

Precaution and analysis: two sides of the same coin?

Introduction to Talking Point on the precautionary principle

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The precautionary principle remains one of the most contested strategies in both risk assessment and risk management. Its most common definition, as found in the Rio Declaration on Environment and Development, states that: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (UN, 1992). The principle is now applied in an increasing number of national jurisdictions, economic sectors and environmental areas, and constitutes a crucial principle for policy-making in the European Union (EU; de Sadeleer, 2002).

However, there remain serious ambiguities and queries about the nature and appropriate role of the precautionary principle in governance (Cross, 1996; Morris, 2000; Majone, 2002; Löfstedt, 2004). For a better understanding of the debate and its implication for policy-making, it is helpful to distinguish three positions or mental framings of the precautionary principle (Resnik, 2003).

Within the frame of risk analysis, risk management relies on the best scientific estimates of probabilities and potential damages in order to judge the ability to tolerate the risk and design protective measures that are cost-effective, proportional to the threat, and fair to the affected population. In these terms, precaution might best be interpreted as being conservative when making judgements and

erring on the side of caution when calculating exposure or determining safety factors. In addition, as Martin Peterson points out in this issue (see page 305), "the precautionary principle can be interpreted as an analogous epistemic principle that prescribes that it is always more desirable to avoid false negatives than false positives when it comes to assessing risks."

Within the frame of precaution, risk is seen from the perspective of pervasive uncertainty, ambiguity and, in particular, ignorance. Precautious risk management therefore aims to ensure prudent decisions in situations where there is a high uncertainty about probabilities, outcomes or both, and a high vulnerability of the population at risk. Policy and regulatory instruments of precaution include minimization requirements, diversification of risk agents, containment in time and space, and close monitoring. It is not—as many critics believe—a call to ban potentially hazardous activities. As Andrew Stirling, the other contributor to this Talking Point (see page 309), states "[p]recaution does not automatically entail bans and phase-outs, but calls instead for deliberate and comprehensive attention to contending policy or technology pathways."

A third frame of deliberation has been advocated as an alternative or an addition to purely analytical procedures of both assessing and managing risks. Here, the task of risk management is to involve stakeholders and an interested public in designing risk management strategies based on the knowledge and value system of each stakeholder. Both risk assessment and the precautionary approach can use this strategy,

but it has been advocated either as an independent path to risk management or, more often, as a policy-oriented implementation of the precautionary approach (van den Daele, 2000).

In the recent past, advocates of each side have launched a fierce debate over the legitimacy of their approaches. One side argues that precautionary strategies ignore scientific results and lead to arbitrary or inconsistent decisions (Cross, 1996; Peterson, 2006). The precautionary belief that it is better to be safe than sorry could therefore be interpreted as a mandate to ban everything that might result in negative side effects. Such a rule would logically apply to any substance or human activity and would lead to total arbitrariness (Majone, 2002).

Accordingly, the principle has been labelled as ill-defined and absolutist, and is considered to lead to increased risk-taking, to be an ideology, to be unscientific or to marginalize the role of science (Sandin *et al*, 2002). Some analysts claim that using the precautionary principle runs the risk that science might be held "hostage to interest group politics" (Charnley & Elliott, 2002); others contest that policy-makers could abuse the precautionary principle to protect economic interests and to impede world trade (Majone, 2002).

Conversely, advocates of the precautionary approach argue that it does not automatically mean an immediate ban but rather a step-by-step diffusion of risky activities or technologies until more knowledge and experience is available (Fisher, 2001; Stirling, 2003). They have accused

their critics of ignoring the uncertainty and ambiguity of most hazardous situations and relying on data that often turns out to be insufficient for making robust judgments. They also claim that risk assessment techniques pretend to meet a high standard of scientific validity, rigour and reliability that cannot be sustained under scrutiny. Too many unpleasant surprises during the past few decades would therefore justify a more cautious and humble approach to claiming knowledge about possible risks (Gee *et al*, 2001).

The third approach has found wide acceptance among social scientists and risk analysts from academia but has had little impact on institutional risk analysis (Renn, 2004). There are, however, isolated examples of community participation in risk decisions, such as in the US Superfund programme that cleans up contaminated waste sites, or US legislation negotiated among regulators, industry and non-governmental organizations (Coglianese, 1997). However, in recent years, policy-makers have acknowledged that public participation provides many advantages because it transforms difficult issues of uncertainty into topics that can be negotiated. "If society participates in the production of policy-relevant scientific knowledge, such 'socially robust' knowledge is less likely to be contested than that which is merely reliable" (Funtowicz *et al*, 2000). Accordingly, the EU has highlighted the need for more stakeholder involvement and participation in risk management (EC, 2001). However, how to implement this in day-to-day risk management is still under dispute. Many scholars have also questioned the value of deliberative approaches in some settings, arguing that "when there is trust in the regulator, a top-down form of risk communication (information transfer) may be better than dialogue" (Löfstedt, 2005).

Martin Peterson and Andrew Stirling both agree that the precautionary principle does not constitute a decision rule. They argue that precaution is a 'state of mind' that might help decision-makers to avoid false negatives, in the words of Peterson, or to be more sensitive to uncertainties, ambiguities and ignorance, in the words of Stirling. The two authors disagree, however, on the role and reliability of classic risk assessments. Peterson believes that the existing tools are sufficient to yield valid and reliable results for informed decision-making, whereas Stirling argues that

few real-world problems are suitable for classic risk assessment as the scope of possible outcomes and/or their probabilities are often not clear. Peterson and Stirling also disagree about the function that precaution should exert on risk assessment. Stirling favours a precautionary route based on a larger set of assessment tools, whereas Peterson expresses great confidence in the ability of modelling tools to obtain the best estimate of the risk including a thorough characterization of uncertainty.

In my view, the main purpose of precaution is to avoid irreversible decisions. Although highly critical about the use of the precautionary principle itself, policy analyst Giandomenico Majone concedes that it does have a role in risk analysis, namely where "losses (or utilities) are unbounded" and where it is "clearly impossible to calculate expected values", for example, when there is a threat of "serious and irreversible damage" (Majone, 2002). In these cases, it is prudent to proceed in a way in which a decision can be reversed quickly if the outcomes or their probabilities turn out to be higher than expected. In such cases, banning is only one regulatory option; other options include containing the risk, setting boundaries to ubiquitous spreading or bioaccumulation, developing alternatives and/or minimizing exposure. Such a prudent approach to risk management would certainly be supported by representatives of all camps in this debate.

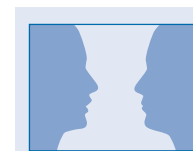
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For more discussion on this topic, see also Peterson M (2007) The precautionary principle should not be used as a basis for decision-making. This issue p305. Stirling A (2007) Risk, precaution and science: towards a more constructive policy debate. This issue p309.