

Climate change is already having an impact on our incomes

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Within the next 26 years, climate change will reduce global income by about 19% relative to a fictional world without global warming. By 2050, this equates to a global income loss due to climate change of \$38 trillion per year. This loss is the combined impact of climate change on various aspects that are relevant for economic growth such as agricultural yields, labour productivity and infrastructure.

This huge economic impact will result from the greenhouse gas emissions that have already been pumped into the atmosphere so far. Future emissions will make things worse. Under a business-as-usual scenario, average global income losses due to climate change may exceed 60% by 2100. On the other hand, if emissions fall to net zero by 2050, income declines will stabilise at about 20%.

These are the outcomes of a new study by researchers at Germany's Potsdam Institute for Climate Impact Research, reported in the scientific journal *Nature*. The study is based on empirical data on actual climate-related impacts on economic growth in more than 1,600 subnational regions around the world over the past 40 years. These data have been

combined with projections of the impacts of changes in temperature and rainfall patterns through to 2050.

Much higher than previous estimates

These estimates are much higher than previous estimates in scientific studies. According to the authors of this study, this is because their study is more sophisticated. Previous studies are mostly based on damages related to rising temperatures at a national level only. This new study also included the impacts of rainfall and extreme weather over the last 40 years in 1,600 subnational regions, thus better representing the local variability of the impact of weather extremes.

Inequalities are increasing

The results are consistent with previous studies in disproportionately severe impacts on countries least responsible for climate disruption, further exacerbating inequality. In the United States and Europe, average income decline is estimated at about 11%, compared with 22% in Africa and south Asia. The countries that will suffer the most from the damages between now and 2050 are those that are least responsible for climate change. They also have the least resources to adapt to it.

Income losses are projected for all regions except those at very high latitudes, at which reductions in temperature variability actually bring benefits.

Shocking results

These results are downright shocking, and yet they are a lower bound estimate. Not only with respect to the ongoing future emissions, but also because many major climate impacts have not yet been incorporated into the analysis, including heatwaves, sea level rise, tropical cyclones, tipping points, and damage to natural ecosystems and human health.

Limiting global warming pays off

Just like many studies have shown before, this study illustrates the economic benefits of mitigating global warming and achieving the Paris Climate Agreement. The damages of climate change from greenhouse gas emissions in the past already outweigh the mitigation costs. By 2050, global income loss due to climate change is estimated to be \$38 trillion per year. The costs of limiting global warming to 2 °C are estimated to be 'only' \$6 trillion per year by 2050.

However, a major impact of climate change on global economy can no longer be avoided. Stronger adaptation strategies are therefore needed, particularly in poorer, worst-affected countries, to cope with the changes up to 2050 that are already locked into the climate system, the authors conclude.

Source: Kotz et al., 2024. The economic commitment of climate change. Nature 628: 551-557.