development

The scientific needs of the CSD can be divided into those associated with monitoring and those associated with implementation – both of which are integral aspects of the mandate of the Commission. The need for early warning and expert assessment relate to monitoring, and the need for authoritative statements and impact on the scientific community relate to implementation. In addition to these four specific needs, the Commission and its secretariat also have a more general need to be well informed scientifically in order to ensure that policy discussions and documents produced reflect a solid grounding in scientific knowledge and an understanding of the scientific basis behind the policy issues at hand. The four main requirements are described below.

Early warning

In order to act quickly, the Commission needs to have the capacity to identify emerging sustainability crises across the world. The negotiation of international agreements and world-wide action is a lengthy process, so the early identification of new issues is critical for national governments to be able to respond in time. Scientists and other researchers need the ability to "raise the alarm" effectively at an international level when urgent dangers are found. It is also necessary for the Commission to be fully informed about new technologies and their potential either to exacerbate or alleviate problems in the local and global environment. This allows the Commission to formulate policy and take coordinated action at the national level to promote those technologies that are most sustainable, while controlling those that pose a threat to global well-being. An example of this is the process leading to the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. Meetings of scientific experts were convened by UNEP in 1977, eight years before the Antarctic ozone hole was discovered, but nonetheless three years after the identification of ozone depleting substances.[6]

Expert assessment

As well as early warning of future problems, the Commission needs access to expert assessments of current situations, including trends, likely impact on societies, and implications for development. This information is the basis from which decisions on current programs and their success or adequacy can be taken. When necessary, it must bridge the gap between science and policy, being accessible and comprehensible to policy makers and presenting supporting technical detail in a succinct form appropriate to a non-expert audience. World events, whether natural or

[6] K.M. Sarma, UNEP

human, environmental or economic, often affect the ability of countries to implement the goals of Agenda 21. The CSD's mandate requires it to have the best available assessments to monitor these developments so that new measures and policies can be considered in response. A large scale example of this type of assessment is the ongoing Millennium Ecosystem Assessment initiated by WRI, UNEP, UNDP and the World Bank and supported by a wide range of UN and external agencies.

Authoritative statements

Clear and authoritative statements of scientific evidence are important for establishing international consensus around the need to act on issues of sustainability. The need for such "headline" statements is dependent largely on the degree of resistance that the action is likely to receive from those opposed to the agenda of sustainability. Moving from unsustainable to sustainable modes of production and consumption inevitably involves the decline of harmful forms of economic activity, and the resulting debate will often call into question the scientific basis for the proposed actions. When significant commercial interests are at stake, the precautionary principle is often at risk of being overlooked. This risk can be reduced when credible sources of scientific expertise can make authoritative statements regarding the strength of available evidence. This is well illustrated by the IPCC's highly publicized 1995 statement that the "balance of evidence … suggests a discernible human influence on global climate."[7]

Impact on the agenda of scientific research

Agenda 21 calls for national scientific programs to support the goals of sustainable development through their research and other activities. In many areas, there are priorities for further work and understanding laid out in the document. These calls require the Commission to have a degree of leadership and impact on the scientific community and its agenda in order to put them into practice, otherwise institutional research programs will continue without regard to these decisions and priorities. Because of the growing international and collaborative nature of the S&T Community, leadership at the international level is increasingly appropriate. Without this active input into the agenda and priorities of the scientific process, research and development is less likely to reflect the needs of the international community and more likely to reflect commercial interests, as can be seen in the current "glaring contrast between the world's research agenda and the world's research needs."[8] One example of this is the dramatic imbalance in medical research priorities, where an estimated 10% of funds are used for research into 90% of the world's health problems,[9] including diseases such as malaria and pneumonia that primarily affect people in the developing world.

Trends in Science and Sustainability

As an agent of change, science may be considered to be the human endeavor having the greatest effect on development and the environment in the long term, and as a tool which rapidly increases the capability of societies to do both good and harm to each other and to the earth. In the 10 years since the Rio conference in 1992, there have been significant trends in science and in the methods of the scientific community which amplify their role in sustainability. In some cases the

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[7] Intergovernmental Panel on Climate Change, *IPCC Second Assessment Synthesis of Scientific-Technical Information relevant to interpreting Article 2 of the UN Framework Convention on Climate Change,* Geneva 1995

[8] UNDP, *Human Development Report: Making new technologies work for human development*, Oxford 2001

[9] Estimated by the Global Forum for Health Research, 2000

increasing impact of science is a result of the emergence of specific new branches of technology such as genetic engineering, and in others it is just the inevitable result of accumulated advances in established fields such as electronics and information technology. With the increasing impact of science comes an increasing urgency to direct scientific resources where possible towards the pursuit of sustainability, rather than continuing along a business-as-usual path. As a result, there is an increasing urgency to use international forums to this end.

In addition to the rapid advancement of scientific knowledge there are two important trends in the way that science is done. The first is its increasingly cross-border nature. Whereas collaborations between academics from different countries once involved major practical difficulties, technology such as the Internet and teleconferencing, as well as the decreasing cost of international travel has lead to a rapid rise in the prevalence and success of international scientific cooperation. Cross-border academic networks such as the Harvard-based Initiative on Science and Technology for Sustainability[10] and the Columbia Earth Institute[11] create centers of academic excellence defined by common research goals rather than geography. This trend means that national science policies – the major concern of Agenda 21's chapter on science – are no longer sufficient, and a new role exists for this input to take place at the international level.

The second trend in science methods is the rise of interdisciplinarity. Over the last ten years, growing numbers of academic programs and departments are being formed around areas of research that depend on more than one traditional area of research. This heightens the ability of academic institutions to contribute to enterprises like sustainable development that depend on a broad array of fundamental sciences. It also means that scientists are better able to contribute to policy forums by bringing a higher level perspective on the issues at hand rather than narrow, less policy-relevant specializations. These two trends together suggest both a need for greater direction of the international scientific enterprise by the international community, and a greater likelihood of success in efforts to do so.

Current role of the scientific community in the Commission on Sustainable Development

Unlike NGOs and business groups, the scientific community is by its nature less inclined towards advocacy and lobbying, so involving them successfully requires the establishment of direct means to facilitate this. These means can be either formal or informal. Currently, the main formal means for involving the scientific community in the work of the CSD is through the Multi-Stakeholder Dialog process, and the main informal means is through the personal contact of scientific experts by Secretariat staff in the course of their duties.

As discussed earlier, the MSD process is the primary means for involving the S&T Community during the years in which their input is sought. The 9th session of the CSD held in 2001 involved the scientific community to a greater extent than any previous session because its sectoral themes – atmosphere and energy – were regarded as having a significant requirement for scientific understanding and assessment. This process gave the S&T Community a forum for presenting their views on the themes of the session and to engage in dialog with government representatives on policy. The International Council for Science, working with the World Federation of Engineering Organizations, represented the S&T Community in these processes, producing dialog starter papers for the two days of meetings and carrying out the discussions. More recently, ICSU provided similar input into the preparatory process for the World Summit on Sustainable Development.

[10] http://sustsci.harvard.edu/ists/
[11] http://www.earthinstitute.columbia.edu/

Outside of the MSD process, there are less formal means by which scientific experts can contribute to the work of the CSD. Scientists are sometimes called on by Secretariat staff to produce background papers to inform them of the latest developments in specific fields when their work requires this. These background papers may be used as part of the research for a Report of the Secretary General or become discussion papers for official circulation. In some cases, such as the collaborative production of the 2000 World Energy Assessment, scientists are commissioned to contribute documents for a major publication initiative.

There are clear successes of these formal and informal initiatives, such as the continuing informal involvement of many of the authors of the World Energy Assessment, and the partnerships and networks formed as a result of past MSD sessions. Despite these successes, not all the needs identified at the beginning of this section are being met. Although the Multi-Stakeholder Dialog process provides a valuable forum for scientists during the sessions in which they play a role, scientists are not just stakeholders in the sense of those with a collective interest whose involvement is sought due to considerations of inclusiveness or some kind of fairness to the group itself. Instead they are more like a resource that must be utilized in order to further the aims of the Commission, and as a group they are prepared to be engaged on this basis.

The current processes of the CSD do not provide a direct mechanism for the Commission to play a leadership role in setting the priorities of those in the S&T Community whose work is relevant to achieving the goals of sustainable development. When the international community has a pressing need to advance the state of knowledge in a particular field, only indirect processes can currently be used to make this happen, and as is apparent from the stark imbalance in research priorities across the world, this process is not generally successful.

Under the status-quo, there are gaps in the ability of the S&T Community to contribute to the implementation of CSD decisions through making authoritative statements. Even when there is near total consensus on scientific issues underlying sustainability policy initiatives, it is usually possible for those with an interest in opposing these policies to find or encourage dissent from some credible institution or source. As it stands, the CSD does not have a body or mechanism that can fulfill the need to present the facts authoritatively and in an official capacity as they appear on the balance of scientific evidence.

Finally, the needs of early warning and expert assessment are mostly met by using work and assessments that are already being carried out by scientific research institutions, or otherwise produced on an ad-hoc basis when commissioned by the Secretariat. Available assessments can be adequate in many cases, but there is no mechanism to ensure that the required inputs will always be available, or that they will have the breadth and depth necessary for the monitoring and policy deliberations of the CSD. There is also no guarantee that when new threats are identified they will be brought directly to the attention of the Commission, and when this does occur, it is unlikely to happen in a timely fashion.

4. Conclusions and Recommendations

The needs identified above warrant more substantive and ongoing involvement of the Scientific and Technological Community in the work of the CSD. There are a number of ways that this involvement could be achieved, with different mechanisms suited to different scientific issues. Because of the range of approaches that may need to be taken, the first over-arching recommendation is the appointment of a Science Advisor to establish and direct them. Two specific mechanisms are then proposed that such an Advisor could be responsible for implementing.

Advisory processes already established by the various UN agencies provide useful insights into the form that scientific advice must take in order to meet the needs of the organization. The relative efficacy of these existing processes has been studied extensively elsewhere[12], but from these experiences four key success factors can be identified that should be central to any adopted proposal:

Independence

To be useful, scientific advice must be objective, since it must reflect the truth rather than the perceived interests of those involved. Objectivity in turn requires independence from the process of political negotiation, so that the output from any advisory mechanism cannot be regarded as being influenced by any ongoing political processes. To this end, experts engaged in the provision of scientific advice to the Commission may need to serve in their individual capacities rather than on behalf of states or institutions and would have to adhere to clear guidelines on conflicts of interest. The freedom to dissent and to offer advice of a critical nature is also a very important aspect of independence. In practice this requires that those providing advice have minimal ties and loyalties to stakeholder organizations, so that there is no informal pressure on them to put the interests of any institution ahead of the need for objective factual advice.

Credibility

Credibility, the second success factor, is essential for an advisory process to have impact. The stature of the experts involved is central to achieving this credibility. Although there are many competent researchers and academics in any given field of science, the opinions of those who are more prominent generally carry more weight in the community, and are more likely to persuade governments and institutions to act. This persuasion is especially important in cases where the precautionary principle is in conflict with special domestic interests of member states. The CSD must have something to offer in order to attract top experts without remuneration. This can be done relatively easily in the context of a formal advisory group by leveraging the prestige associated with the UN. In the case of less formal initiatives, good will and commonality of purpose can provide the necessary motivation. Just as the scientific experts would be assisting the work of the Commission partly by virtue of their prominence in the community, similarly the UN would be assisting the experts themselves through the recognition inherent in their appointment or through furthering the aims that they hope to achieve with their research work. Provided that the commitment of time required was not excessive, there are unlikely to be major difficulties in securing the cooperation of those in the best positions to contribute to the process.

Accountability and clear mandate

Accountability is important in any organization, but there are unique challenges to implementing it in scientific advisory processes. The principal concern is to see that the output of any process

[12] See for example Jan-Stefan Fritz (2000)

meets the expectations of the Commission, and is delivered in a useful and comprehensible format. The needs of a policy forum like the CSD are fundamentally different from those of scientific journals and conferences which are the usual audiences for scientific experts. Guidance and direction from the Science Advisor and experienced Secretariat staff are necessary to ensure that the reports of scientific experts do not become overly technical or off-topic, a problem which has been identified in some bodies in the past. Clear mandates are also critical to obtaining useful output from advisors, with focused questions and tasks that can be answered efficiently by the participants, giving a clear indication of what is to be expected.

Interagency inclusiveness

One of the most important success factors identified in this study for science-based collaborations is a focus on cooperation and inclusiveness of all relevant stakeholders within the UN system. As mentioned in Section 2, there are a large number of UN bodies whose mandate is relevant to either science or sustainability. Each has different strengths and must be given an appropriate level of involvement or ownership with regard to any new advisory processes in order to capitalize on the experience and institutional knowledge that exists among them. Fostering closer working relationships between UN agencies with complementary mandates is also a worthwhile end in itself, beneficial to all parties.

(a) Appointment of a Science Advisor

The first recommendation of this report is the creation of the position of Science Advisor. This would be a senior post reporting to the DSD director. If necessary, other staff could be assigned to assist the Advisor, forming an Office of the Science Advisor. The mandate of the Science Advisor would be to ensure that the scientific needs of the Commission identified in Section 3 are met. Importantly, the role of the Science Advisor would not be to provide scientific advice themselves but to establish appropriate and transparent procedures for obtaining this advice. Just as no individual can provide expertise in every scientific area of interest to the Commission, no single advisory process can be regarded as appropriate for every issue. Appointing a Science Advisor gives the Commission and its secretariat the flexibility to adapt their advisory mechanisms to the nature of the issues before them.

The Science Advisor would be responsible for establishing appropriate ad-hoc advisory mechanisms in response to requests from the Commission or on their own initiative whenever the need for scientific advice arises. If an important new scientific or technological development occurs, they would have the ability to seek advice on its implications for sustainability and to inform the Commission appropriately. The processes at their disposal would range from requesting a background paper from an academic, hiring a consultant or commissioning a study, through to convening an expert group or even forming an IPCC-like panel if necessary. The more extensive of these processes would require specific assent from the Commission, but the Advisor would be given a wide degree of discretion in cases where necessary resources are already available.

Understanding the most appropriate process for a given scientific question and the means for achieving independence, credibility and accountability would be the specific professional expertise of the Advisor. Although this person would need a solid background in science, their role would be procedural not substantive, so it would be their expertise in the management of scientific processes that would be of primary importance. The Advisor would be regarded as the custodian of the procedures for mobilizing expert scientific advice for the Commission. In order to do their job effectively, the Advisor would be in constant contact with all branches of the DSD as well as representatives of the scientific community.

This proposal is in line with trends in several governmental and intergovernmental agencies around the world, such as the World Bank, the CGIAR and the U.S. Government, all of which have established comparable positions. Under this conception, the management of scientific expertise is increasingly being viewed as an area of specialization that cannot effectively be handled as one aspect of a broader job description by staff members with duties in other areas. Instead, specialists in the management of scientific knowledge and processes are used and their experience ensures that the most appropriate and efficient processes are employed to meet the scientific needs of the organization.

(b) Establishment of a Science and Sustainability Network

An informal network of universities and research institutes is one specific framework through which greater involvement of the scientific community could be effected. A Science and Sustainability Network would bring together institutions to meet the scientific needs of the CSD and its Secretariat, with the Secretariat having ultimate responsibility and oversight over the process. The institutions making up the network would be able to delegate tasks to the most appropriate experts, who would act in their capacity as representatives of their organizations. A network of such institutions could be built either through completely informal channels or through semi-informal means such as non-binding memoranda of understanding or similar partnerships. The aim of the network would be to provide solid scientific background for documentation produced by and for the CSD, and to assist in ensuring that those participating in meetings are as well informed as possible.

The main benefits of an informal network over more formal advisory processes are that it is more likely to remain flexible and adaptive to the changing focus of the Commission's work, and would require fewer resources. Working through institutions rather than individual experts reduces the degree to which influence is concentrated among a small number of people, and means that any work will be produced under an additional layer of accountability and oversight within the institution, which may also be regarded as advantageous. However, depending on the means of implementing the network, it may be hard to achieve geographic diversity since seminars and informal events are only likely to be attended by experts living in the vicinity of the UN Headquarters in New York or able to travel there easily. Similarly, ability to take part in the network would depend heavily on the resources available to a given institution, making it more difficult for those from developing countries to participate. An informal network would not have the ability to make authoritative "headline" statements in the way that a formally constituted body would. The seriousness of this drawback depends on how important such statements are, which is in turn largely a function of the degree of controversy of the issues before it.

Tasks which an informal network could carry out would include the preparation of background papers on issues requiring specialist knowledge, surveys of academic literature, and dedicated studies. In each case, a lead institution could be selected to act as task manager and would delegate the task to individuals or teams as appropriate, collaborating wherever possible with other relevant institutions. Clear terms of reference or a list of questions would be supplied to the institution and a realistic time frame worked out collaboratively. These tasks would be directed by the DSD at branch level with assistance from the Science Advisor, and it would be expected that over time a closer working relationship would develop between secretariat staff and the relevant academic experts in their fields to the benefit of both parties.

Building a network such as this may be difficult in the absence of specific projects to support the process. For this reason, two tools are suggested here as valuable ways of building links with target institutions: workshops and a flagship publication. As well as being tools for building a

network, they are also independently worthwhile initiatives that each go some way towards meeting the needs identified in this report.

Seminars and workshops

An informal seminar or workshop series with a range of cross-sectoral themes would establish an active channel for dialog between the scientific community and those directly involved with the work of the CSD. A cross-sectoral scope rather than narrow subject-specific themes would broaden the appeal of the series to a wider range of participants both within the Secretariat and elsewhere. The aim of the series would be to hear from academic and scientific experts about the state of the art in fields of relevance to the Commission, and also to promote dialog with the scientific community on policy issues that have scientific dimensions. It would also play the role of alerting the Commission and its secretariat staff to emerging issues, as participants would be encouraged to present new findings on subjects that may not yet have been addressed at a policy level. Delegates and secretariat staff would also have the opportunity to brief the invited experts on the Commission's work so that the experts can be better aware of how their research relates to the work program of the CSD. Coordinating these events would be an integral part of the work of the Science Advisor. If organized effectively, they would add to the vibrancy of the Commission and keep people informed of the latest developments relevant to sustainability.

Flagship science and technology publication

When carried out successfully, publications have the potential to form lasting connections between experts and the UN, and among different collaborating UN agencies. When less successful, they can produce unwieldy or unhelpful documents and consume a large amount of resources. A successful flagship science and technology publication would involve voluntary contributions from expert authors and consequently minimal production costs. By comparison with publications organized along similar lines, production costs could potentially be kept as low as $10,000. Articles would be short and aimed at an non-technical audience, covering the range of current issues before the commission as they affect each region of the world. The publication could be released every two years, and its aim would be to provide a platform for the insights of the scientific community to be shared with policy makers, secretariat staff and the wider community.

In order to be readable, the publication should be under 100 pages in length and could be divided into four sections: a section dealing with assessments of current conditions, one on specific recent developments, one dealing with strategies and policy, and a final section on issues remaining to be addressed by policy makers. Priority would be given to pressing or contentious issues, and each section would include articles relevant to each region of the world. As an outreach exercise, the publication would ideally be available for sale through the UN or alternately through an academic publisher.

(c) Formation of an Expert Advisory Group on Science for Sustainability

The UN has successfully used dedicated expert advisory bodies in a number of instances to provide a solid scientific foundation for its work, as well as to establish direct channels for the exchange of information and concerns. The IPCC is a particularly good example of this. In most cases, these advisory bodies have narrowly focused mandates, providing assessment and expert opinion in support of specific conventions and for MEAs on specific issues. The broad mandate of the CSD means that any standing advisory body would require a much broader cross-section of expertise than these existing bodies. Nonetheless, the same motivation for creating a standing

expert forum arguably exists. The mandate of such a forum would be to provide advice on any scientific matters of potential relevance to sustainability, to carry out assessments, alert the CSD to newly identified environmental and developmental risks and to work with scientific institutions to implement sustainability research priorities.

A formally constituted standing body would have the advantage of being well positioned to make authoritative statements and to further the aim of having an impact on the agenda of the scientific community once its credibility has been established. One major challenge however would be to ensure its flexibility and responsiveness so that it can adapt to the evolving focus of the Commission's activities and provide timely and relevant advice to complement the current work program. With an appropriate choice of experts, the Commission's need for assessment and early warning would be met directly as part of the ongoing duties of those appointed.

An effective Expert Advisory Group would comprise members of the scientific community with expertise in each scientific area relevant to the Commission's program of work at that time, perhaps 15 individuals. These people would be regarded as facilitators rather than representatives, since their role would be to seek out a consensus from among the experts in their field, and not just to present their own opinions. It is less important for participants personally to have all the necessary expert knowledge themselves than for them to be in a position to contact and involve those that do. Terms of membership would be directly matched to the Commission's priorities and work program, which could be months rather than years in many cases so that the body remains dynamic and responsive. Geographic and gender diversity would be ensured following the example of other UN advisory bodies[13].

The Expert Advisory Group could be established by ECOSOC and report directly to the CSD. Its formation would likely be carried out in close consultation with ICSU as the representative organization for the Science and Technology Community. The Group could be served by a secretariat as a joint initiative between DESA and other relevant UN bodies under the coordination of the Chief Executives Board for Coordination, and funded accordingly. Any relevant UN body should be able to make requests of the Group by meeting directly with its Secretariat to work out a realistic schedule and terms of reference. The Secretariat can then produce a draft agenda and timetable for approval by its parent body. This way UN stakeholder agencies can be guaranteed access to and involvement with the Advisory Group.

A major issue in considering this option would be the resources required and an analysis of the costs and benefits involved. From a basic comparison with bodies of comparable size and function, overall appropriations for an Expert Advisory Group as described here are likely to be of the order of US$300,000 annually, which for illustrative purposes represents around 2% of the current annual budget of the Division for Sustainable Development[14]. This amount may not need to be provided by new contributions. UN agencies with subsidiary bodies whose work falls under the mandate of the new advisory body may be able to reallocate resources in order to meet the funding requirements. For example, the expert advisory role of the Committee on Energy and Natural Resources for Development may be rolled into the new body, which would already account for more than half of this sum.

Another alternative for establishing this standing body would be for the existing Commission on Science and Technology for Development to be restructured to create it. As discussed earlier, a discrepancy exists between the stated intention for a close working relationship between the CSTD and the CSD secretariats and the reality of little substantive involvement. The present ability of the CSTD to cooperate more closely with the CSD is limited largely by its location in

[13] Such as the Intergovernmental Panel on Climate Change or the Commission on Science and Technology for Development

[14] Based on figures from the 2002-2003 UN Annual Budget (Document A/56/6/Add.2)

Geneva, making communication and cooperation with the CSD Secretariat in New York difficult, as well as the fact that it meets only once every two years. An advantage of this alternate course of action would be that it would not add a new body to the UN system, however there may be a risk of disrupting the CSTD's current work and that of the other UN agencies currently benefiting from it.

Although sustainable development has a particularly close dependence on science, it is worth noting that UN activities outside this field also benefit from scientific input. If there were sufficient interest from other UN bodies, a more ambitious possibility would be the creation of a Science Advisory Group with maximal broadness of scope, such that it could advise any organization in the UN system on issues of science and technology. This would be a significantly bigger undertaking, but economies of scale and the absorption of other more narrowly focused bodies could also make this a cost effective proposition. A major advantage of such a broadly mandated body would be to allow the provision of expert advice to organizations in the UN system that may not have the need for their own standing advisory bodies, but still require occasional expert assessment or opinion from time to time. It may be appropriate to include a wider range of academic expertise in this case, drawing on people from fields outside the natural sciences such as economics and the social sciences.

5. Appendix

(a) Selected resolutions and reports relevant to the role of the scientific community

- Report of the Scientific and Technological Community to the 2002 WSSD:

> The role of science and engineering in the current policy making process at national and global levels regarding the three pillars of sustainable development – social, economic and ecological – is insufficient. [Page 8]

- Chairman's text, WSSD 2002 Preparatory Committee 4:

> 93. Improve policy and decision-making at all levels through, inter alia, improved collaboration between natural and social scientists, and between scientists and policy makers [including actions at all levels to] [with action to]:
>
> …(e) [Agreed] Establish partnerships between scientific, public and private institutions, and by integrating scientists' advice into decision-making bodies in order to ensure a greater role for science, technology development and engineering sectors.

- Multi-stakeholder Dialogue, Dialogue Paper by S&T Communities for WSSD Preparatory Committee 4:

> (d) Governance for sustainable development. Governance systems for sustainable development at local, national, regional and global levels much incorporate the best available scientific and technological knowledge. The link between the S&T community and decision-making is poorly supported by current institutional structures. Existing governance institutions and institutional mechanisms need to be transformed in ways which ensure S&T input; if necessary, new mechanisms should be developed to meet this explicit goal. The tool of integrated scientific and technological assessments needs to be bolstered and enhanced at national, regional and global levels. It is proposed that a formal link be established between the Commission on Sustainable Development (CSD) and the organising partners of the Dialogue Segment for the S&T community (ICSU and WFEO), for example through an S&T Advisory Panel. This would be a mechanism to ensure that the CSD can draw upon independent scientific and technological expertise and advice. [Section 4]

- Report of the Secretary-General, "Overall progress achieved since the United Nations Conference on Environment and Development" / "Science for sustainable development" (addendum) 1997:

> 14. The use of scientific assessments of specific environmental problems and their implications for development continues to gain widespread acceptance as a vital support for policy- and decision-making. Through the assessment process, the global scientific community is mobilized to establish the current peer-reviewed scientific knowledge on a specific issue so as to identify major gaps in scientific understanding and to carry out strategic programming of further scientific research.
>
> 15. The value of scientific assessments had already been demonstrated prior to the United Nations Conference on Environment and Development, as was evidenced by their input into the formulation of the Vienna Convention for the Protection of the Ozone Layer, its Montreal Protocol on Substances that Deplete the Ozone Layer and subsequent amendments. At the international level, one of the main ongoing scientific assessment programmes is that of the Intergovernmental Panel on Climate Change (IPCC) sponsored by WMO and UNEP. … As IPCC interfaces effectively with the international scientific community, its framework could serve as a model for similar assessment panels on environment and development. … [Section C]

(b) Acronyms

CEB	Chief Executives Board for Coordination
CGIAR	Consultative Group on International Agricultural Research
CSD	Commission on Sustainable Development
CSTD	Commission on Science and Technology for Development
DESA	Department of Economic and Social Affairs
DSD	Division for Sustainable Development
ECOSOC	Economic and Social Council
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
ICSU	International Council for Science
IPCC	Intergovernmental Panel on Climate Change
MEA	Multilateral environmental agreement
MSD	Multi-Stakeholder Dialog
NGO	Non-governmental organization
S&T	Science and Technology (major group)
UNCCD	United Nations Convention to Combat Desertification
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNU	United Nations University
WFEO	World Federation of Engineering Organizations
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development

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