

# Climate change and the non-linear impact of precipitation anomalies on income inequality

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## Abstract

Climate anomalies have been convincingly shown to have adverse economic impacts on our societies. Although studies find that climate change might increase global inequality by widening disparities between countries, its possible effects on within-country income distribution have been little investigated. Further, the role of rainfall anomalies is often deemed as marginal. Using statistical techniques traditionally employed in economics, we show that extreme levels of precipitations exacerbate within-country income inequality. Crucially, the strength and direction of such non-linear relation depend on the agricultural intensity of an economy. With bottom-earners in developing countries being primarily employed in mainly rainfed agricultural sectors, anomalies that disproportionately affect agricultural income translate into higher economic disparity. Our results indicate that a 1.5 standard deviation increase in precipitations from average values has an effect on bottom income shares that is 35 times stronger for countries with high employment shares in agriculture. Our projections with modeled future movements in precipitations and temperatures reveal highly heterogeneous patterns on a global scale, with income inequality worsening especially in high agricultural-intensity economies in Africa. Our results point to rainfall anomalies - in addition to temperature's - and the degree of dependence on agriculture as crucial factors in assessing distributional impacts of climate change.