Assessing and managing multiple risks in a changing world — The Roskilde recommendations

Roskilde University (Denmark) hosted a November 2015 workshop, Environmental Risk—Assessing and Managing Multiple Risks in a Changing World. This Focus article presents the consensus recommendations of 30 attendees from 9 countries regarding implementation of a common currency (ecosystem services) for holistic environmental risk assessment and management; improvements to risk assessment and management in a complex, human-modified, and changing world; appropriate development of protection goals in a 2-stage process; dealing with societal issues; risk-management information needs; conducting risk assessment of risk management; and development of adaptive and flexible regulatory systems. The authors encourage both cross-disciplinary and interdisciplinary approaches to address their 10 recommendations: 1) adopt ecosystem services as a common currency for risk assessment and management; 2) consider cumulative stressors (chemical and nonchemical) and determine which dominate to best manage and restore ecosystem services; 3) fully integrate risk managers and communities of interest into the risk-assessment process; 4) fully integrate risk assessors and communities of interest into the risk-management process; 5) consider socioeconomics and increased transparency in both risk assessment and risk management; 6) recognize the ethical rights of humans and ecosystems to an adequate level of protection; 7) determine relevant reference conditions and the proper ecological context for assessments in human-modified systems; 8) assess risks and benefits to humans and the ecosystem and consider unintended consequences of management actions; 9) avoid excessive conservatism or possible underprotection resulting from sole reliance on binary, numerical benchmarks; and 10) develop adaptive risk-management and regulatory goals based on ranges of uncertainty.

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