

Potentially large economic impacts of climate change can be avoided by human actions

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People are less motivated to take action if an outcome is uncertain, and this could be true for climate-related issues. The uncertainty in climate response to the increase in greenhouse gas concentration, which is often believed to be substantially large, makes it difficult to believe the benefit

of reducing emissions or the effectiveness of making society more resilient to climate-related hazards. This could be one of the reasons for inaction even though urgent action is called for. A new study published in *Nature Climate Change*, conducted by a Japanese research team estimates economic impacts of climate change and suggests that mankind's decisions and actions can overwhelm the uncertainty in climate response in terms of reducing the impact of climate change.

Estimation of the economic impacts of [climate change](#) is itself extremely challenging because it can affect society in many ways. Collaboration between researchers in a diverse range of fields enabled the research team to conduct a global-scale assessment covering the economic impacts associated with [climate](#) change for nine impact sectors: the economic impacts arising from changes in [agricultural productivity](#), undernourishment, heat-related excess mortality, cooling/heating demand, occupational health costs, capacity of hydroelectric power generation, capacity of thermal power generation, fluvial flooding, and coastal inundation.

Describing the novelty and significance of the study, Dr. Hijioka, the research managing director of Center for Climate Change Adaptation, National Institute for Environmental Studies states, "This is very special research, with no equivalent in the world."

The estimated value of the aggregated economic impacts had a large divergence depending on three assumptions: socioeconomic conditions, amount of greenhouse gas emissions, and climate responses to the increased greenhouse gas concentration. Under the most pessimistic combination of assumptions, the estimated economic impact will be equivalent to 8.6 percent of the global total GDP at the end of the 21st century, while it will be limited to around or less than 1 percent if the 2-degree target, which was adopted in the Paris Agreement, is achieved and societal resilience to climate-related hazards improves. More

importantly, the results also indicated that the contribution of the uncertainty in the climate response to the divergence—or variance—of the estimates was minor compared to the contribution of the differences in the anthropogenically directed societal pathways (i.e., greenhouse gas emissions and socioeconomic developments). "This means that mankind has the potential to determine the scale of the economic impacts of climate change," explains Dr. Takakura, a researcher at National Institute for Environmental Studies.

According to the results of this study, the future is uncertain mainly because how we behave is uncertain, rather than because how the climate behaves is uncertain in terms of the [economic impacts](#) of climate change. "In other words, we can choose the future by taking or not taking actions, and have responsibility for the outcome," he added.

More information: *Nature Climate Change* (2019). [DOI: 10.1038/s41558-019-0578-6](#)

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