

# Decisions under Risk and the Precautionary Principle: An Economist's Perspective

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The aim of this presentation was to analyze the Precautionary Principle from the perspective of Decision Theory, which represents the economist's framework of choice to study decision problems under uncertainty and risk.

The first part of the presentation reviewed the main elements of Decision Theory, with emphasis on what makes a decision problem under uncertainty different from one under certainty. The assumptions of the so-called Expected Utility model were discussed in some detail, and the expected utility decision rule was contrasted with that of safety-first (MaxiMin) behavior. With the help of specific examples, the discussion highlighted the distinct roles of probabilities and (contingent) payoffs in the decision rules. The notion of risk aversion was illustrated, as well as the representation and importance of subjective elements in the decision process.

To assess the Precautionary Principle in this setting, the presentation introduced several definitions of this principle, specifically those from: The Rio Declaration on Environment and Development (1992); The Second Conference on the Protection of the North Sea (1987); The European Union paper on the Precautionary principle (2000); The "Wingspread Statement" (1998). It was argued that these definitions are not necessarily mutually consistent and are amenable to divergent interpretations. The U.S. regulatory framework based on the notions of Risk Assessment and Risk Management was introduced at this point, and how that may relate to the Precautionary Principle was discussed.

The preliminary assessment offered was that the Precautionary Principle displays many reasonable features, such as: Lack of certainty is no excuse not to make a choice; Serious negative outcomes could be quite relevant, even when they are unlikely; and, Prevention is a substitute for "insurance." But the Precautionary Principle is vague and ambiguous: It can rationalize a wide range of choices; It can rationalize bad choices, especially in a dynamic context; And, it can be misused (e.g., protectionism). Furthermore, extreme interpretations of the Precautionary Principle, which implicitly call for safety-first decision rules, are not tenable from the viewpoint of decision theory.

The concerns that arise in a dynamic setting were discussed in some detail, and the Precautionary Principle was contrasted with a Learn-Then-Act principle. Specifically, it was argued that when future actions are a good substitute for current actions (e.g., abatement efforts), sometimes it may be better to wait before taking drastic actions. Ancillary issues in the application of the Precautionary Principle were discussed, such as the role of expected economic growth and rising living standards of future generations, and the role of government in regulating the risk associated with new products and new technologies.

The specific case study of Smallpox Vaccination was used to illustrate some of the standard tradeoffs that a government authority may face when making public decisions under uncertainty and risk. In such cases there are rarely risk-free alternatives. The Precautionary Principle can provide a useful organizing framework for risk communication and risk management. But the Precautionary Principle, *per se*, is neither necessary nor sufficient for a rational risk management policy.