

Extreme poverty and shared prosperity under socioeconomic and climatic uncertainties

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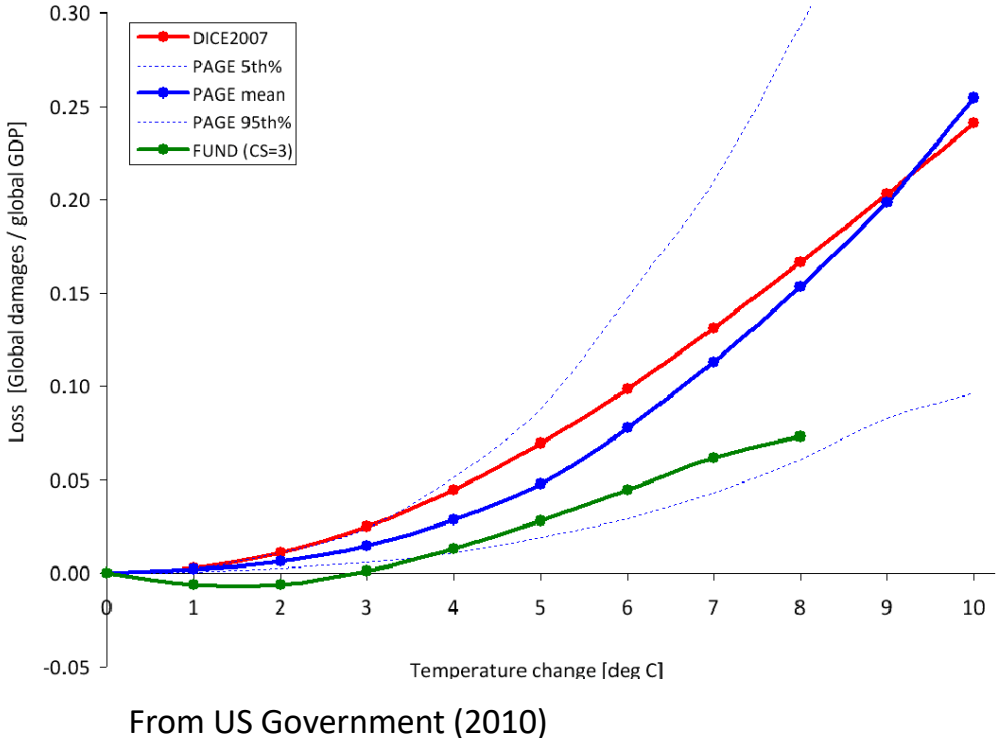


3 main points in this presentation

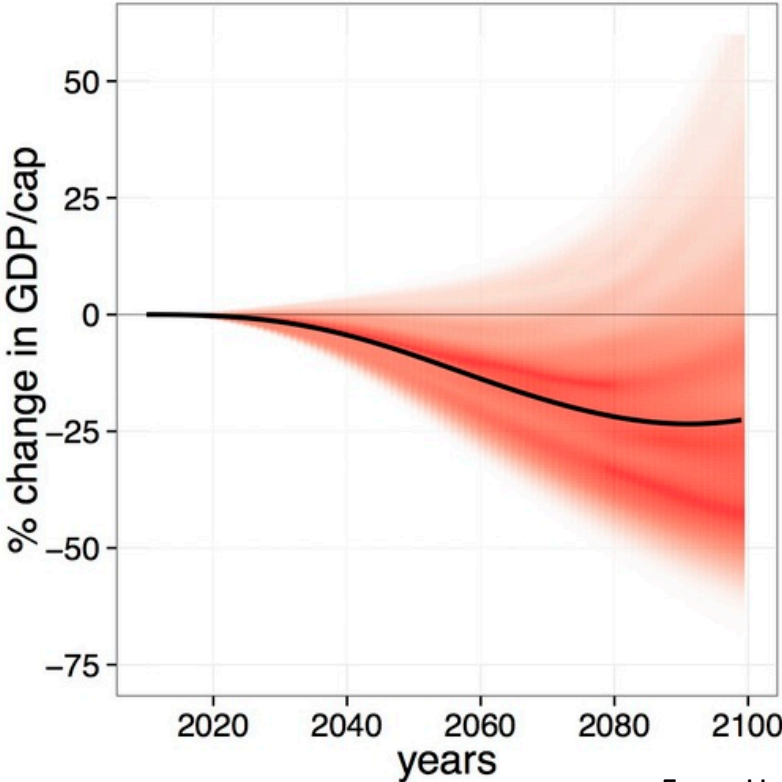
- GDP is not sufficient (or even not helpful) as an indicator for climate change impacts
- By 2030, what happens to people in the baseline is the most important driver of future climate change impacts
- The main drivers of this vulnerability are context-specific, making it hard to build universal scenarios

There are many assessments of the GDP impact of climate change

Integrated Assessment Models (or process-based models)



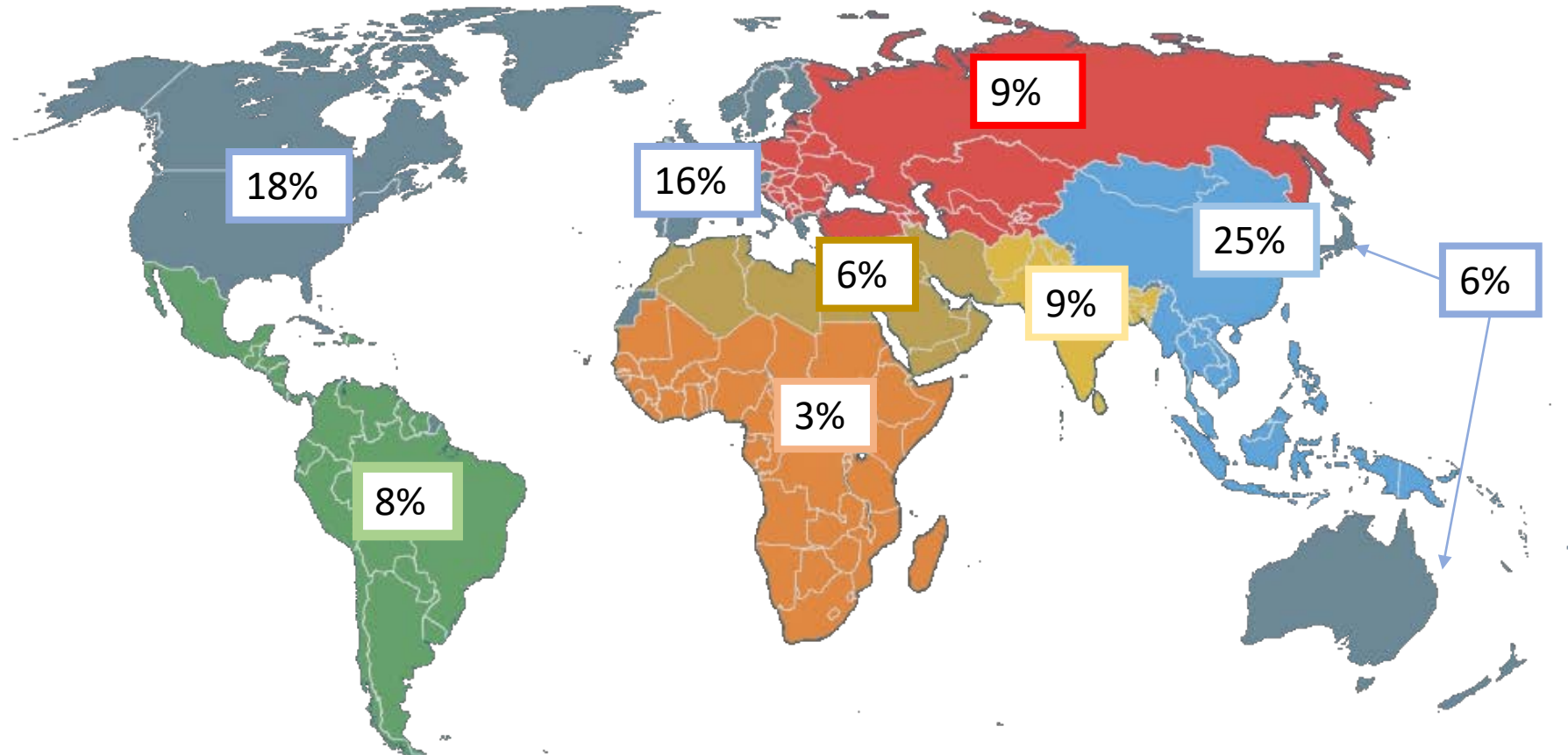
Empirical estimates (econometric work)





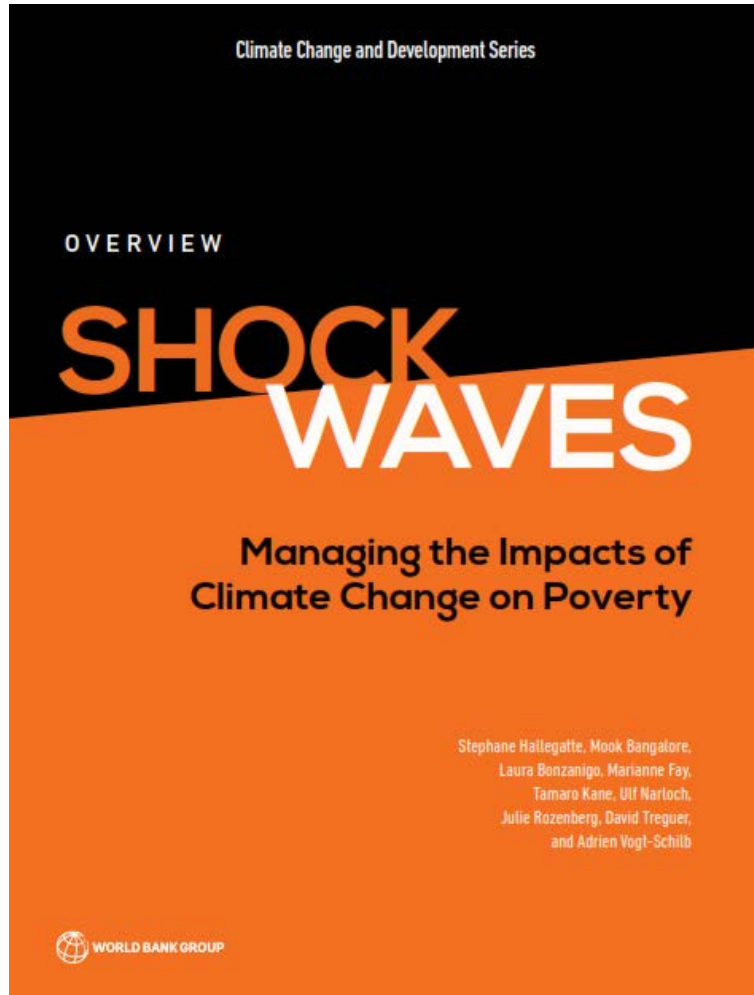
GDP is a poor indicator
of the severity of
climate change

Share of GDP by world regions



What if the important question is not the impact on GDP, but the impact on poverty and welfare?

Previous reports / publications



PERSPECTIVE

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nature
climate change

Climate change through a poverty lens

Stephane Hallegatte¹ and Julie Rozenberg^{2*}

Analysis of the economic impact of climate change typically considers regional or national economies and assesses its impact on macroeconomic aggregates such as gross domestic product. These studies therefore do not investigate the distributional impacts of climate change within countries or the impacts on poverty. This Perspective aims to close this gap and provide an assessment of climate change impacts at the household level to investigate the consequences of climate change for poverty and for poor people. It does so by combining assessments of the physical impacts of climate change in various sectors with household surveys. In particular, it highlights how rapid and inclusive development can reduce the future impact of climate change on poverty.

Very few quantified estimates of the impact of climate change on poverty have been proposed^{1,2}. The economic impact of climate change is almost always analysed at aggregated levels³. Studies consider regional or national economies, with various sectoral breakdowns, to assess the impact of climate change on macroeconomic aggregates such as gross domestic product (GDP) or aggregate consumption. Most studies therefore show that poor countries are more vulnerable than rich countries—not that poor people are more vulnerable than rich people^{4,5}. A few studies have investigated the implications of such aggregate impacts for households, and have looked at impacts on poverty and poor people⁶. But these studies follow a top-down approach where aggregate impacts are estimated first, and the micro-level consequences for households are considered second.

There are good reasons to start with the impact of climate change on economic growth when investigating the impact on poverty. We know that aggregate economic growth is fundamental for poverty reduction: in the past decades, most of the reduction in poverty was achieved by growing the size of economies, not by redistributing income^{14,15}. But economic growth is not the only channel through which climate change can affect poverty, and aggregated approaches are insufficient.

First, climate impacts on aggregate economic metrics—such as GDP—and impacts on poor people may be only weakly correlated. Poor people represent an extremely small share of national income—for instance the income of the poorest 20% of the households in Panama represent only 3% of GDP—so the impacts of climate change on poor people may have almost no impact on national income. One can imagine a scenario where only the poorest are affected by climate change: in that case, GDP would barely change, but poverty may increase nevertheless. Second, the sectors and occupations represented in models of national economies may not be the ones that provide income to many poor people. For instance, non-commercial extraction from forest and other ecosystems represents up to 30% of consumption in some poor tropical communities, reducing poverty by up to 14% (ref. 16). Such consumptions are not represented in national accounts and macroeconomic models, which cannot capture the poverty effects of climate change impacts on ecosystems.

The poverty impact of climate change

In a recent World Bank report (*Shock Waves: Managing the Impacts*...

a bottom-up approach starting from the impacts of climate change at the household level, in the spirit of previous work on food prices and poverty^{18,19}. This section summarizes the main findings of this report on the impact of climate change on poverty and poor people, but also reports on new results from analyses done after the publication of the report.

Findings confirm that poor people may be heavily affected by climate change even when impacts on the rest of the population remain limited. Many household surveys with self-reported shocks show that poor people are more often affected by environmental shocks, that poor people are losing more—relative to their wealth—when they are affected by a shock, and that poor people receive less post-shock support from friends and family, the financial system, and social safety nets. Using Demographic and Health Survey (DHS) data and hazard maps, we find that poor people are more often exposed to floods, droughts, and extreme heat^{20,21}. In Nigeria, for instance, the most poor 20% of people are 50% more likely to be affected by a flood, 130% more likely to be affected by a drought, and 80% more likely to be affected by a heat wave than the average Nigerian. Case studies in Bangladesh, India, and Honduras also suggest that poor people are losing two to three times more than non-poor people when hit by a flood or storm. Climate-related shocks can keep people in poverty by making it more difficult for households to accumulate assets, regularly wiping out their stock of assets, or even creating irreversible impacts on human capital (through health or educational impacts)^{22,23}.

These findings support a bottom-up approach, based on individual or household-level vulnerability, instead of a macro-level approach. To follow such an approach, we use a global database with 92 household surveys that describe the current distribution of income and occupations in 92 countries—the International Income Distribution Data Set, created at the World Bank. Then, we use micro-simulation techniques^{24,25} to project the evolution of these households until 2030, driven by demographics and socioeconomic changes.

In our model, the population of each country is represented by a set of thousands of representative households, described by the share of the country's population they represent (which is referred to as their 'weight') and their characteristics, namely the number of people in the household and their age, education level, sector of employment, employment status, and income. To model the representative households of the future, we change the income and

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Background Paper

Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030

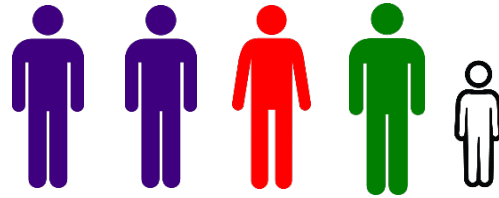
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 WORLD BANK GROUP
Climate Change Group

&
Global Facility for Disaster Reduction and Recovery
September 2020

2 innovations in the method

- We model impacts directly on households instead of using GDP (micro-simulation)



- We systematically explore the uncertainty pertaining to future demographic and socio-economic changes



Projecting households in 2030 requires assumptions on a number of uncertain variables

Structural change



Demography



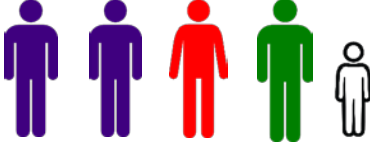
Productivity growth



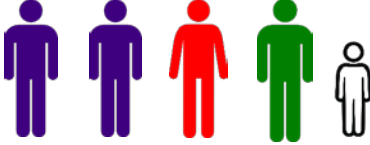
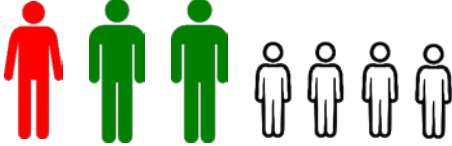


Redistribution



Examples of representative households

	Weight in 2018	Income in 2018
	10,000	10
	50,000	5
	200,000	3
	200	25
	4,000	70

We readjust weight and income of future household (1 000 times)

	Weight in 2018	Income in 2018	Weight in 2030	Income in 2030
	10,000	10	15,000	30
	50,000	5	4,000	25
	200,000	3	50,000	5
	200	25	2,000	70
	4,000	70	10,000	150

Climate impacts through five different channels



- Increasing food prices
- Reducing available household income



- Decreasing productivity
- Decreasing food demand and thus farmers income



- Reduced labor productivity for outside workers
- Share of outside workers differs per sector



- Increasing severity and occurrence of floods, drought, cyclone, and storm surges



- Increasing prevalence and severity of malaria, diarrhea, and child stunting



Propagating climate impacts to household income

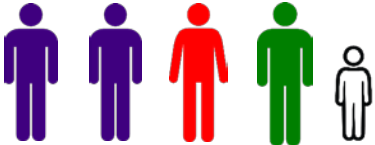


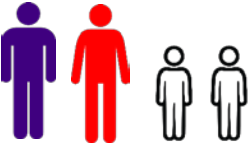

	Weight in 2018	Income in 2018	Weight in 2030	Income in 2030
	10,000	10	15,000	30 28
	50,000	5	4,000	25 23
	200,000	3	50,000	5 8
	200	25	2,000	70 50
	4,000	70	10,000	150 140

Illustration on Bangladesh

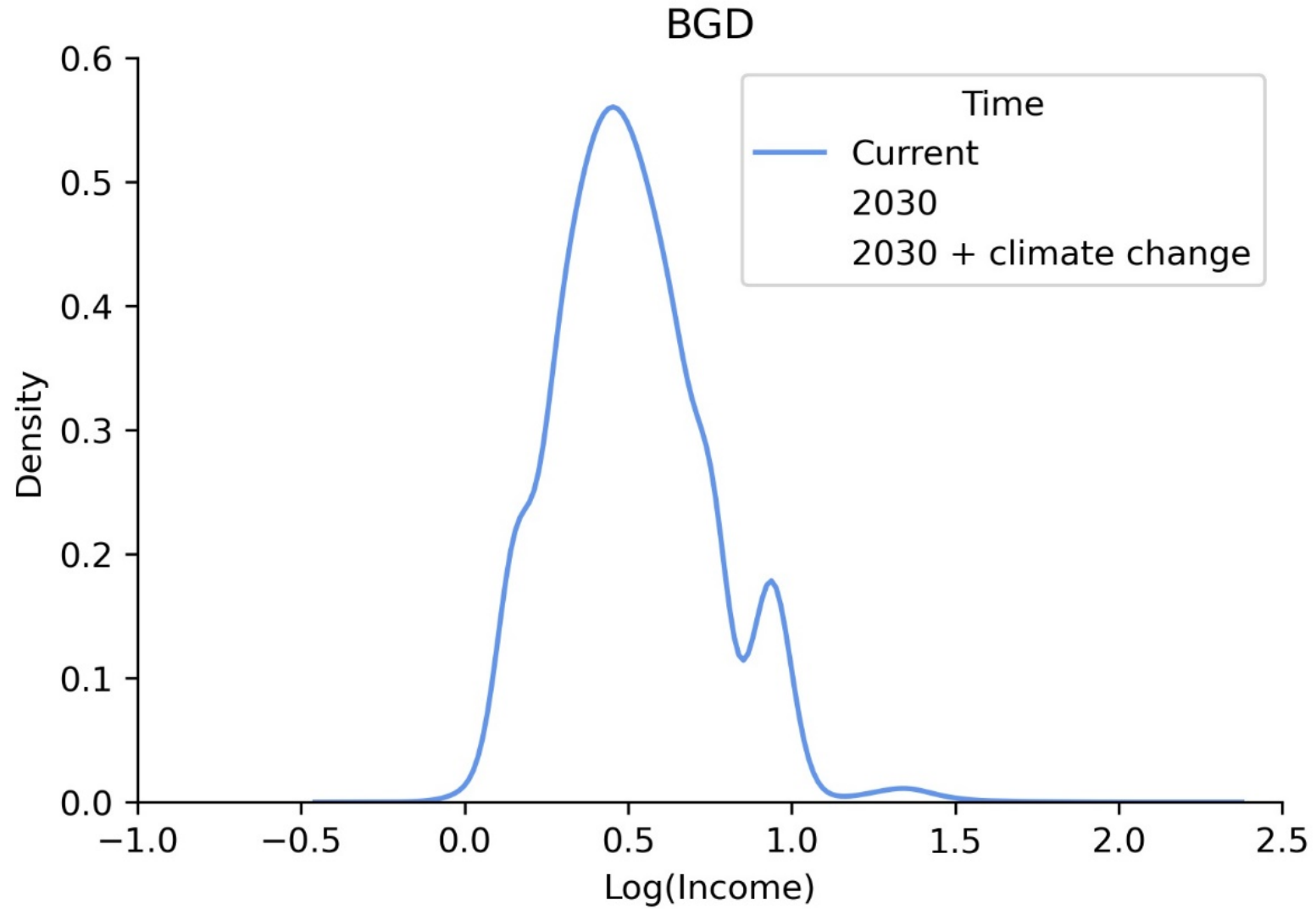


Illustration on Bangladesh

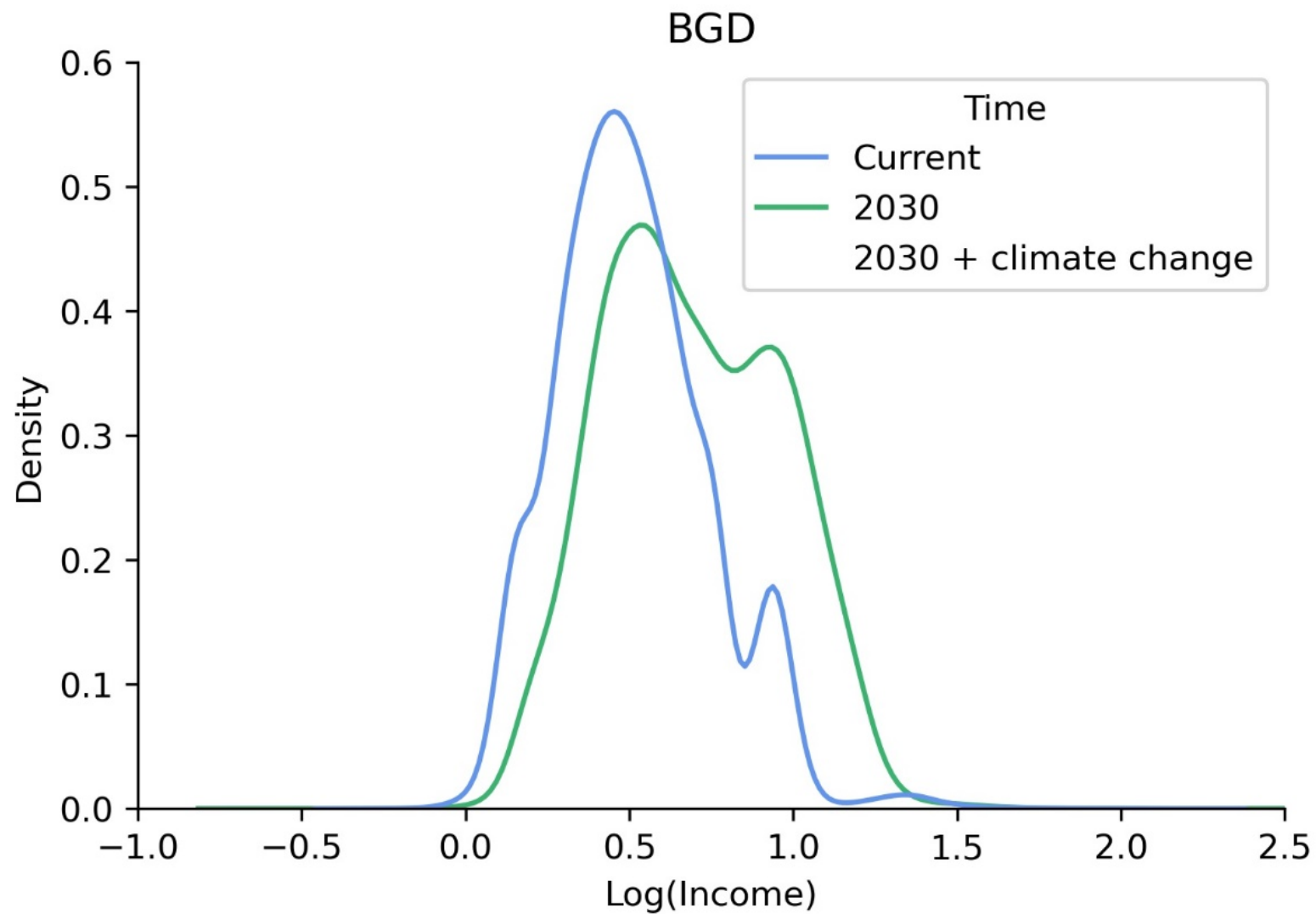
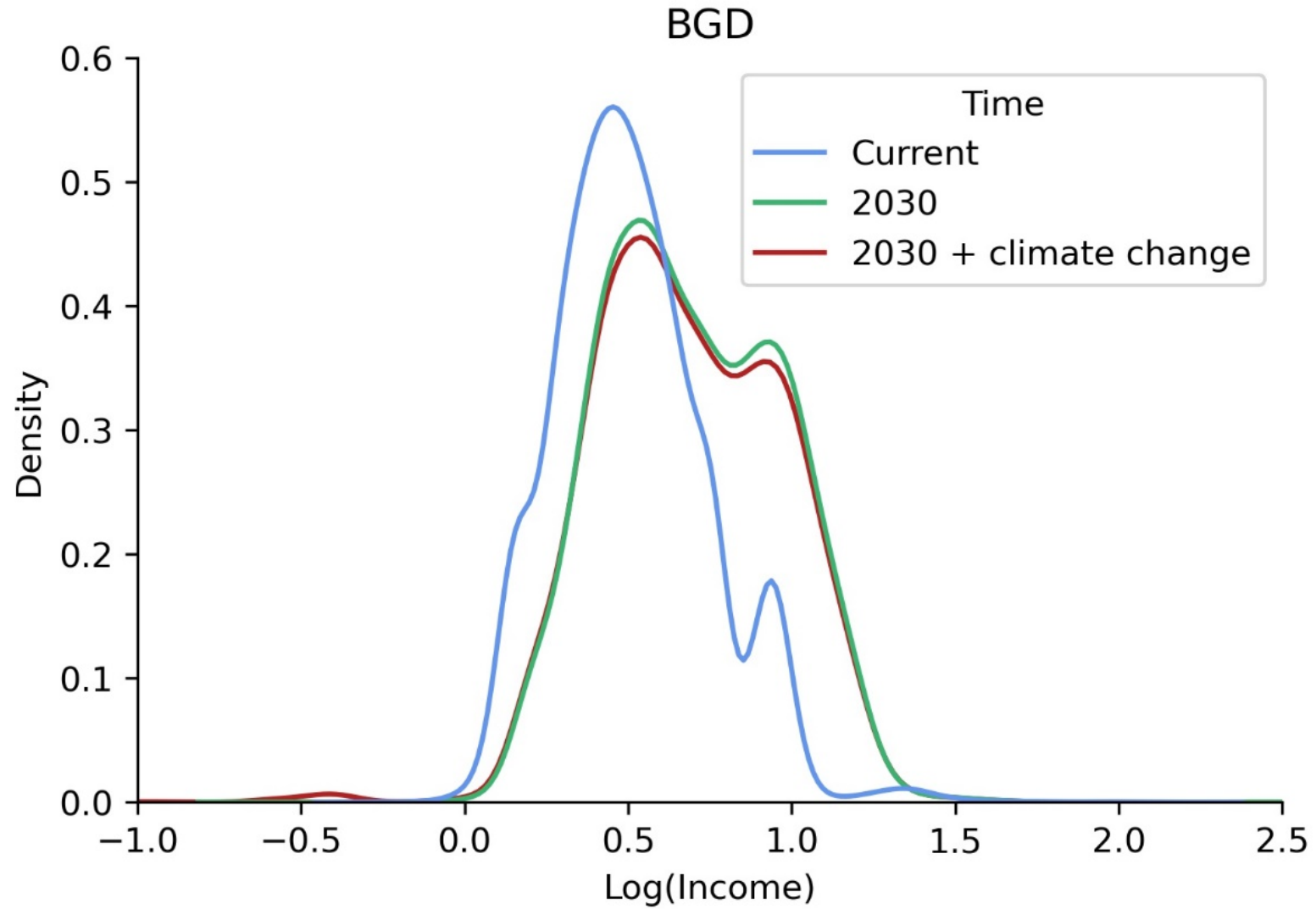
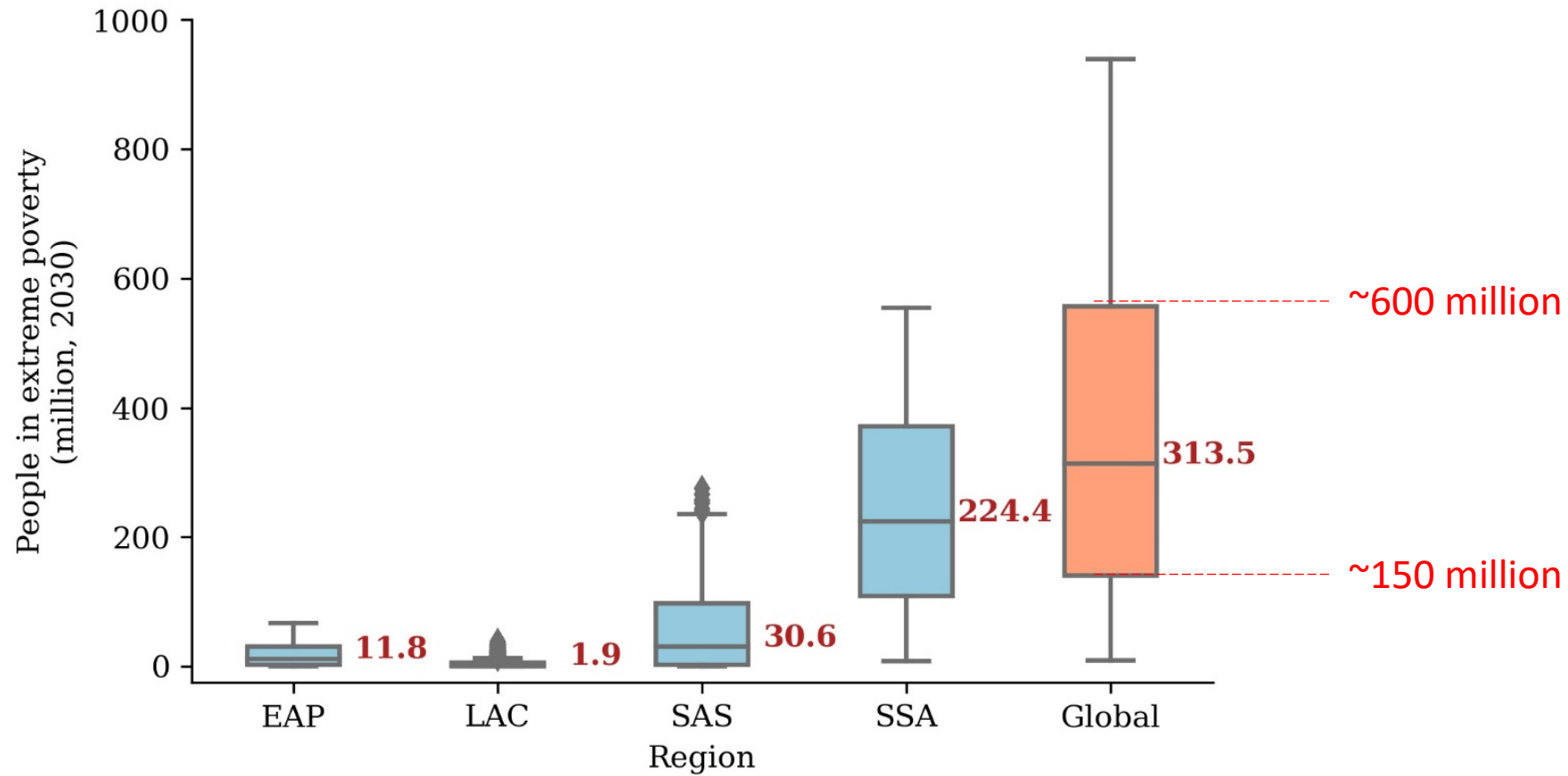


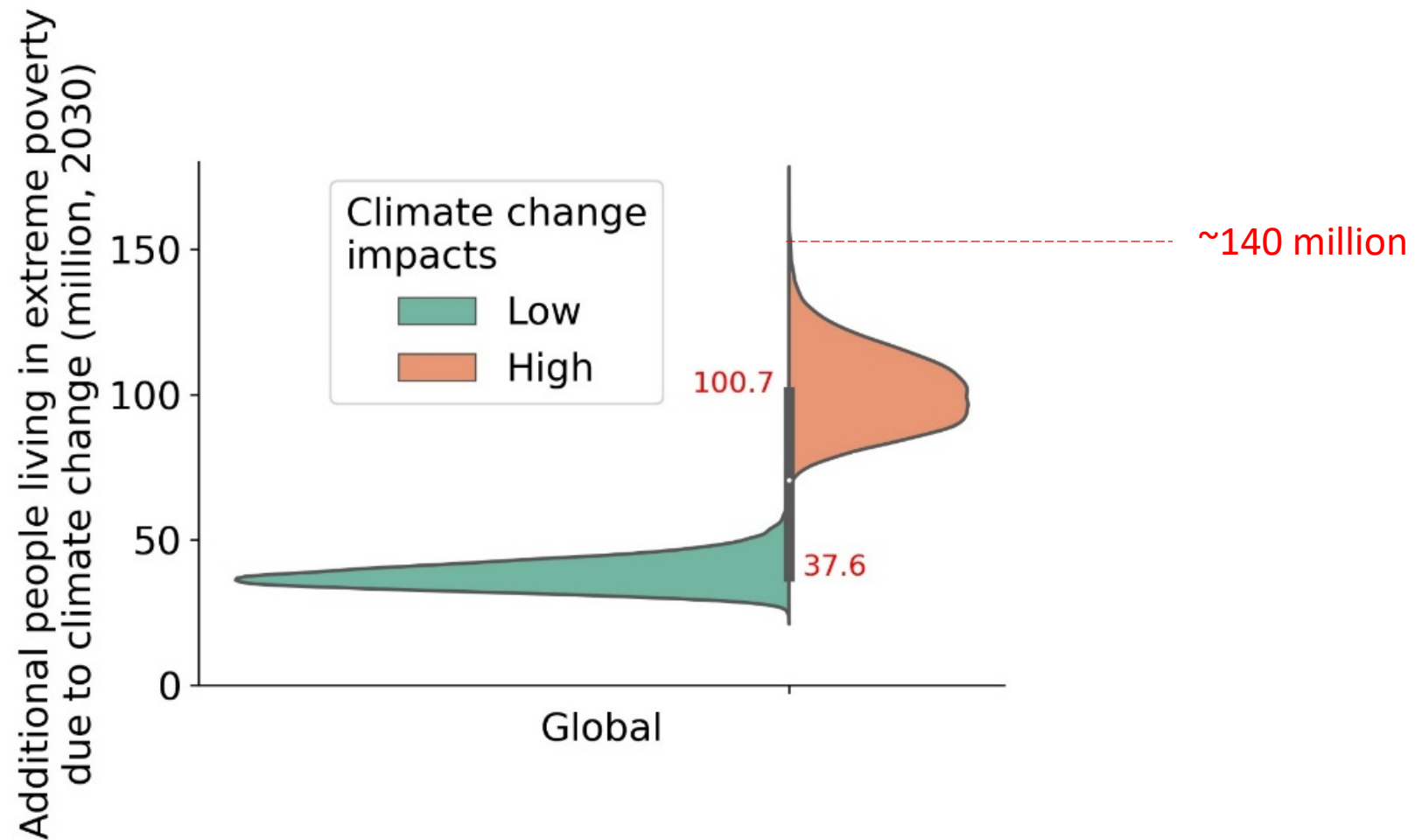
Illustration on Bangladesh



Extreme poverty by 2030 in baseline scenarios (no climate change)

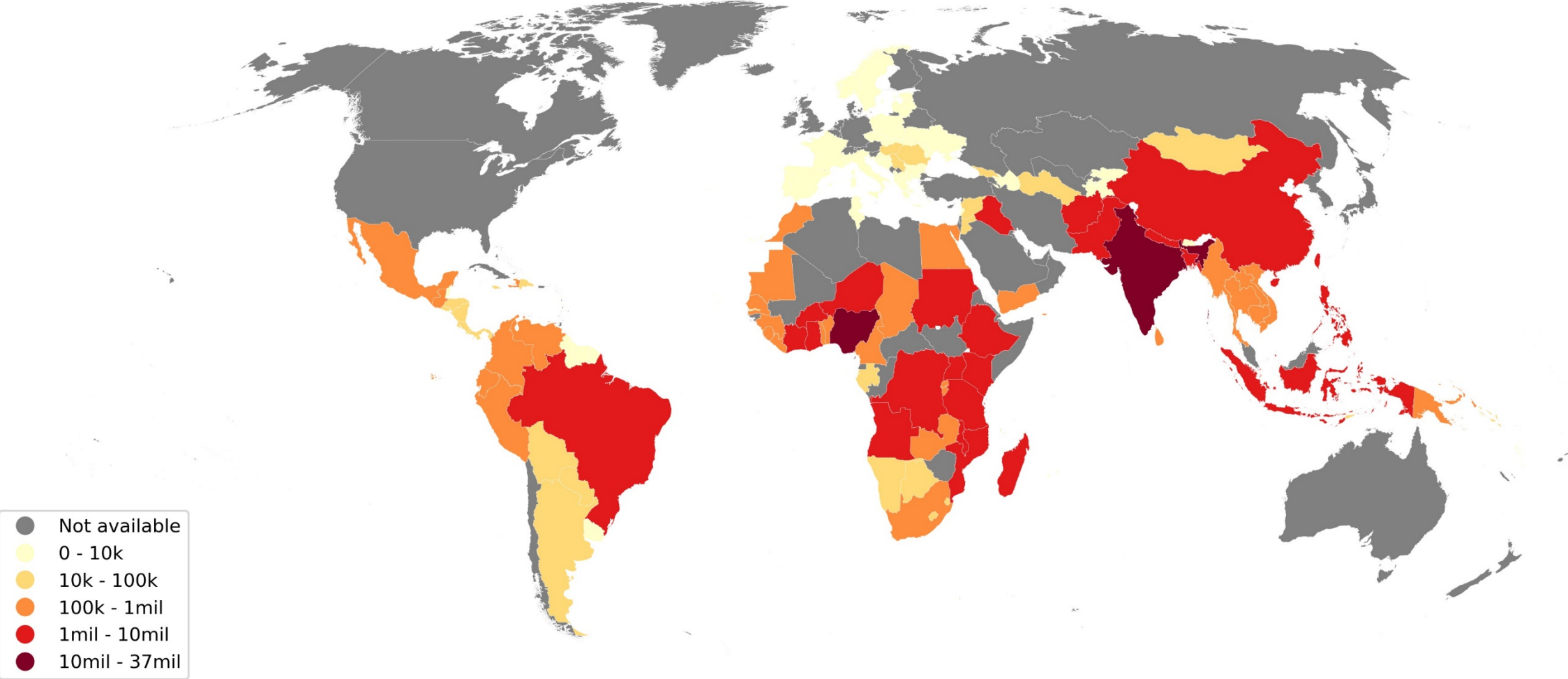


Climate change pushes more people into extreme poverty



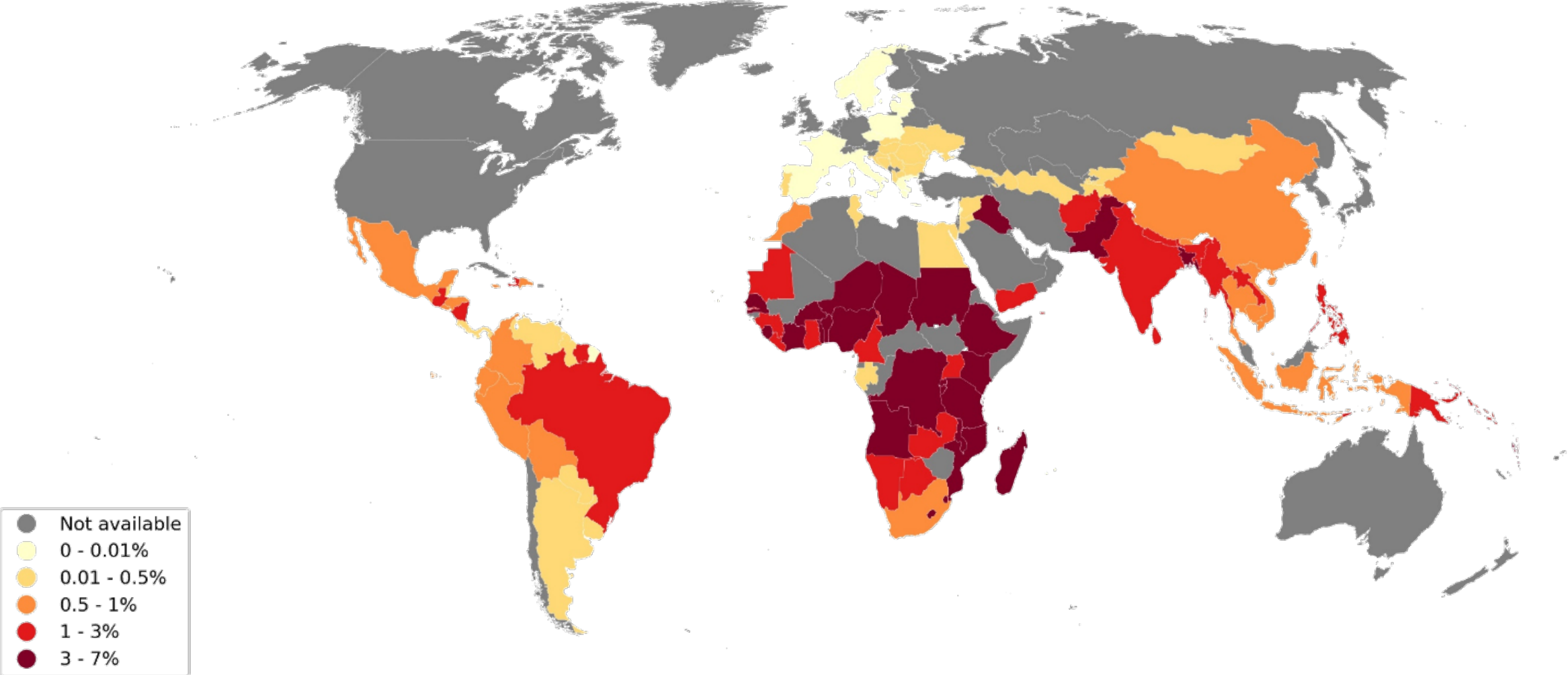
Climate change pushes more people into extreme poverty (absolute numbers)

People pushed to extreme poverty
Pessimistic development + high climate change scenario

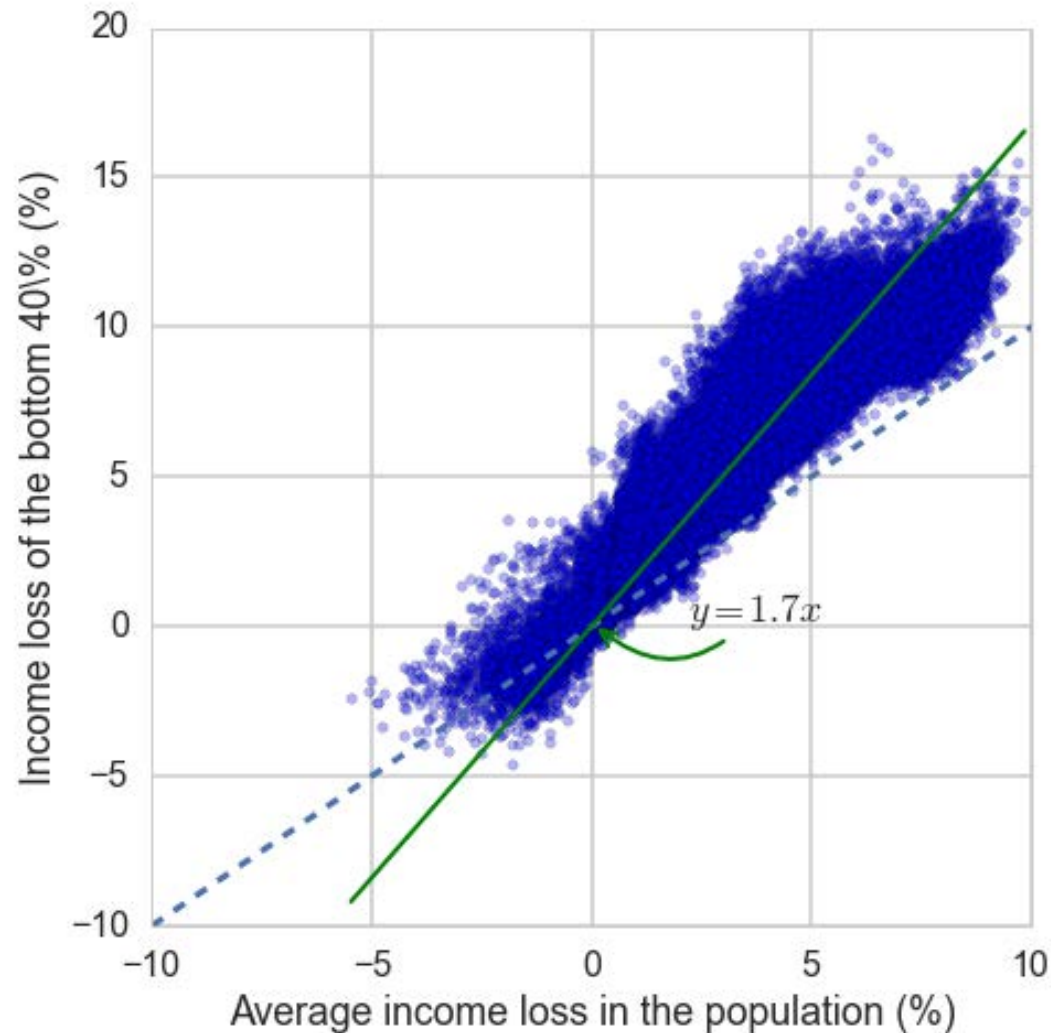


Climate change pushes more people into extreme poverty (relative numbers)

Percentage of population pushed to extreme poverty
Pessimistic development + high climate change scenario

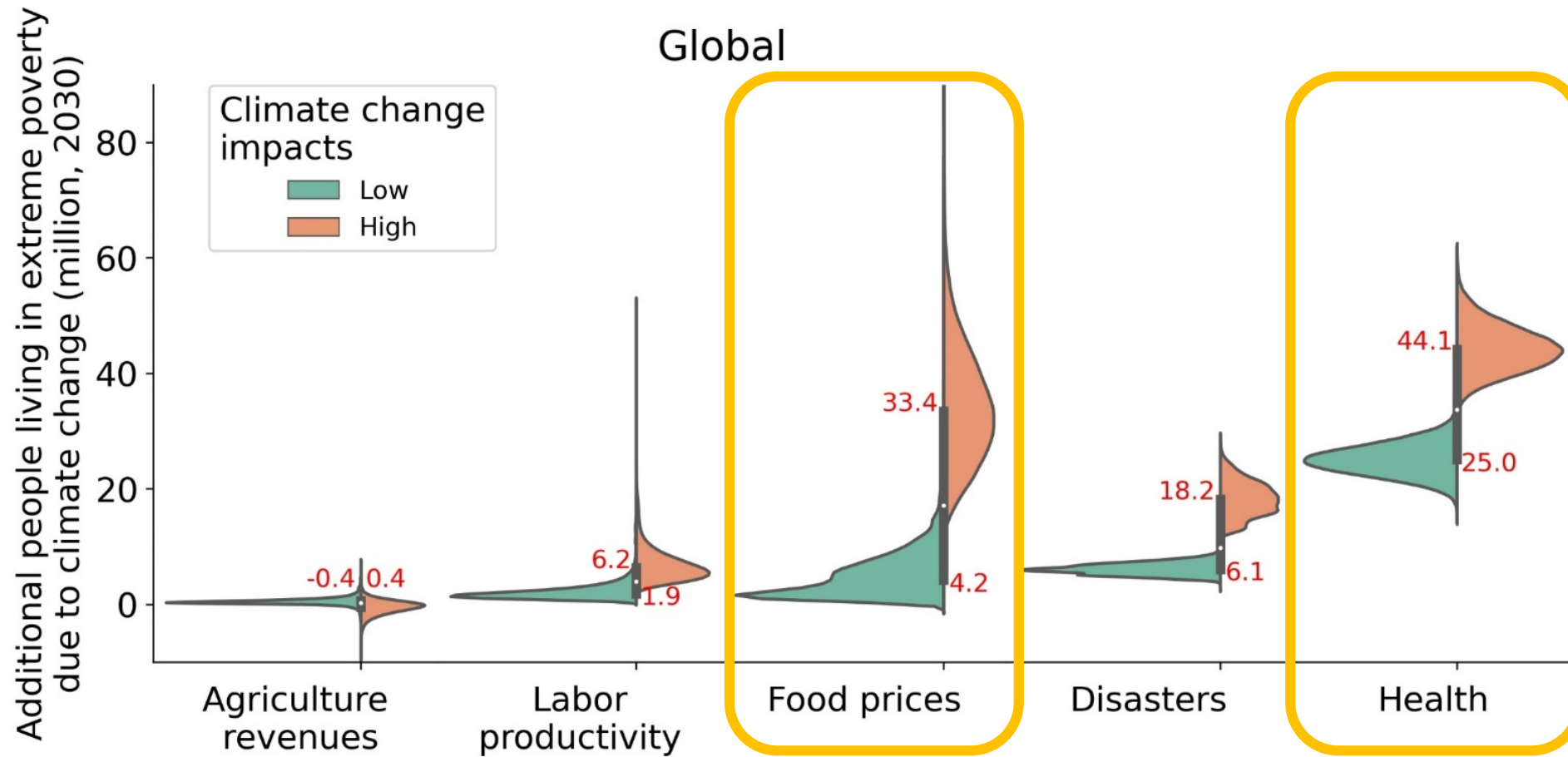


Across all countries and all scenarios, the bottom 40 is more hurt than the rest of the population



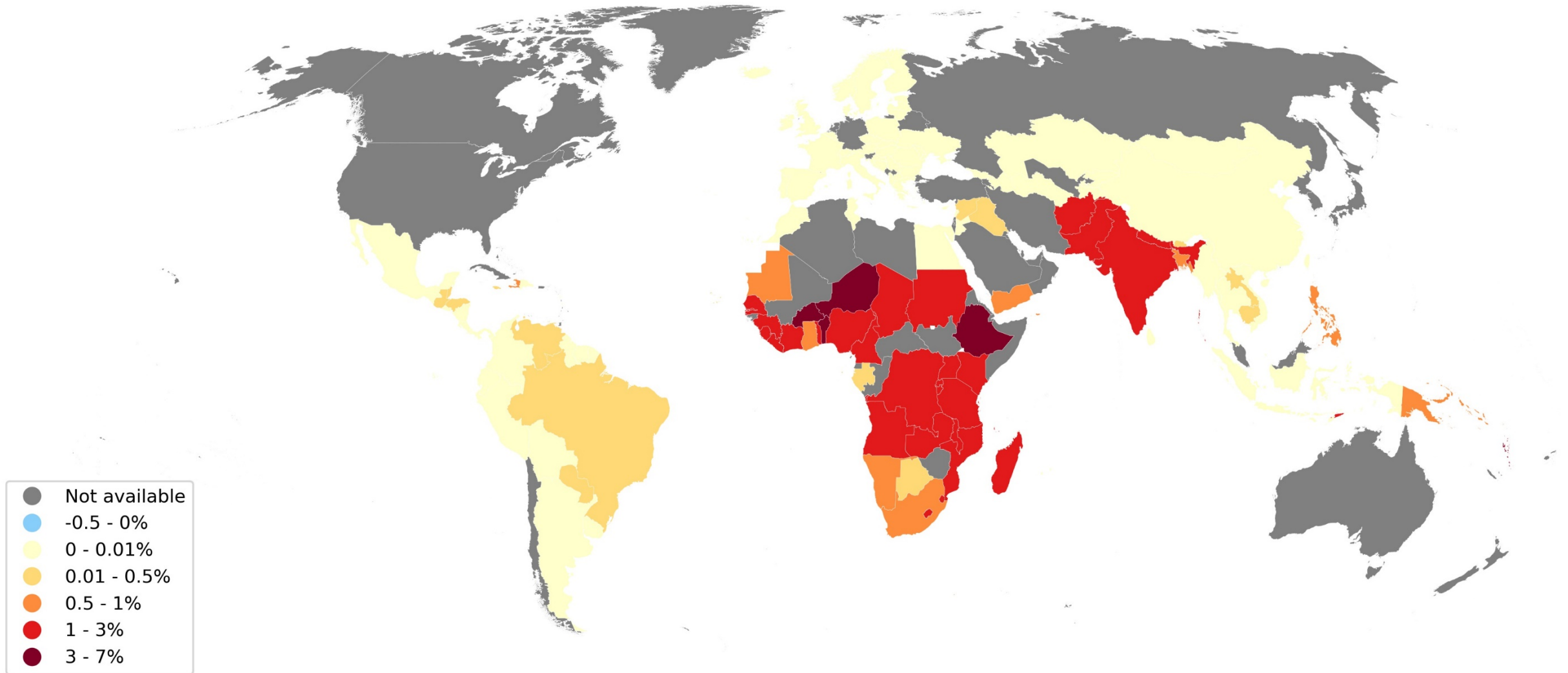
- Poor people are more exposed and more vulnerable to natural disasters
- They spend a higher share of their budget on food
- They are more likely to work outside

Impacts of climate change vary across channels...



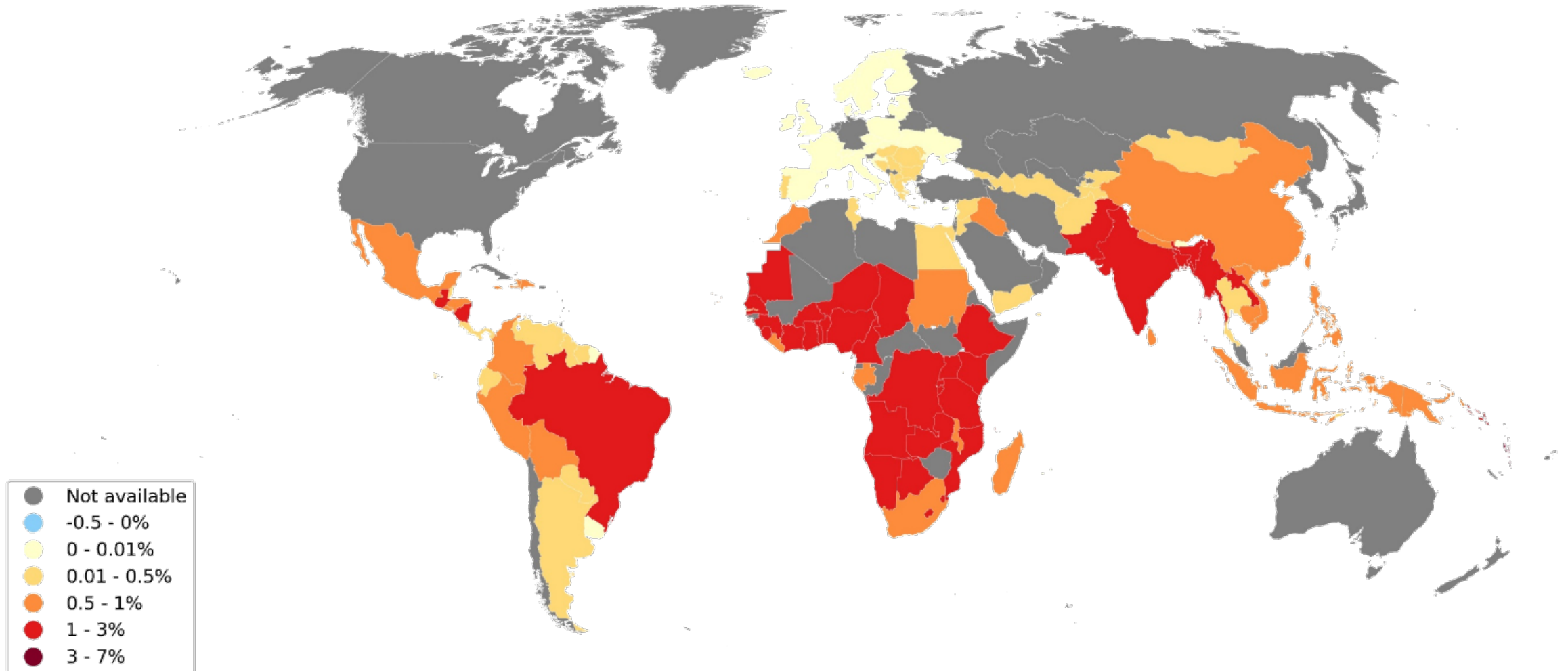
Food prices threaten poverty eradication in Africa and South Asia

Percentage of population pushed to extreme poverty - food prices channel
High impact scenario

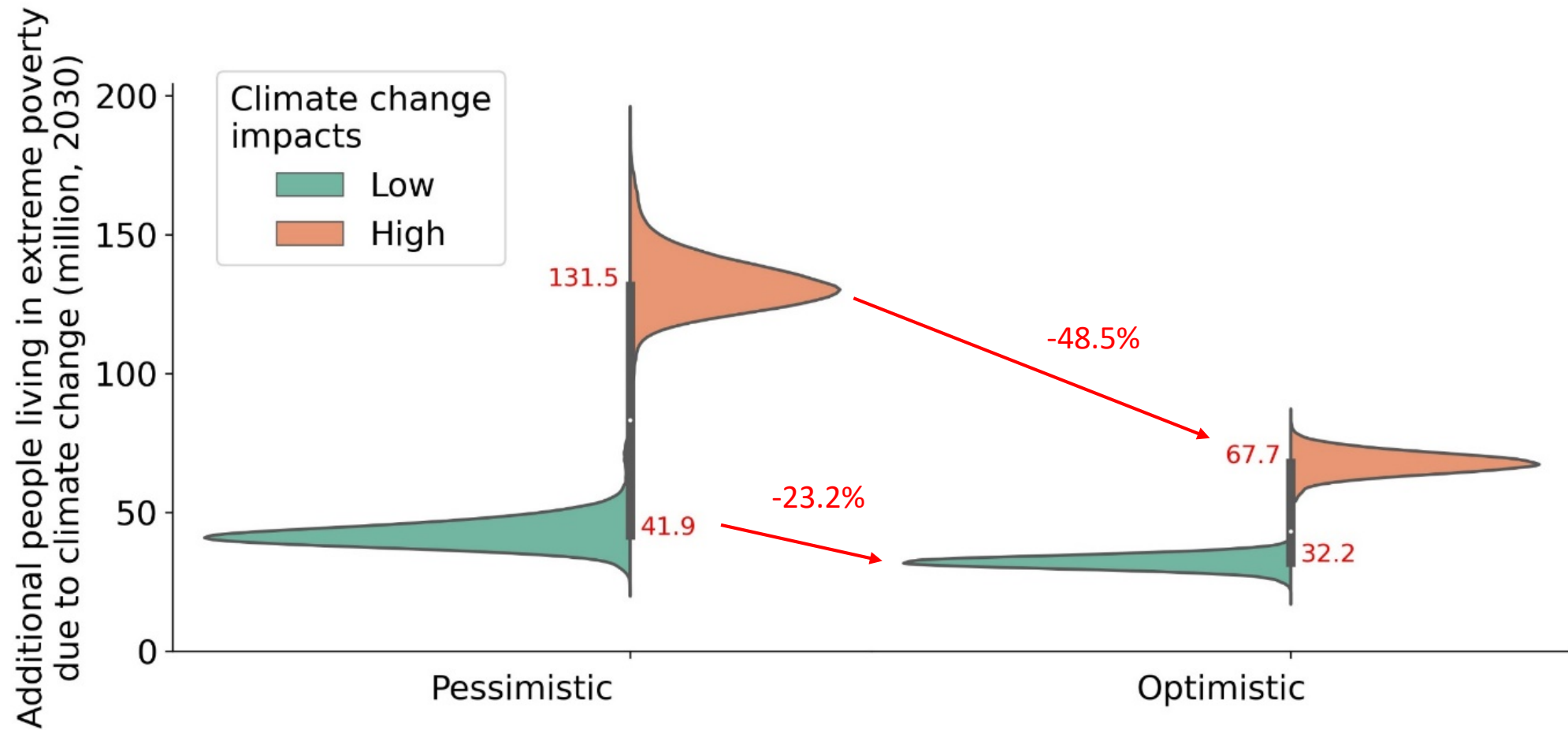


Health risks are broadly distributed

Percentage of population pushed to extreme poverty - Health channel
High impact scenario

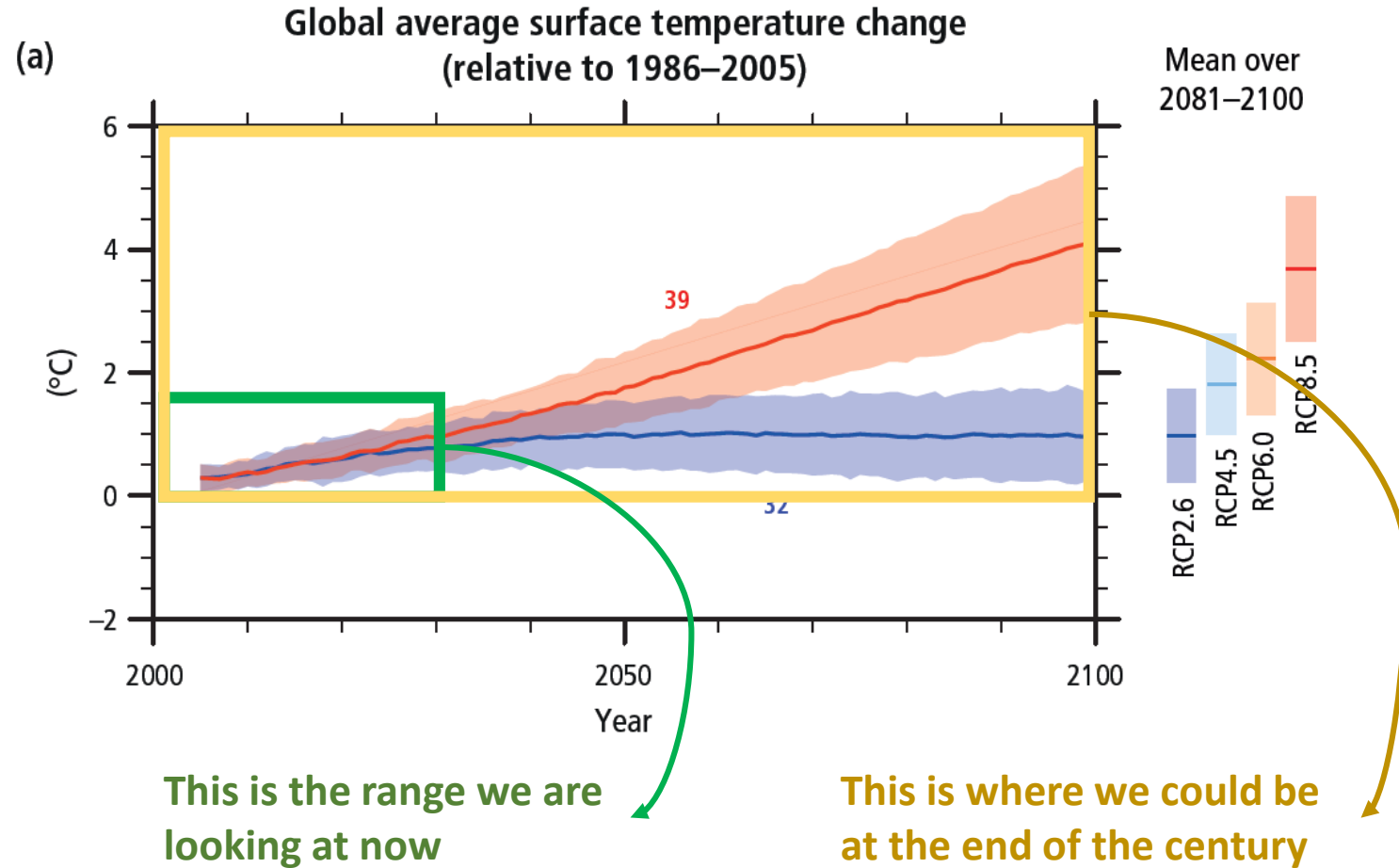


Good development reduces climate change vulnerability

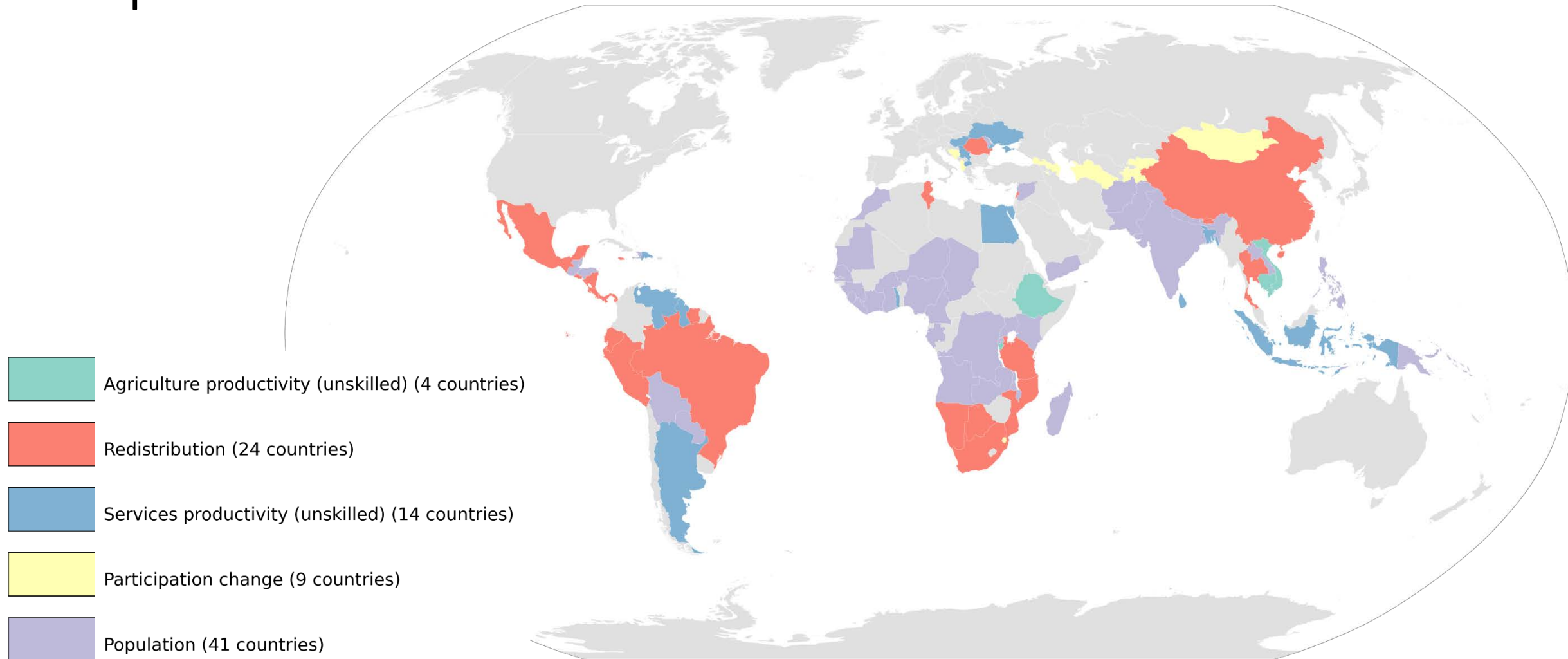


- Pessimistic: High poverty rate, high inequality
- Optimistic: Low poverty rate, low inequality

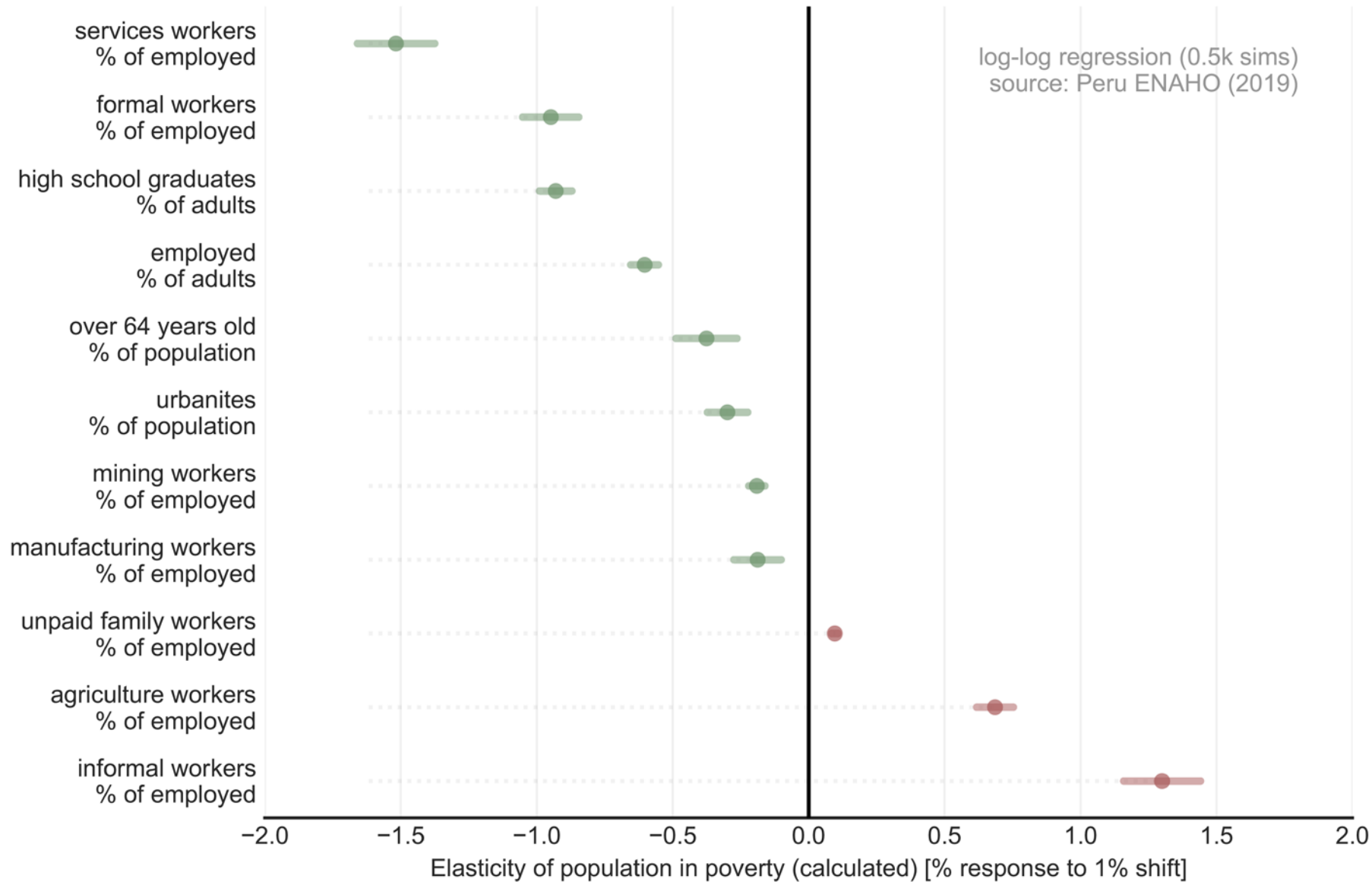
All in all, climate change can contribute to poverty but with a 2030 horizon climate change is not the dominant factor



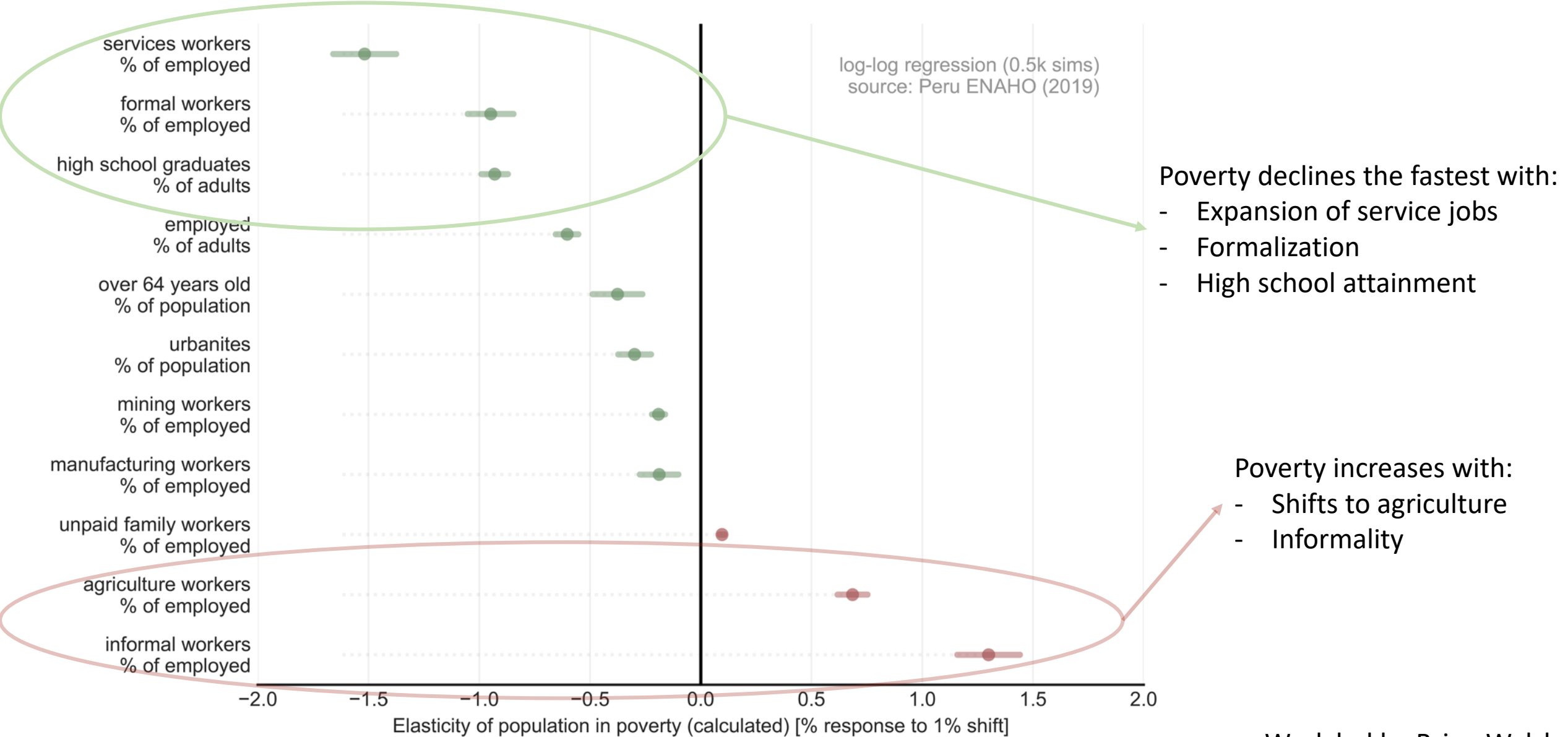
The main driver of extreme poverty reduction depends on the context



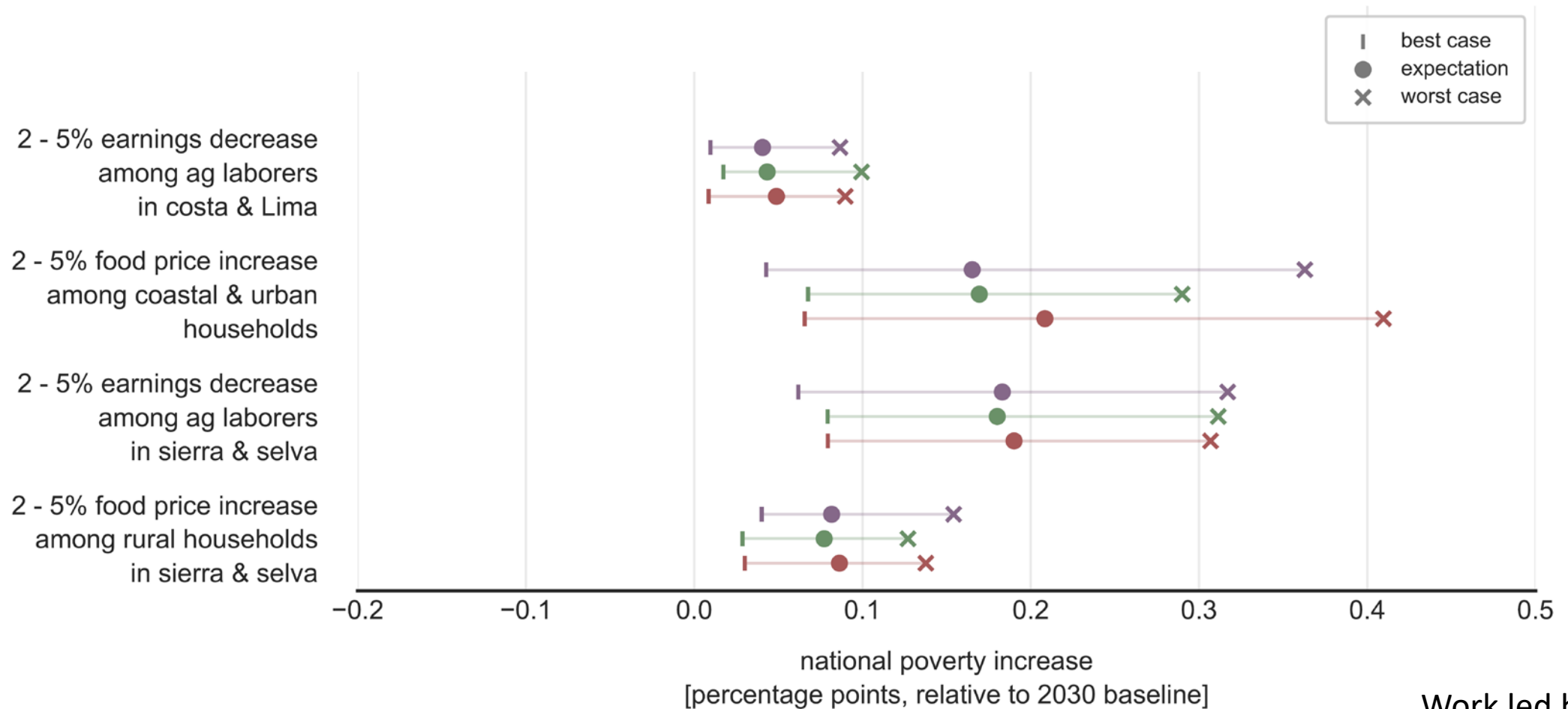
How does poverty in Peru respond to structural shifts?



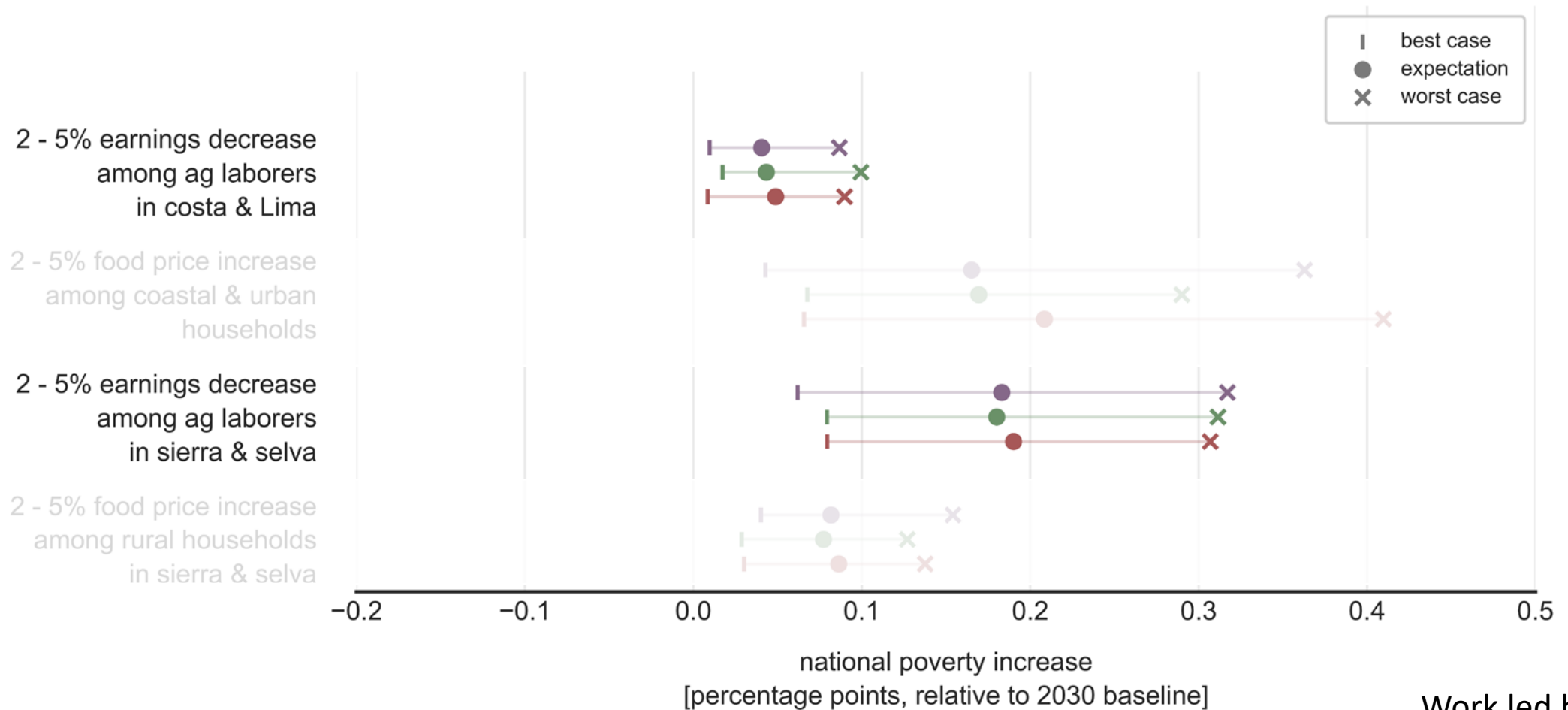
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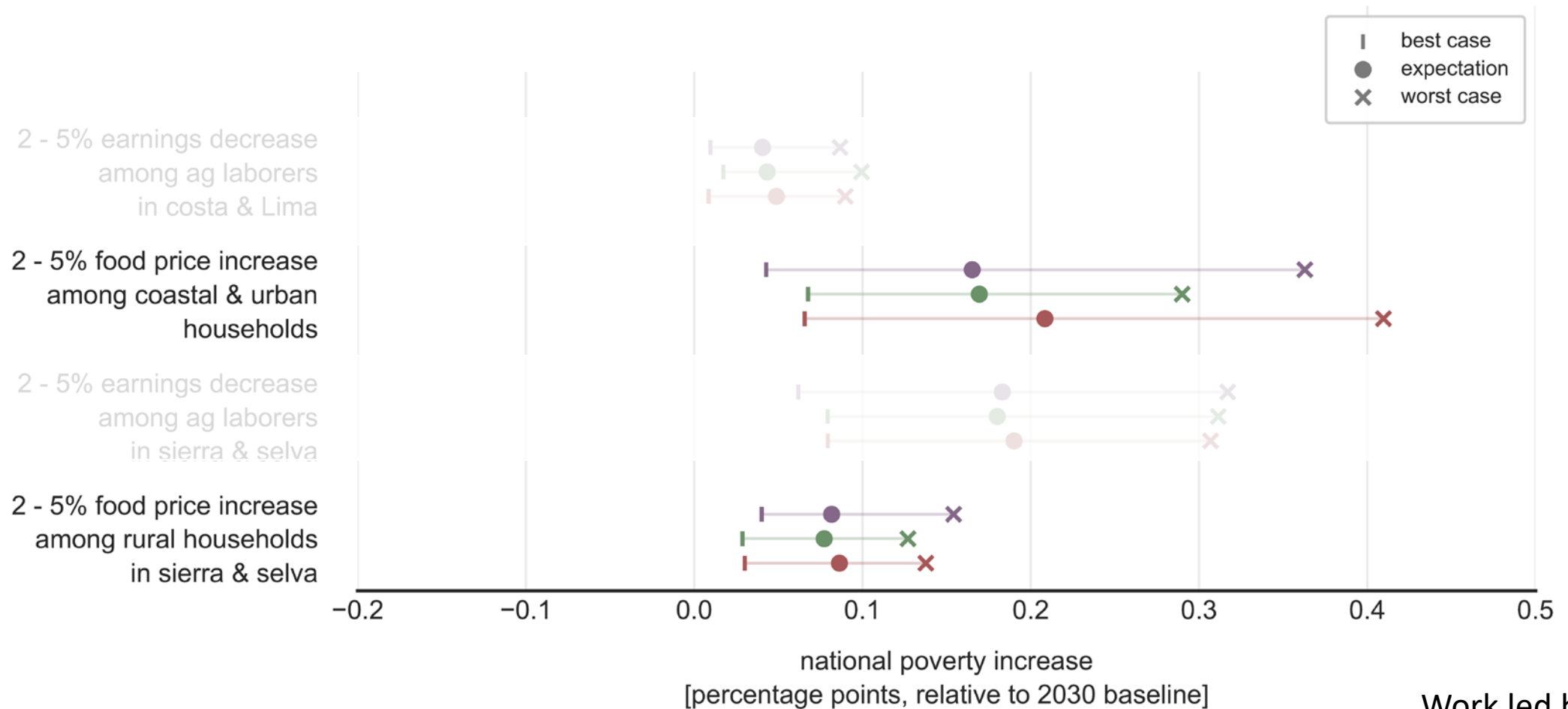
How do different groups respond to climate shocks?



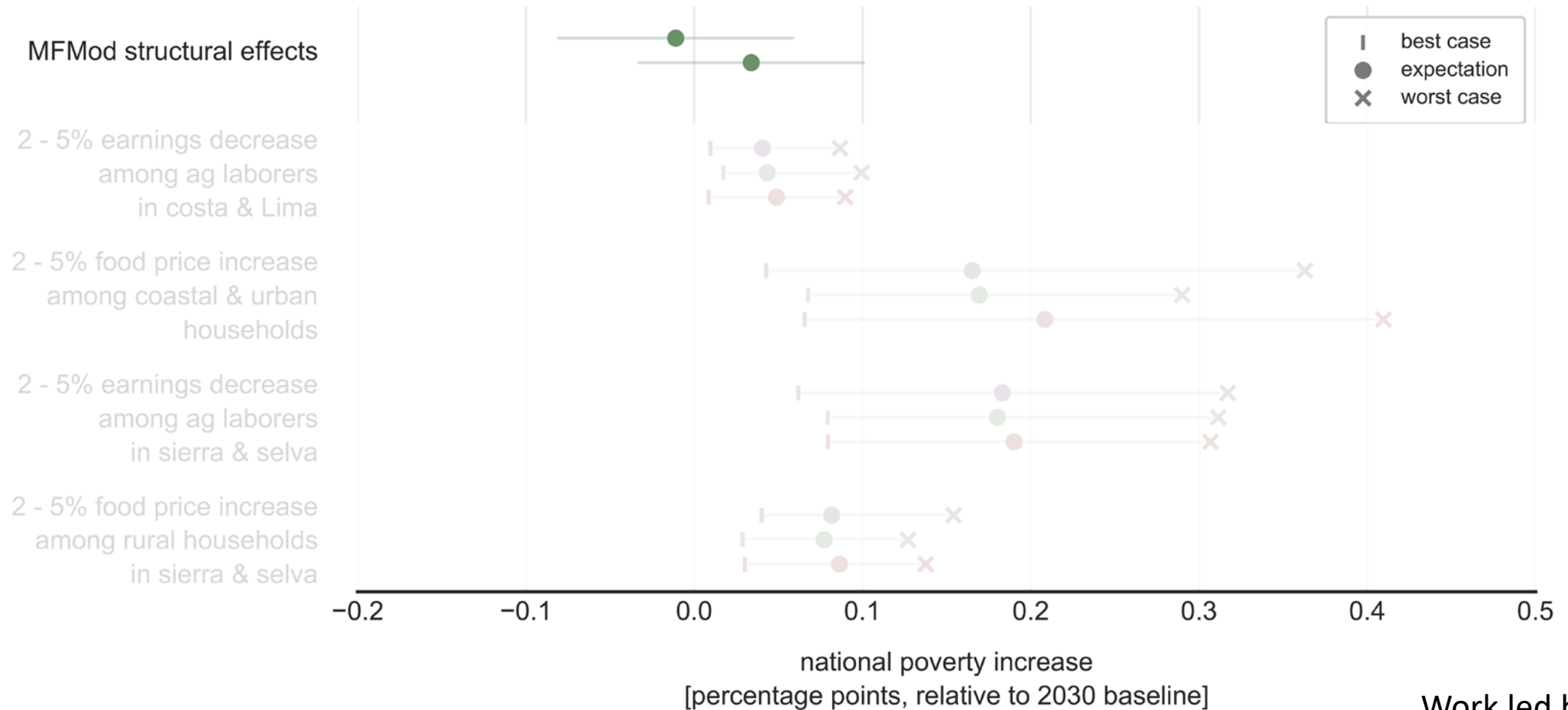
Farmers in the Amazon and Andes are more vulnerable than on the coast



Consumers in Lima and on the coast are more vulnerable than in the Amazon and Andes



By the way, GDP is still not a good indicator



3 main points in this presentation

- GDP is not sufficient (or even not helpful) as an indicator for climate change impacts
- By 2030, what happens to people in the baseline is the most important driver of future climate change impacts
- The main drivers of this vulnerability are context-specific, making it hard to build universal scenarios

Thank you!

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