

# Scientists suggest how countries can cooperate on climate

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When countries try to work together to limit the effects of climate change, the fear of being the only nation reducing greenhouse gas emissions – while the others enjoy the benefits with no sacrifice – can bring cooperation to a grinding halt.

In a commentary in the Early Edition of the *Proceedings of the National Academy of Sciences*, Thomas Dietz, professor of sociology and environmental science and policy and assistant vice president for environmental research at MSU, and Jinhua Zhao, director of the MSU Environmental Science and Policy Program and professor of economics and agricultural, food and resource economics, suggest using game theory and a scalable method of rewards and punishments (called linear compensation) to help develop strategies that encourage all nations to participate fully in greenhouse gas mitigation programs.

Dietz also is a member of the MSU Center for Systems Integration and Sustainability.

"If we assume that each nation will act rationally in its own self-interest, then the path to reducing climate change risk is to design a set of rules for [emissions](#) that countries will agree to because they find the rules beneficial," said Dietz. "Punishments for not meeting the emissions targets are an important part of the design, but these punishments may discourage nations from joining. That's where the mechanism of linear compensation is useful."

Instead of imposing a fixed punishment, linear compensation calls for the punishment to be adjusted relative to how well other nations met the emissions goals.

"So if most other nations also failed to meet the emissions targets, the punishment for each nation would be less – nations would be punished most for being the farthest away from the results of the other nations," Dietz explained.

"A key feature of linear compensation is that if a nation fails to meet its treaty obligations, other nations punish it by reducing their own abatement," said Zhao. "So each nation has leverage: its own abatement helps make other nations abate more. This is the beauty of the linear compensation mechanism."

Provided by Michigan State University

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