

Entrevista

Jerry M. Melillo

Jerry M. Melillo obtuvo su título de Doctor por la Universidad de Yale, y es en la actualidad investigador científico, y co-director del Instituto de Ecosistemas del Laboratorio Biológico Marino de Woods Hole, Massachusetts (EE.UU). Las investigaciones del Dr. Melillo abarcan desde el cambio climático, alteraciones del ciclo del nitrógeno, consecuencias ecológicas de la deforestación tropical, y gestión sostenible de agro-ecosistemas tropicales, temas sobre los que es una autoridad internacional. Ha sido uno de los líderes del IPCC entre los años 90-95, del IGBP, y actualmente es Presidente de SCOPE (Scientific Committee on Problems of the Environment), que es el Comité de ICSU dedicado a la problemática ambiental. El Dr. Melillo ha formado parte de diversos comités de asesoramiento para organizaciones internacionales (National Science Foundation, Atmospheric Chemistry Division of the National Center for Atmospheric Research, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences). También ha participado activamente en política científica, como Director Asociado para el Medio Ambiente en la Oficina de Política Científica y Tecnológica, y asesor del Presidente de los EE.UU, durante los años 1996 y 1997. Recientemente ha sido elegido Presidente de la Sociedad Ecológica Americana (ESA) en enero de 2003. El Dr. Melillo es autor de más de 200 trabajos científicos en revistas especializadas, y ha escrito dos libros de texto. Ha colaborado también como editor asociado en diversas revistas de ecología, como *Ecological Applications*. [Regino Zamora](#) le hizo la siguiente entrevista sobre el programa Internacional SCOPE (<http://www.icsu-scope.org>), que publicamos íntegra en inglés.



Q In the programme SCOPE (Scientific Committee on Problems of the Environment, of the international Council for Science-ICSU), there are 40 national science academies and research councils, and 22 international scientific unions, committees and societies, making SCOPE one of the most representative and prestigious international programmes. In your opinion, what have been the greatest contributions and achievements of the SCOPE programme since its creation in 1969?

R SCOPE has played a special role at the intersection of science and policy since its inception in 1969. It identifies and brings together the world's most preeminent scientists to address and forge a consensus on critical emerging environmental issues. These efforts, on a range of issues, have resulted in authoritative assessments that are highly regarded by policy makers. The success of this approach is shown by its adoption in recent years by intergovernmental agencies. Recently, SCOPE has added a new step in the assessment process by bringing its studies to the general public through the publication of books that interpret SCOPE's assessments in simple yet accurate terms. Further, in the past few years SCOPE has pioneered in bringing together social and natural scientists to jointly address the nature and solution of environmental problems.

In the estimation of many, SCOPE stands alone in its capacity to bring together the enormous talents of the non-governmental science community to work towards the common goal of

improving the Earth's environment. SCOPE has a 30-year history of timely and influential syntheses of scientific understanding on environmental problems that is inherently international and interdisciplinary. Its more than 60 books have helped lay the foundations for international awareness, research programs, and treaty negotiations on many issues including nuclear disarmament, global change, and biodiversity.

SCOPE occupies a very special place in international environmental science. It does not engage in new science, but rather assesses the state of knowledge in areas that are viewed as emerging environmental problems. It has set the standards that are now utilized by intergovernmental agencies for scientific assessments---getting the best scientists from all nations to review our knowledge on important emerging environmental issues, reaching a consensus, and then to focussing on what can be done to address these issues. Many of SCOPE's assessment documents endure as principal resources for an issue. Examples include Bolin and Cook's synthesis on major biogeochemical cycles (Bolin and Cook, 1983), climate change and ecosystems (Bolin, et al., 1989), and the biogeochemistry of major world rivers (Degens and Richey, 1991). SCOPE has produced pioneering assessments on ecotoxicology, climate change, biogeochemical cycling, environmental impacts of nuclear warfare and the consequences of biological invasions. The "nuclear winter" study, led by Sir Frederick Warner, involved over 300 scientists from around the world and was an important forerunner of collaborative work between biologists and physical scientists in global ecology (Harwell and Hutchinson, 1985, Pittock, et al., 1986).

ECOTOXICOLOGY

The UN Stockholm conference on Man and the Environment recommended the development of international programs to acquire knowledge for the assessment of pollutant sources, pathways, exposures and risks. The early study by SCOPE of the principles of ecotoxicology (1973-77) led the way for the development of a series of pioneering appraisals of the environmental behavior of pollutants and the toxic effects of chemical and physical agents on living organisms. Special emphasis has been given to the effects of toxins on natural ecosystems. A major focus in these studies has been the transfer pathways of toxins and their effects on plants and animals. To date, more than 30 SCOPE projects have dealt with various aspects of the effects of pollutants on environment and human health, including an ambitious program, launched in 1980, on methodologies for the evaluation of the safety of chemicals. Results from these assessments are aimed at the scientific community, policy makers, intergovernmental agencies and industry.

CYCLES / CLIMATE CHANGE

The early assessments of SCOPE (1974-80) focussed on the cycles of carbon, nitrogen, sulfur and phosphorus separately, to highlight the importance of these cycles as parts of the Earth's life support system, providing human beings with food, fiber, fodder and fuel as well as pure air and water. These assessments also identified the critical role played by human activities in altering drastically the cycles of these elements. It was however understood from the beginning that none of these cycles operate in isolation, and a second phase of the SCOPE program (1979-83) exemplified how the cycles are tied together in one integrated system comprising many mechanisms of mutual interaction. It was this series of pioneering studies on global biogeochemistry, especially the review

of the consequences of increased atmospheric CO₂ on global climate, environment and society (1982-85), that provided a foundation for exploring the global consequences of environmental change, particularly climate warming. Those involved in the early assessments of the seventies became the leaders in the process leading to the Villach conference in 1985, to formal negotiations for the climate convention and the development of the IPCC process. Launched in the eighties, a number of major international research efforts (IGBP, WCRP) and national programs on biogeochemical cycles, and on their interaction with global climate change, also find their origin in concerns and recommendations first expressed in these early SCOPE assessments.

As we move into the new millennium, SCOPE is revisiting the major element cycles and their interactions. Special attention will be given to the effects of human-caused changes in the cycles and the potential consequences of these changes. Methods for exploring the potential consequences, such as integrated assessment modeling, will be assessed by SCOPE in the 2000-2005 time frame.

ENUWAR

The links between sound science and sound policy are growing stronger with the passage of time. SCOPE has been and remains a strong partner in the linkage between science and policy. The project on the environmental consequences of nuclear war (ENUWAR, 1983-86) is a good example of this point. The ENUIWAR project was launched at the request of several academies of sciences in order to provide a neutral, objective review of the then controversial concept of nuclear winter. The assessment concluded that even the moderate drop in global temperature (3-4 degrees Celsius) that would follow a limited nuclear exchange (100Mt as a threshold) at the time of the growing season would have catastrophic consequences for major crops throughout the world. The projected consequences were large enough to jeopardize the survival of 80% of the world's population according to the assessment. The knowledge derived from this assessment was so compelling that it had an important influence on the nuclear disarmament discussions. It was SCOPE that brought together the important mix of disciplines that made it possible for the first time to give a meaningful analysis of the global consequences of a nuclear exchange.

BIODIVERSITY - INVASIVE SPECIES

The very important idea that species, and biodiversity in general, provide crucial services to society has gained considerable momentum from a SCOPE project on the significance of biodiversity for ecosystem functioning (1991-95). This important idea is now at the center of considerations of the maintenance of biodiversity. This project brought together biologists and economists to forge a new understanding of the consequences of the loss of biodiversity for ecosystems and society alike. Both technical and popular books have resulted from this effort.

Following early studies on the ecology of biological invasions (1983-87 and genetically modified organisms (1987-89), SCOPE has recently decided to revisit the issue. SCOPE launched a project on developing a global strategy for dealing with invasive species (1997-2001), that includes an international review of the science of invasives and the development of a set of operational tools to deal with various aspects of the problem. The SCOPE project is exploring the technical (early warning systems, prevention and management, risk assessment, etc.), legal, economic, social, cultural, educational dimension of the invasive species issue. This program is unique in that it

involves the necessary disciplinary mix to approach this complex problem - lawyers, ecologists, economists, resource managers and social scientists. This new effort involves not only an assessment but also the development of a plan of action to be used by governments.

INDICATORS OF SUSTAINABLE DEVELOPMENT (ISD)

The UN Commission on Sustainable Development (CSD) recognized at its first session the need for indicators that take into account current economic, social, environmental, and institutional forces and that are adaptable to different contexts. Such indicators were called for at the Rio Conference and in Agenda 21. Intergovernmental and governmental bodies need indicators in order to enable a more meaningful analysis of information relating to sustainability. Indicators can provide a common language by which to structure and interpret national reporting on sustainability. A powerful information tool, indicators can also be an important policy guide.

SCOPE's project (1994-97) has been closely tied to the CSD indicator development process from CSD-1. The project was initiated in order to: (1) synthesize the intellectual efforts of the scientific and academic community on the development of indicators; and (2) improve indicators of sustainability that include the linkages among economic, social, environmental, and cultural dimensions of sustainability. SCOPE's efforts have catalyzed the UN process and played a key role in the preparation for CSD-3, at which the Work Program on Indicators of Sustainable Development was approved. It accompanied the implementation of this work plan and the development of a series of pilot experiments launched by governments at national and regional levels.

At the CSD-4 in April-May 1996, the European Union openly recognized SCOPE's contribution to the CSD Work Program. The German delegation presented the results of the project, stating that although further development of ISDs is a long-term process, the project was an important and successful step towards intensifying the international exchange of experience and cooperation within the science community, and pooling and coordinating the scientific efforts. The synthesis was released at the UN General Assembly Special Session on the Environment (UNGASS) in June 1997.

ENVIRONMENT IN A GLOBAL INFORMATION SOCIETY (EGIS)

This project considers the consequences of the globalization of economy and information and the environmental risks and opportunities related to this new reality.

An ever-increasing number of people now live in a global information society, where development depends increasingly on the skill of human resources and the ability to adapt to change. Most prospective studies of the environment are simply projections of linear trends referring to the industrial society and do not take into account the inherent discontinuities and surprises that result from this societal changes.

The scientific and information community has a crucially important role to play in the emerging global and open knowledge-based society and economy. It can focus environmental information gathering, monitor the quality and timeliness of this global information flow, and translate this into

accessible knowledge to foster the development of informed decision-support systems. In response to these needs, SCOPE has launched a new project on environmental issues, problems and opportunities of the post-industrial information society (1999-2001) designed to identify emerging priorities for environmental research and management at the onset of the 21st century. In-depth studies will explore environmental issues by sectors (e.g. forestry, agriculture, fishery, tourism, industry), themes (e.g. as related to biodiversity, sustainable development, cultural landscapes, employment and environment), and regions (e.g. European Union, ASEAN, NAFTA, MERCOSUR, the Mediterranean, Eastern Europe, Africa, Indian Ocean Rim). A final synthesis will seek to consolidate results and speak to the needs of political and economical decision-makers, as well as those of the scientific community.

SUMMARY

The above are just some examples of the important impacts that SCOPE and its participating scientists have had in providing the scientific community, policy makers, and the general public with authoritative assessments they can use to inform the difficult decisions they must make about how to manage the environment.

Q How are these objectives decided, and what instruments does SCOPE have to put these into practice?

R Topics for SCOPE projects are identified in two ways - most often by proposals presented at SCOPE general assemblies and sometimes by special petitions to the SCOPE Executive Committee. Every three years SCOPE holds a general assembly that is attended by its member organizations - national committees for SCOPE and adhering scientific unions. At each general assembly, SCOPE's existing projects are reviewed and its members propose new projects. These projects are then passed on to SCOPE's Executive Committee for consideration in the context of the organization's overall portfolio of projects. At times between general assemblies, member organizations can submit project ideas to SCOPE's Executive Committee. Criteria for selection of projects include relative importance, feasibility and timeliness.

Once the Executive Committee accepts a topic for SCOPE assessment, a Scientific Advisory Committee (SAC) is appointed to oversee the design and implementation of the assessment. SAC members are recognized world experts on the topic. The SCOPE Secretariat then works with the SAC to find financial support for the assessment and helps to arrange planning meetings and workshops.

The SAC gathers leading scholars from across the globe to carry out the assessment. They document their work in a variety of ways including SCOPE synthesis volumes, articles in peer reviewed journals, summary papers written specifically for policy makers.

Current SCOPE is carrying out almost 20 assessments on a range of environmental issues ranging from biogeochemical topics such as the interactions of life-sustaining elements and the global carbon and nitrogen cycles, to health-related topics such as cadmium pollution and endocrine disrupting chemicals. Some of these assessments are using SCOPE's new Rapid Assessment Project (RAP) format, that "fast tracks" the work. With the RAP format, the entire project is completed in

an 18-month period. Over this time, a series of background papers on a topic are written and reviewed, a workshop that uses the background papers as its foundation and considers a series of crosscutting issues within the topic, and a peer-reviewed book is published that contains the background papers, papers summarizing crosscutting discussions at the workshop, and an overview paper. The first RAP publication is due out in the summer of 2003 and its subject is element interactions and their importance in global change.

Q Would it not be better to concentrate on a few, vigorous international programmes that channel scientific efforts?

R SCOPE functions as the environmental assessment arm of the International Council for Science (ICSU). SCOPE's mission is to identify emerging environmental issues, to review what is known about them, and to point out direction for new research. It is not the mission of SCOPE to then develop vigorous international programmes that actually do new research. However, SCOPE has been instrumental in the establishment of international programmes such as the IGBP and Diversitas that concentrate for long periods of time on defined issues.

Q Precisely now that the subject of fulfillment or violation of political resolutions of international organizations is so current, do you think that we should also rigorously check that all countries comply with the international commitments in environmental terms, as in the case of the Kyoto accords?

R SCOPE has and will continue to provide policy makers with the scientific information needed to make informed policy on major international environmental issues. SCOPE, to have its greatest impact, must be viewed as objective and not policy prescriptive.

On a more personal note, I am deeply disappointed that my own government has not recently been support of the Kyoto accords. As an individual I have worked and will continue to work towards sensible solutions to the problem of climate change.

Q In your opinion, what would be needed to take scientific opinions into account, both for the political planning as well as the decision making that can have serious environmental repercussions?

R First and foremost, we must provide decision-makers with sound scientific information that is communicated clearly. I think that the IPCC process is one of the best examples of the kind of information transfer that I am referring to. In the case of IPCC, its effectiveness is enhanced by the fact that governments have called for the information. A decision-makers request for information imparts a degree of legitimacy to the information gathering process and its products.

Second, where possible, we need to provide answers to the questions being asked by decision-makers. In my experience, scientists and decisions makers often talk past each other, such that we answer questions they have no interest in and they consider us non-responsive. A continued dialogue between scientists and policy makes will not only avoid these misunderstanding, but also

build a climate of trust that is essential if our work is to be taken into account.

Q Environmental problems can also directly affect human health, and in this sense SCOPE very appropriately includes the thematic block Health & Environment. What international organization would be responsible for spearheading and initiative of these characteristics, to establish international guidelines that are much more rigorous concerning the prevention and control of environmental risks?

R Several of the UN organizations and programmes would clearly be the clients for assessments relating to human health. SCOPE has a long and positive history of working with UN bodies such as UNEP and UNESCO.

Q What reasons or advantages could you cite for Spanish ecologists and environmental professionals to encourage them to participate in international programmes such as SCOPE?

R Many of the most pressing environmental problems that humankind faces are regional to global in scale. These are problems that often have no respect for national borders. Spanish ecologists and environmental professionals, and their counterparts the world over, must share knowledge as we work towards a sustainable biosphere. All partners in this quest will benefit from participating in international science. We will learn new ways of framing issues, cutting-edge analytical techniques, advanced integrated assessment approaches and so much more. Spanish ecologists and environmental professionals will both give and gain as participants in international scientific programmes such as SCOPE.