



# SCIENCE AND RESEARCH



## Precautionary Principle; Prevention Rather Than Cure

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An innovative principle is emerging in international environmental policies of northwest Europe and Scandinavia. The precautionary approach is encouraging new thinking through its emphasis on clean production methods and prevention of environmental contamination in the belief that it is cheaper, easier and more practical to prevent pollution in the first place than to try to clean contaminated systems later on (2). As M. MacGarvin observes (3), the precautionary ideal arises from recognition that scientific understanding of ecosystems is complicated by a host of factors, including complex and cascading effects of human activities and uncertainty introduced by naturally chaotic population dynamics.

Precaution also serves as a progressive policy tool. The principle addresses a key question for environmental managers: how should policies be decided in the face of scientific uncertainty? The response from science is to engage in further rigorous studies better to understand the hidden workings of nature. But a similar response is not available within the culture of policy; in a setting that must cope with demands for economic growth, the pressures for resource extraction are immense. So important policy decisions (including continuing the status quo) are made despite poor knowledge of the ultimate effects of anthropogenic activities; this situation is proving increasingly problematic for modern environmental management.

Precautionary thinking counters traditional regulatory emphasis on 'end of pipe' pollution control technologies. Moreover, precaution fundamentally rejects assimilative capacity-for instance of the coastal oceans-as a convenient means of (hoped-for) dilution. Vague definitions of precautionary action are evolving as it is increasingly applied. Initially the principle was put forward in an international setting at the first ministerial conference on North Sea pollution in Bremen in 1984 (ref. 4); it was strengthened at the second North Sea conference in 1987 (London) and further reinterpreted at the third conference in 1990 (The Hague) (1-4). The approach now appears in non-marine applications such as regulating pesticides in Africa (Bamako Convention, 1990), and efforts to reduce atmospheric contamination (Second World Climate Conference, 1990) (5).

In sum, the emerging precautionary principle could become an important new link between science and policy. When first suggested, precautionary action was intended mainly to reduce marine contamination due to synthetic chemicals and heavy metals, and to halt dangerous activities such as ocean incineration because the burden of suspicion made it prudent to prevent such activities (3). In only a few years, preventive thinking behind this principle has spread to broader matters (2), and may yet become an eloquent step in achieving greener paths of development. Significantly, the United States has so far resisted the precautionary concept (1); whether the US position evolves towards acceptance of precautionary action will surely have much to do with the eventual fate of this rising principle.

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