

Researchers find smart decisions for changing environmental times

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You've just been told you're going on a trip. The only problem is, you don't know where you're going, how you'll be traveling, or what you'll do when you get there.

Sound like a wild ride? It's the one our planet is on right now. As land use, [human population](#), consumption and atmospheric greenhouse gas concentrations change at an unprecedented pace with complex and unpredictable interactions, it's anybody's guess where we'll end up or what we can do to ensure the most favorable outcome.

Recognizing that "guess" is not good enough when talking about the viability of an entire planet, researchers from the University of Minnesota's College of Food, Agricultural and Natural Resource Sciences and Institute on the Environment teamed up with others at the University of Wisconsin and the Stockholm [Resilience](#) Center to find a better way. Together, experts evaluated existing environmental decision-making tools and constructed an approach they think will give us the best chance at making good choices for an uncertain future. They reported their work in the most recent issue of *Trends in Ecology and Evolution*.

"We're trying to do a good job of leaving behind a [habitable planet](#)," said Stephen Polasky, a University of Minnesota applied economist, Institute on the Environment resident fellow and lead author on the paper. "It's easier to be a good planetary steward when you know where you're going. But we're driving with a muddy windshield. We could make mistakes and end up where we don't want to be."

The researchers looked at four "tools to clear the windshield" -- strategies for making decisions in the face of uncertainty: decision theory, threshold approaches, scenario planning and resilience thinking. Evaluating the strengths and limitations of each, they recommended bringing the best aspects of all together to create a two-phase process that boosts the ability to gather new information and perspectives; make decisions without full knowledge, but using best knowledge; and learn from decisions and then incorporate the lessons learned into future decisions.

"There's been a lot of review of these different approaches and their utility, but not an integrative framework," said co-author Bonnie Keeler, an IonE interdisciplinary graduate fellow. "We can't just use tools from economics; we can't just use scenarios; we can't just use thresholds. We need to think of all of these in combination."

In the first phase of the innovative strategy, decision-makers create a list of possible scenarios that include responses that allow plenty of room for rolling with the punches if something unexpected happens. The second phase involves choosing among courses of action based on those scenarios and available knowledge. After the decision is made and the consequences emerge, the process then starts again with the insights gained from experience factored in.

"The take-home message is that there are some very powerful tools out there, like decision theory, but they typically require that you know a lot [about the likelihood of various possible outcomes]," Polasky said.

"We're trying to think about a broader array of things that possibly could happen and anticipate what we might do about them."

Polasky said he hopes the new approach will help decision-makers recognize the value of looking at a wide range of possible scenarios when selecting the path most likely to lead to a desirable outcome. So,

for example, when making insurance decisions, companies or individuals would consider not only the events that have happened in the past, but also unprecedented events that could occur in the future.

"We may think we know the probability of a storm hitting my house," he said. "What if the climate is changing so we don't know the future probability of a storm? [We need to] be clever and creative and take a wide view so we're not surprised by things."

Provided by University of Minnesota

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