

# Scientists argue current climate change models understate the problem

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A new study on the relationship between people and the planet shows that climate change is only one of many inter-related threats to the Earth's capacity to support human life.

An international team of distinguished scientists, including five members of the National Academies, argues that there are critical components missing from current climate models that inform environmental, climate, and economic policies.

The article, published in the *National Science Review*, describes how the recent growth in resource use, land-use change, emissions, and pollution has made humanity the dominant driver of change in most of the Earth's natural systems, and how these changes, in turn, have important feedback effects on humans with costly and serious consequences.

The authors argue that current estimates of the impact of [climate change](#) do not connect human variables—such as demographics, inequality, economic growth, and migration—with planetary changes. This makes current models likely to miss important feedbacks in the real Earth-human system, especially those that may result in unexpected or counterintuitive outcomes.

Furthermore, the authors argue that some of the existing models are unreliable. The United Nations projections of a relatively stable population for the whole of the developed world depend, for instance, on dramatic, and highly unlikely, declines projected in a few key countries. Japan, for example, must decline by 34%, Germany by 31% and Russia by about 30% for the projected stability in total developed country population to be born out.<sup>12</sup> In addition, countries often highlighted for their low birth rates, like Italy and Spain, are not projected to decline by even 1% for decades.

In this new research, the authors present extensive evidence of the need for a new type of model that

incorporates the feedbacks that the Earth System has on humans, and propose a framework for future modeling that would serve as a more realistic guide for policymaking and sustainable development.

"Current models are likely to miss critical feedbacks in the combined Earth-Human system," said co-author Eugenia Kalnay, professor of Atmospheric and Oceanic Science at University of Maryland. "It would be like trying to predict El Niño with a sophisticated atmospheric model but with the Sea Surface Temperatures taken from external, independent projections by, for example, the United Nations. Without including the real feedbacks, predictions for coupled systems cannot work; the model can get away from reality very quickly."

**More information:** "Modeling Sustainability: Population, Inequality, Consumption, and Bidirectional Coupling of the Earth and Human Systems" [DOI: 10.1093/nsr/nww081/2669331/](https://doi.org/10.1093/nsr/nww081/2669331/)

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