



Water and the Environment



This workshop will have as its goal to discuss the scientific frontiers of the main environmental issues related to the impact of hydrologic dynamics on sustainable development.

The Priority of Water

For the Presocratics, water was the principle of all things, and curiously enough it is only today that we have once again become aware that the survival of humanity and of all other species on earth depends upon the fate of water. Where water is absent, life is absent. Thus water, the common symbol of life for all mankind, valued and respected in all religions and cultures, has also become a symbol of social equity. Today we can say that the problem has two main facets: the first belongs especially to the natural sciences (study the great basins, conserve them and develop them in a sustainable way with relation to the rest of the environment); the second facet pertains more to the social sciences (fair distribution of water). For these reasons, the Pontifical Academy of Sciences, which has already organised several study weeks on this topic in the past, now wants to organise a first workshop referring principally to the first aspect, with a view to a second workshop in conjunction with the Pontifical Academy of Social Sciences.

Workshop Goals

The world is keenly aware of the fundamental role that water resources play for a safe and sustainable development. Moreover, society is also conscious of the serious danger that these resources are facing because of industrial development, megacities, contamination, and many types of conflicting uses. Concepts like Integrated Water Resources Management are commonly used as 'a process which promotes the coordinated development and management of water, land

and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (*Global Water Partnership TEC Background Paper No. 4*).

The above coordinated development needs a solid scientific background that will allow the decision making process to proceed with long term goals and equitable considerations. In this scientific foundation a key role is played by the science of Hydrology and its intimate links with Ecology and also with its sister geophysical sciences like Geomorphology, Geology, Climatology and Meteorology. As Hedin *et al.* have described it (2002, *Report to the U.S. National Science Foundation*), 'this disciplinary convergence will over the next several decades transform our understanding of basic processes that control the stability and sustainability of natural environmental systems. The ensuing findings will have extraordinary implications for our abilities to predict and manage how humans impact the health of ecosystems across local, regional, and global scales. Such knowledge is a critical component of a safe, sustainable and prosperous future'.

The workshop is addressed to the analysis and discussion of some of the key scientific issues that arise in the formulation described above. Because of the very wide scientific scope of the problem and its associated impacts, the workshop concentrates on some aspects that have a number of connections with the decisions that society faces in relation to water and the environment. The Vatican Academy plans to sponsor a following future meeting that will center on the more applied considerations of this most important scientific area.

Workshop Structure

The workshop is organized around 5 main topics: *Biodiversity*, *Global Hydrology*, *Climate Change*, *Land-Atmosphere Interactions*, and *River Basins*. In all of them hydrologic dynamics provides the underlying unifying theme through which all the 5 themes are studied and discussed. A central purpose of the meeting is to analyze the feedbacks and interactions between the 5 areas described above and explore the main scientific challenges that presently exist for a sound understanding of the hydrologic dynamics underlying some of the world most pressing environmental problems.

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