

The global economics of climate action

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Climate change has serious consequences for the environment and people and is a major threat to economic stability. A new assessment published in *Nature Climate Change* reviews innovative, integrated research that underpins the economic case for strong near-term climate action.

Economic studies analyzing the costs and benefits of ambitious and rapid climate action have struggled to build a strong case due to methodological difficulties in trying to quantify all climate impacts. A new analysis looks at a pioneering approach to project economic impacts along climate mitigation pathways, finding that near-term emissions reductions are globally economically optimal, with central estimates for the "optimal warming" around 1.8-1.9°C by 2100.

Cost-benefit analyses of climate change impacts generally fall in one of two groups. The first group uses [statistical methods](#) to relate climate and weather patterns to economic productivity. While there have been improvements in this area, such methods remain a "black box"—it is not possible to easily relate economic productiveness to heat- or drought-related mortality. The second group adds up various climate impacts calculated in a more transparent and detailed manner, but is unable to quantify all impacts as well as all the interactions between them over time.

The assessment finds that new research takes a pioneering approach to build on previous work with increased detail incorporating some of the interaction between sectors, improving upon the methods of previous studies. The new study calculates the relative benefits and costs of climate mitigation and [climate impacts](#) in three integrated assessment models. These models have traditionally focused on mitigation when simulating future climatic and economic trajectories, with limited multi-model studies of detailed [economic impacts](#) along these pathways.

To narrow the gap, the new work analyzes these factors together to calculate the economically optimal emissions reductions and resulting global temperature trajectories for each model. The damage functions in the models, which relate GDP to temperature and [sea-level rise](#), account for impacts on agriculture, forestry, fisheries, floods, road infrastructure, energy supply and demand, and labor productivity. Using this novel

approach, the researchers estimate that the avoided damages are 1.5-3.9 times higher than the costs of climate mitigation. In other words, one euro invested in climate solutions saves the world about 1.5 to 4 euros in effects from [climate change](#).

"This new, more integrated approach is a reminder that there has been a disconnect between climate economics and holistic analyses, drawing on multiple lines of evidence. With this new study, this disconnect seems to be getting smaller, with global economics also supporting strong climate action," notes IIASA researcher Jarmo Kikstra. "It is clear that what is economically optimal is (still) not fully aligned with global climate targets. However, while economists may historically not have been able to provide the strongest arguments, new studies such as this one increasingly support urgent climate action."

More information: Jarmo S. Kikstra et al, Strong climate action is worth it, *Nature Climate Change* (2023). [DOI: 10.1038/s41558-023-01635-2](#)

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