The multidimensional global poverty and income inequality landscape in a decarbonizing world

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ABSTRACT

- **Background**

Understanding the deep links between climate mitigation targets and the alleviation of income inequality and poverty is necessary to devise strategies that address these challenges in parallel.

- **What we did**

In this study, the sectoral resolution of global climate policy impacts on poverty and income inequality was increased and countermeasures for negative climate policy impacts were tested in Asia-Pacific Integrated Model (AIM).

- **Our results show**

Without careful design, stringent climate policies can **increase income and food poverty as well as income inequality**.

Progressive redistributions might not suffice to eradicate poverty fully in many Sub-Saharan African countries.

Addressing poverty and income inequality issues in a decarbonizing world requires **international financial support**, **well-targeted subsidies**, and **holistic socioeconomic and technological transitions**.

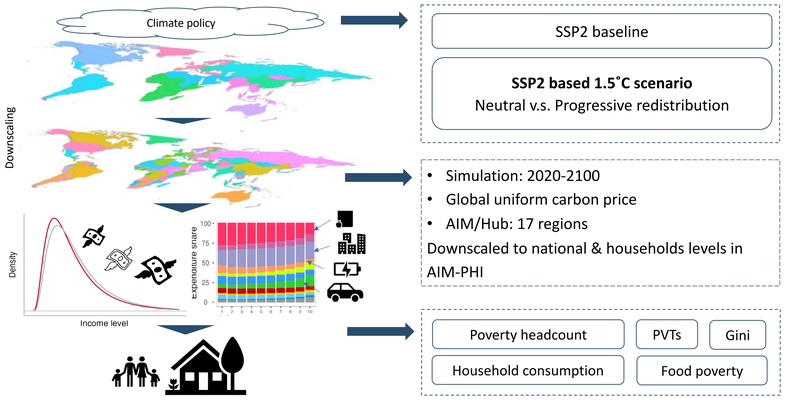
INTRODUCTION

Existing research: the risk of adverse social outcomes associated with climate change mitigation policies, including a worsening of poverty and income inequality, increases as countries ratchet up their climate change mitigation targets. However, **scenarios quantifying such global transitions hold limited information when it comes to granular poverty and inequality effect**s, and **to identify the channels behind the policy impacts.**

This study aims to provide answers to the following questions:

- **How do climate policies affect the global and regional poverty and income inequality landscape?**
- **Who is likely to be affected?**
- **Through what channels and mechanisms are they affected?**

Method



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RESULTS

Poverty headcount (Fig.1)

- **India**, **Sub-Saharan Africa**, and **the Rest of Asia** are strongly affected by climate policies, accounting for 94% of the additional poverty headcount (neutral redistribution in 2030).
- They also benefits the most with a progressive redistribution

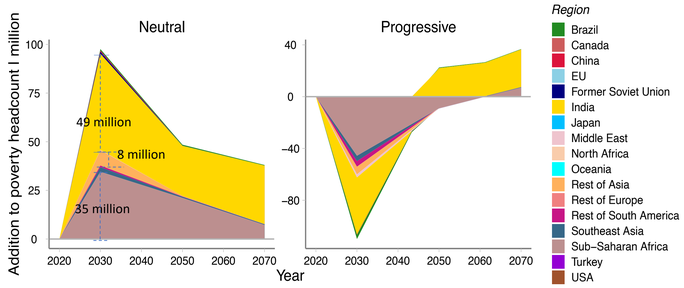

Fig. 1 The increase in the poverty headcount in the 1.5°C scenario with different revenue redistribution schemes compared to the No-Miti scenario.

Poverty vulnerability thresholds (PVTs) (Fig.2)

- Neutral redistribution: among the top 20 countries with the highest PVTs under a neutral redistribution, 15 are in Sub-Saharan Africa, 3 are in the Rest of Asia, and the other 2 are Brazil and India
- Progressive redistribution: offsetting policy impacts
  - the PVT declines but it is **still higher than the poverty line in countries with a high poverty headcount or high poverty rate**.
  - Among the top 20 countries with the highest PVTs, 16 are in Sub-Saharan Africa, 3 are in the Rest of Asia, and the other is Brazil.

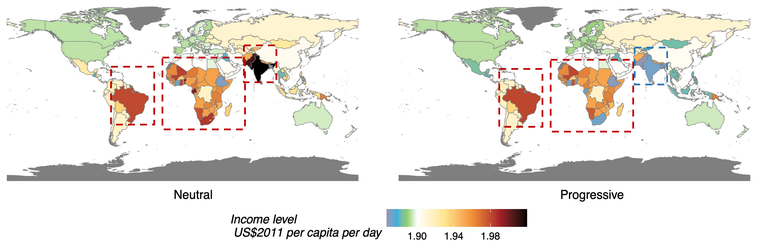

Fig.2 Poverty vulnerability thresholds (PVTs) relative to the international poverty line of $1.9 per capita per day in the 1.5C scenarios in 2030 and 2050. The consumption level at the international poverty line is shown in white.

Income inequality and expenditure changes (Fig.3)

- Strong regressive effects occur across income deciles in the 1.5˚C scenario with neutral redistribution. All income groups suffer net consumption loss (5.4% in the 1st and 4.7% loss in the10th-decile on average).
- **Progressive redistribution promotes consumption in the lower-income group, thereby reducing income inequality.**

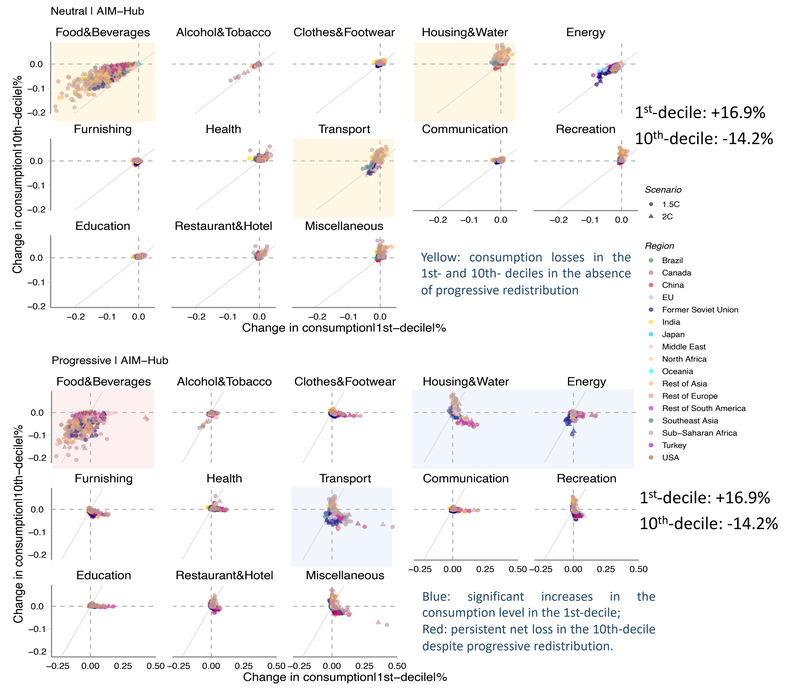

Fig. 3 The contribution of all commodities to the total consumption changes in the 1st- and 10th-deciles in 2030 in a) neutral redistribution and b) progressive redistribution scenarios.

Food poverty (Fig.4)

- Neutral redistribution:
  - An additional **952 million more people unable to afford a nutrient adequate diet** in 2030.
  - Most prominent effects in **India, Sub-Sahara-Saharan Africa, and Southeast Asia.**
- Progressive redistribution:
  - **Alleviates food poverty** by compensating for expenditure losses in lower-income households.
  - Highly heterogeneous effects.

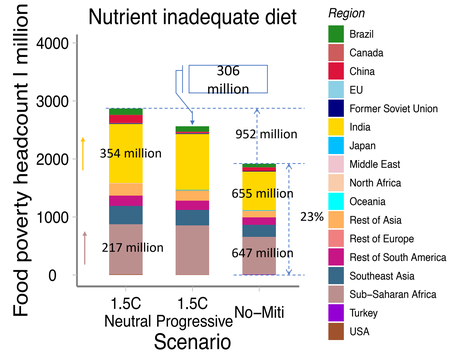

Fig.4 Population falling below the expenditure thresholds for maintaining a nutrient adequate diet in 2030.

DISCUSSION

Our study goes beyond an investigation of income poverty by also focusing on food poverty and detailed consumption loss to show the importance of countermeasures in the key sectors of food, energy, and transport.

Following are some discussion points

- **Uncertainties in carbon tax revenues** due to the uncertain coverage of carbon tax, institutional capability of collecting and managing the carbon tax revenues, investments required by decarbonization, and uncertainties in the emissions inventories.
- Uncertainties concerning the **economic impacts of climate change**, mainly reflecting spatial temperature patterns, climate responses, the channels considered, socioeconomic and policy assumptions, and the estimation and modeling framework.

CONCLUSION & KEY TAKEAWAYS

- A poverty vulnerability threshold is developed to enable **the identification of households vulnerable to climate policy impacts**.
- A progressive redistribution of domestic carbon tax revenue might **not be as effective in elevating consumption levels as expected or enough to eliminate extreme poverty** in lower income countries.
- **Persistent food poverty** occurs if the increased cost of meeting dietary requirements, combined with a loss of income related to climate policies, are not addressed by complementary policies.
- **Energy consumption** is the most affected sector in **higher-income countries**, including European and countries of the former Soviet Union.
- Balancing the alleviation of poverty and income inequality with ambitious climate goals can be achieved with complementary policy packages.

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