IUGS Looks at an "Alternative Agenda" for Environment and Development

In May 1986, IUGS President W.W.Hutchison presented a brief, summarized here, to the World Commission on Environment and Development, a high-level group set up by the Secretary-General of the United Nations. Under the leadership of Gro Brundtland, former Prime Minister of Norway, WCED is looking at critical problems affecting both the global environment and the processes of economic and social development. The Commission has already proposed an "alternative agenda" to direct attention to environmental problems in terms of their common sources in sectoral policies and related economic and trade issues. The aim is to develop strategies that are "anticipatory and preventive...., rather than reactive and curative."

THE ISSUES: The WCED will "deal simultaneously with several key issues such as carbon dioxide, trace gases and climatic change, air pollution and acid rain, in terms of their common source in energy policy." Likewise, the Commission will approach "soil erosion, desertification, loss of cropland, and wild life habitats from the perspective of their common sources in agriculture, land and food policies." (Emphasis added here.)

The IUGS brief (which complements Dr. Price's article in this issue on planning for the Global Change program), agrees that many of the growing environmental problems stem directly from industrial, economic, and resource policies. The increasing use of fossil fuels is leading to a build-up of CO₂ and other gases in the atmosphere, with important implications for climatic change within the lifetimes of our children. The growing exploitation, concentration and use of energy and metallic and non-metallic resources affect the environment in numerous ways, including disturbing and contaminating the water and soil, causing land to subside, and generating large amounts of waste. And the increase in the industrial and military use of radioactive and toxic substances is causing enormous environmental problems in the disposal of the waste by-products.

However, it is essential to take into account not only sectoral, economic and trade policies, but also natural processes, which operate regardless of the presence of man. These include: climatic changes, volcanic eruptions, earthquakes, sea-level variations, fluctuations in ocean circulation, soil formation and erosion, movement of water underground, rapid uplift of land masses, landslides and subsidence, and floods and tidal waves.

EXAMPLES AND ANALYSIS: For example, recent research in the Sahara has shown quite conclusively that where desert now exists there were rivers, savannas, wildlife and people, not once, but repeatedly. In southern Egypt and northern Sudan there are sites where early man survived comfortably in a wet period 180,000-200,000 years ago. In what is now the hyperarid core of the western Sahara in northern Mali, the fossil and sedimentary record shows that between 8,000 and 4,000 yBP there were several arid-humid cycles. By 4,500 yBP sheet floods indicate the onset of aridity, and the lakes began to recede around 4,000 yBP. As the desert set in 3,000 yBP man moved to the Atlantic coast of the Sahara where settlement lasted until around the time of Christ, or inland to the inhospitable but wetter mountains of the Air and Hagggar. It is clear here and in many other regions that

deserts are not simply man-made, and that changing policies towards landuse will not necessarily reverse what are natural processes.

There is little doubt that the CO₂ content of the atmosphere is increasing due to man's activities at a rate sufficient perhaps to cause a 2°C warming by the middle of the next century, with profound climatic consequences for agriculture, water supply and sea levels. However, we now know that about half the CO₂ produced by man is going into solution in the oceans. Likewise soils represent a large potential reservoir for carbon, but we have as yet little direct information on exchanges with the atmosphere and their control on the CO₂ system. Other greenhouse gases, too, may affect the climate: methane and nitrous oxide are certainly important.

Records of past, pre-industrial variations in atmospheric composition of these and other gases have only recently begun to emerge from studies of ancient air trapped in bubbles in the ice caps of Greenland and the Antarctic, and from analyses of the isotopic composition of the remains of marine organisms preserved in oceanic sediments. Gases and particles blown into the atmosphere during volcanic eruptions can have profound effects on short-term weather patterns, though it is only of late that we had the means, e.g. through satellites, to study and analyze these patterns. They will certainly not be controlled by changes in energy policy!

Other natural forces and phenomena must also be taken into account. National programs to develop new population centers, building codes, and approaches to land-use management have to take account of local soil and rock conditions, or of earthquake and volcanic hazards. Authorities must take appropriate measures to protect cities astride active fault-lines or near volcanoes that are not extinct, from the natural hazards inherent in their environment. Obviously this requires a full understanding of natural changes and an ability to predict them. Neither can society cope with the problems of population centers on unstable deltas or near eroding coastlines unless the natural processes of sea-level change, marine erosion, compaction and subsidence are considered.

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