

In search of compromise among climate risk management strategies

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Balancing the impacts of climate change risks for all involved may not be within the realm of economics or physics, but a novel approach may help to achieve a better compromise, according to Penn State and Cornell climate researchers.

"Different [climate](#) risk management strategies can yield diverse and potentially severe impacts across different global stakeholders," the researchers said in a recent issue of *Climatic Change*. They add that solving this problem requires clear knowledge of the trade-offs across different risk management strategies.

"Since the Paris talks, a lot of attention has gone to mitigation of carbon dioxide, but this won't always work," said Gregory Garner, postdoctoral fellow in Earth and Environmental Systems Institute in Penn State's College of Earth and Mineral Sciences. "Traditionally, analysts use integrated assessment models that aggregate all the individual preferences across the globe into a single function. What we found is that this formulation hides significant trade-offs relevant to a set of diverse stakeholders."

The highest point on the island nation of Tuvalu, located halfway between Australia and Hawaii, is about 15 feet. A relatively small sea-level rise would make this small country uninhabitable. However, the Paris talks set a goal of limiting atmospheric warming from greenhouse gases to 2 degrees Celsius—3.6 degrees Fahrenheit—which could produce sea level rise over time that poses serious risks to places such as

Tuvalu. Certainly not all trade-offs can be navigated to accommodate everyone's goals, but the researchers demonstrated how an alternative approach can be used to improve this navigation.

Rather than look at one aggregated number, the researchers used an integrated assessment model to look at the multidimensional trade-offs of four goals—to increase global economic growth, to achieve reliable temperature stabilization, to minimize climate damages and to minimize abatement costs.

"What you don't see in the traditional method is compromise," said Garner. "If we can trade a small portion of economic growth for earlier, more aggressive, carbon abatement, we could see a large increase in probability of stabilizing temperature below 2 degrees Celsius. But unless you look at the components separately, you don't see this potential compromise." Balancing all four goals is not easy, but having the option of looking at what happens when any of these four goals is altered can help policy planners and climate assessors to better navigate these trade-offs and to address some of the ethical problems involved with mitigating climate change. Using this approach can improve the ability of integrated assessment models to provide decision support.

Provided by Pennsylvania State University

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