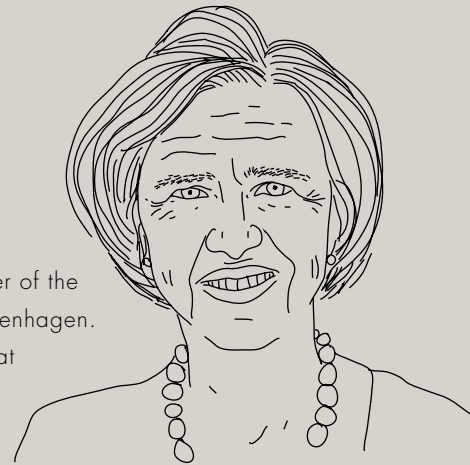


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ACHIEVING SUSTAINABILITY

The human demand for many natural resources is now so great that it exceeds the Earth's ability to replenish these resources. This resource demand is changing not only local environments but also the way in which the entire Earth System functions. A compelling example of this comes in the form of changes in the Earth's climate processes resulting from overuse of a common resource - the global atmospheric garbage dump for greenhouse gas waste. If use of this resource is not contained, then resulting climate changes may, ultimately, dramatically change the habitat conditions that have characterized the planet over the last 12,000 years. We are certain that human societies can prosper under the environmental conditions that the Earth has provided during this period because, although modern humans have existed on Earth for around 250,000 years, it has only been during these last 12,000 years that our species has really flourished. We do not, on the other hand, know how human societies would fare under drastically changed environmental conditions.

Climate change is not, however, the only resource issue facing our society. Resource scarcity (fossil fuels, water, land, phosphorous, biodiversity, metals, etc) is the single greatest threat to continued societal development. An absolutely fundamental prerequisite for, and the greatest challenge to, achieving sustainability is, then, that the human demand for the Earth's natural resources is brought to within the global supply. This is true both for those resources which are mined, harvested and otherwise collected from on or near the Earth's surface as well as those ecosystem services that are more difficult to quantify than material resources but just as essential for our survival. The Brundtland Report (1987), at least indirectly, acknowledged this when it proposed the now widely accepted

definition of sustainable development, i.e. "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The bad news is that the demand for resources has only increased relative to the global supply over the past 25 years. The good news is that society is much better equipped today than it was at the time of the Brundtland Report to actually quantify resource demand relative to global supply and, thereby, identify what actions are necessary to achieve and to monitor progress towards achieving this prerequisite for sustainability.

What has made it so is recognition that the Earth functions as an interconnected system and that human activities are a force that influence the workings of the system at the global level. Understanding - at least in overall terms - how this system works, makes it possible to identify the components and functions of the system (i.e. resources) that are particularly important and which of these are most vulnerable to human impact. Scientists are now beginning to propose what might be called "safe limits" for the amount of human impact that these components of the Earth System can tolerate without jeopardizing our global habitat. Thus, a capability has been developed within the natural sciences to quantify both the global supply and demand of many critical natural resources in the years since the Brundtland Report. Of course, that capability, in and of itself, does not bring society any closer to actually achieving sustainability. It does, however, provide decision-makers with a framework for identifying milestones en route to the goal of sustainability and a tool for assessing progress. Without concrete milestones and assessment tools, the vision of sustainability will never be more than just that - a vision.