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# Chapter 40

## The Amsterdam Declaration on Global Change

The scientific communities of four international global change research programmes – the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP), and the international biodiversity programme DIVERSITAS – recognise that in addition to the threat of significant climate change, there is growing concern over the ever-increasing human modification of other aspects of the global environment and the consequent implications for human well-being. Basic goods and services supplied by the planetary life support system, such as food, water, clean air, and an environment conducive to human health are being affected increasingly by global change.

Research carried out over the past decade under the auspices of the four programmes to address these concerns has shown that:

- *The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological and human components.* The interactions and feedbacks between the component parts are complex and exhibit multi-scale temporal and spatial variability. The understanding of the natural dynamics of the Earth System has advanced greatly in recent years and provides a sound basis for evaluating the effects and consequences of human-driven change.
- *Human activities are significantly influencing Earth's environment in many ways in addition to greenhouse gas emissions and climate change.* Anthropogenic changes to Earth's land surface, oceans, coasts and atmosphere and to biological diversity, the water cycle and biogeochemical cycles are clearly identifiable beyond natural variability. They are equal to some of the great forces of nature in their extent and impact. Many are accelerating. Global change is real and is happening *now*.
- *Global change cannot be understood in terms of a simple cause-effect paradigm.* Human-driven changes cause multiple effects that cascade through the Earth System in complex ways. These effects interact with each other and with local- and regional-scale changes in multidimensional patterns that are difficult to understand and even more difficult to predict. Surprises abound.
- *Earth System dynamics are characterised by critical thresholds and abrupt changes.* Human activities could inadvertently trigger such changes with severe consequences for Earth's environment and inhabitants. The Earth System has operated in different states over the last half million years, with abrupt transitions (a decade or less) sometimes occurring between them. Human activities have the potential to switch the Earth System to alternative modes of operation that may prove irreversible and less hospitable to humans and other life. The probability of a human-driven abrupt change in Earth's environment has yet to be quantified but is not negligible.
- *In terms of some key environmental parameters, the Earth System has moved well outside the range of the natural variability exhibited over the last half million years at least.* The nature of changes now occurring simultaneously in the Earth System, their magnitudes and rates of change are unprecedented. *The Earth is currently operating in a non-analogue state.*

On this basis, the international global change programmes urge governments, public and private institutions and people of the world to agree that:

- *An ethical framework for global stewardship and strategies for Earth System management are urgently needed.* The accelerating human transformation of the Earth's environment is not sustainable. Therefore, the *business-as-usual* way of dealing with the Earth System is *not* an option. It has to be replaced – as soon as possible – by deliberate strategies of good management that sustain the Earth's environment while meeting social and economic development objectives.
- *A new system of global environmental science is required.* This is beginning to evolve from complementary approaches of the international global change research programmes and needs strengthening and further development. It will draw strongly on the existing and expanding disciplinary base of global

change science, integrate across disciplines, environment and development issues and the natural and social sciences, collaborate across national boundaries on the basis of shared and secure infrastructure, intensify efforts to enable the full involvement of developing country scientists, and employ the complementary strengths of nations and regions to build an efficient international system of global environmental science.

The global change programmes are committed to working closely with other sectors of society and across all nations and cultures to meet the challenge of a changing Earth. New partnerships are forming among university, industrial and governmental research institutions. Dialogues are increasing between the scientific

community and policy makers at a number of levels. Action is required to formalise, consolidate and strengthen the initiatives being developed. The common goal must be to develop the essential knowledge base needed to respond effectively and quickly to the great challenge of global change.

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