COLLABORATION AND SECTOR ACTIVITIES

Government, academia, industry, and NGOs are key actors in promoting and implementing sustainable chemistry.

Role of Government:
Government can promote sustainable chemistry by:

- establish and fund programmes on sustainable chemistry R&D,
- support efforts to inform industry and educate the general public of the importance and benefits of sustainable chemistry.

Role of Academia:
Academia can promote sustainable chemistry by:

- assess the impacts of chemical technologies on human health and the environment,
- engage in practical and cutting-edge research applicable to industrial processes and products,
- educate and training scientists, managing directors, and other workers in the chemicals industry, as well as students, about the importance of sustainable chemistry R&D.

Role of Industry
Industry can:

- design, develop, and manufacture products, benign for Human Health and the Environment
- continually improve manufacturing processes and products,
- provide society with product data relevant to human and environmental impacts.

Role of Professional Societies and NGOs
NGOs can:

- disseminate information on sustainable chemistry research and results and on how those results meet societal objectives,
- establish criteria for international standards for assessing sustainable chemistry R&D,
- provide awareness to and act as an interface between the scientific community and the public.

RESOURCES AND WEB LINKS

Organisation for Economic Co-Operation and Development, **Environment, Health & Safety Publication, Series on Risk Management, No. 15, 28-Mar-2002** [ENV/JM/MONO(2002)12]
http://www.oecd.org/ehs

Japan Chemical Innovation Institute
Green and Sustainable Chemistry Network
http://www.gscn.net

U.S. Environmental Protection Agency
Green Chemistry Program
http://www.epa.gov/greenchemistry

American Chemical Society
Green Chemistry Institute
http://www.acs.org

Inter-University Consortium of Chemistry for the Environment (Italy)
http://helios.unive.it/inca

Royal Society of Chemistry (UK)
Green Chemistry Network
http://www.chemsoc.org/networks/gcn

OECD

SUSTAINABLE CHEMISTRY

ENVIRONMENTAL DIRECTORATE

ORGANISATION FOR ECONOMIC

CO-OPERATION AND DEVELOPMENT

IOMC UNEP OECD
Inter-Organization Programme for the Sound Management of Chemicals

WHAT IS *SUSTAINABLE CHEMISTRY*?

Sustainable chemistry is the design, manufacture and use of efficient, effective, safe and more environmentally benign chemical products and processes. Within the broad framework of sustainable development, government, academia and industry should strive to maximise resource efficiency through activities such as energy and non-renewable resource conservation, risk minimisation, pollution prevention, minimisation of waste at all stages of a product life-cycle, and the development of products that are durable and can be reused and recycled.

OECD SUSTAINABLE CHEMISTRY INITIATIVE

The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental organisation in which representatives of 30 industrialised countries in North America, Europe and the Pacific, as well as the European Commission, meet to co-ordinate and harmonize policies, discuss issues of mutual concern, and work together to respond to international problems. The work of the OECD related to risk management is carried out by the Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, with Secretariat support from the Environment, Health and Safety Division of the Environment Directorate.

In 1998, OECD Member countries endorsed the start of work on a new initiative called "Sustainable Chemistry" which would encourage the development of environmentally benign chemicals. As a first step, a workshop was held in Venice of the same year to focus on the policy and programmatic aspects of sustainable chemistry initiatives.

One of the major recommendations made at the Venice workshop, and later endorsed by the Joint Meeting, was that OECD should encourage Member countries to undertake such research and facilitate the development of effective research activities in institutions and other organisations. Subsequent surveys indicated that a number of organisations had undertaken work (or were in the process of doing so) on R&D in sustainable chemistry, and many more were interested in co-operative research at the fundamental or pre-competitive level.

One of the main objectives of a second workshop held in Tokyo in 2000 was to develop guidance to assist OECD and others in developing effective research and development programmes. This document, *Need for Research and Development Programmes in Sustainable Chemistry (Series on Risk Management, No.15)* is based on the results of the surveys and input from participants at the workshop.

AREAS OF SUSTAINABLE CHEMISTRY R&D

Technical areas of sustainable chemistry R&D include:

- use of alternative synthetic pathways,
- use of alternative reaction conditions,
- design of chemicals that are inherently safer than current materials,
- use of renewable or recycled feedstocks,
- avoidance of persistent, bioaccumulative, and toxic substances,
- increased energy efficiency, and
- use of green analytical methods in processing.

BENEFITS OF SUSTAINABLE CHEMISTRY

The environmental and societal benefits of sustainable chemistry are many and include:

- avoiding the use of persistent, bioaccumulative, toxic, and otherwise hazardous materials,
- utilising renewable resources and decreasing consumption of non-renewable resources,
- minimising negative environmental impacts of chemical processing and manufacturing,
- improving material and energy efficiency,
- decreasing or eliminating the costs of hazardous waste treatment,
- reducing potential industrial liability,
- providing technologies that are economically competitive for and advantageous to industry,
- promoting an understanding of the benefits of sustainable chemistry, and
- attracting promising students to chemistry and related fields.

ASSESSING PRODUCTS AND PROCESSES

Criteria for assessing sustainable chemistry products and processes can include:

- impact on human health and the environment,
- safety of workers and users throughout the product life cycle,
- energy consumption and resource use,
- economic viability of the new technology, and
- evaluation of the above factors at the local, country, regional, and global levels.

These basic criteria can serve as a foundation for each organisation or country to establish its own specific criteria.