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Environmental decision support systems

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We present a general framework for development of quantitative environmental decision support systems (EDSS). It relies on a normative approach to decision theory, which is based on the concepts of rational behavior as defined by the Savage axioms and their subsequent extensions and generalizations. To make decisions under uncertainty, our EDSS is buit upon the von Neumann-Morgenstern utility function that assigns numerical values to alternative strategies (e.g., a remediation effort versus natural attenuation) and the expected utility theory that allows the decision maker to choose between risky or uncertain prospects by comparing their expected utility values. We conclude by contrasting the proposed EDSS with other existing approaches to decision making, including cost-benefit analysis, which replaces expected utility with expected monetary value.