

Climate change mitigation and its SDG implications: an example of SDG1 poverty

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Outline

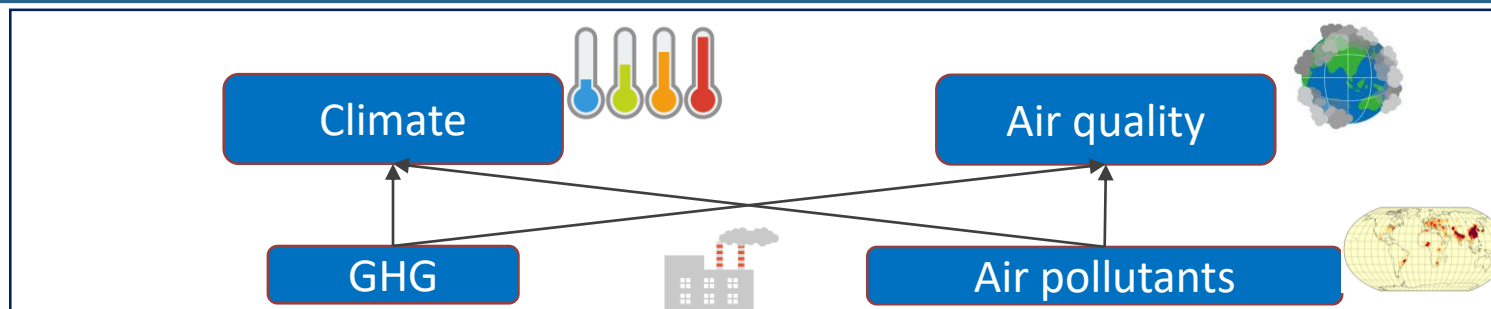
- Our research approach
- Main features of 1.5 degree climate stabilization scenarios
- Multi-dimensional social and environmental implications of climate change mitigation

What we do

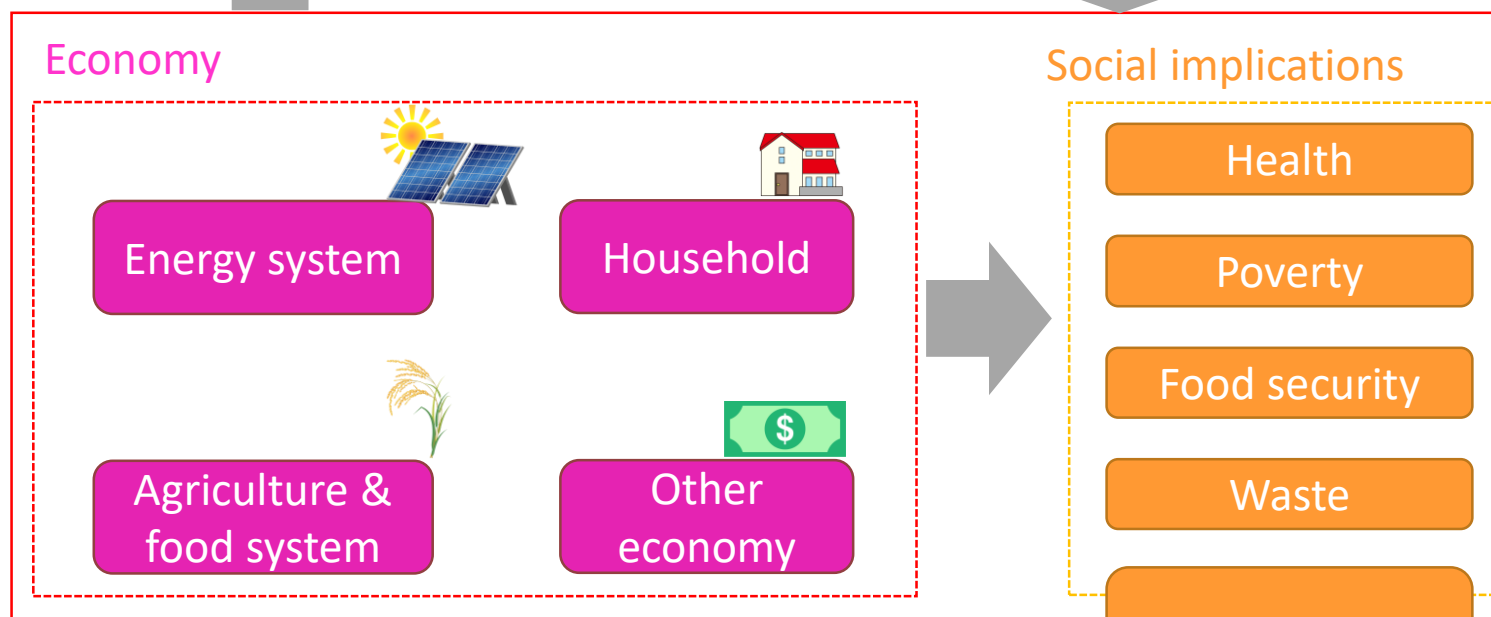
- Inform policy or decision makers about climate change mitigation measures
 - ✓ Derive implications policy implementation (e.g. NDCs)
 - ✓ Estimate cost of climate change mitigation
 - ✓ Describe energy and land-use system transformation
- Scenario analysis for future (2020-2100)
- Global, Asia, Japan and other countries
- Integrate environment, energy, land-use, economy, social aspects into a computer simulation platform

Global integrated assessment model *AIM*

Atmospheric environment



Human system



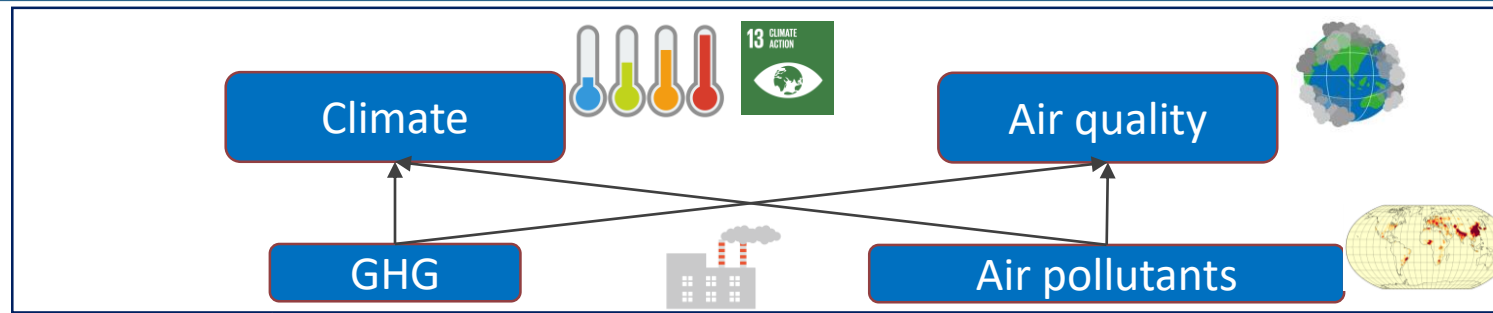
Terrestrial environment



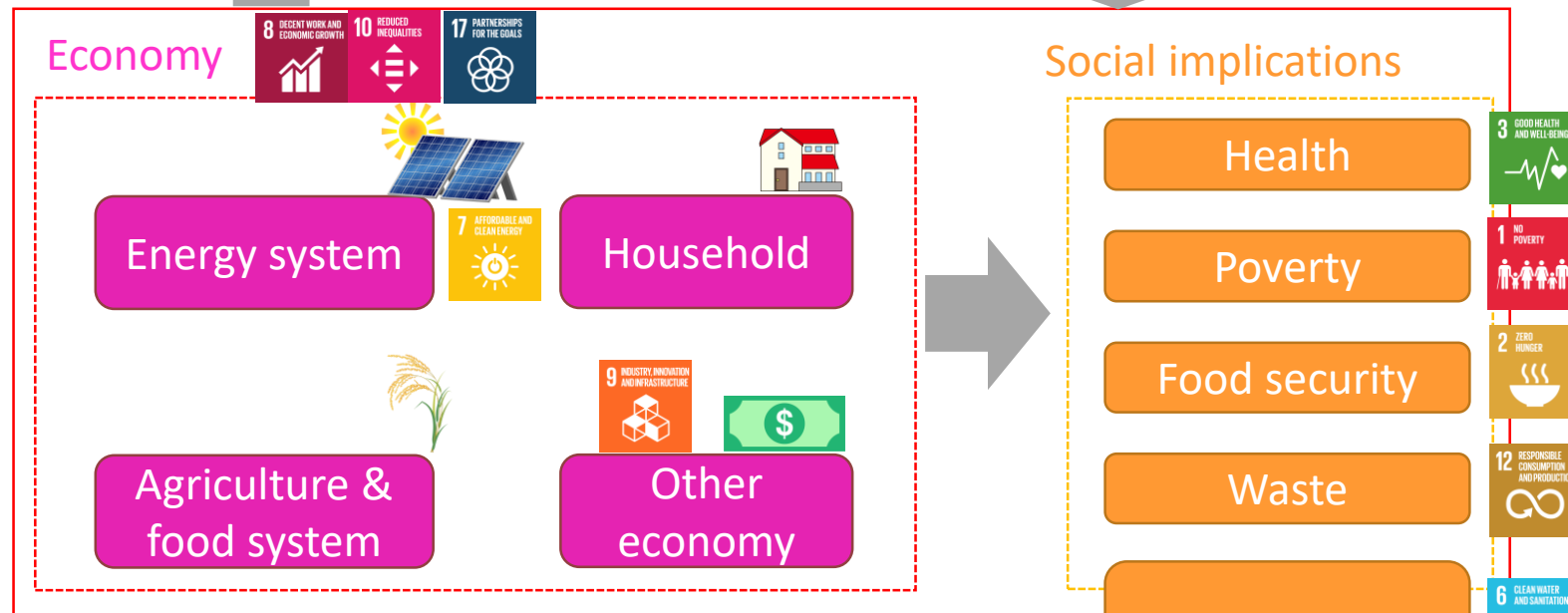
- An integrated assessment platform with computer simulation models
- Assess human system and global natural environment interactions consistently
- Policy designs or human behavioral changes
- Climate change is a center of study focuses
- Broader social, economic and environmental issues are under coverage.
- Contributing to IPCC and other relevant international activities

Global integrated assessment model *AIM*

Atmospheric environment



Human system



Terrestrial environment



SUSTAINABLE DEVELOPMENT GOALS

- An i
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with
simi
- Assess human system and global natural environment interactions consistently

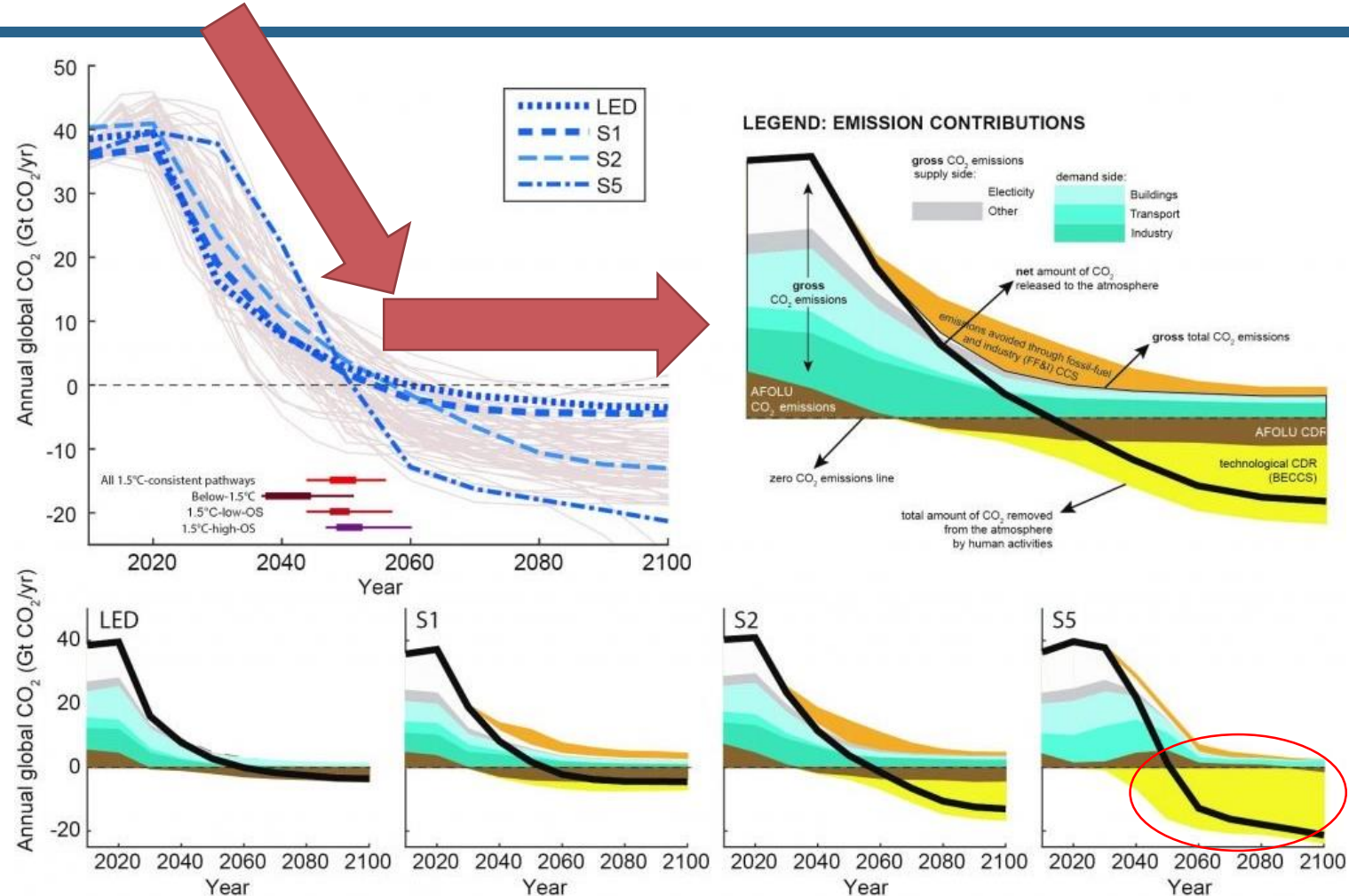
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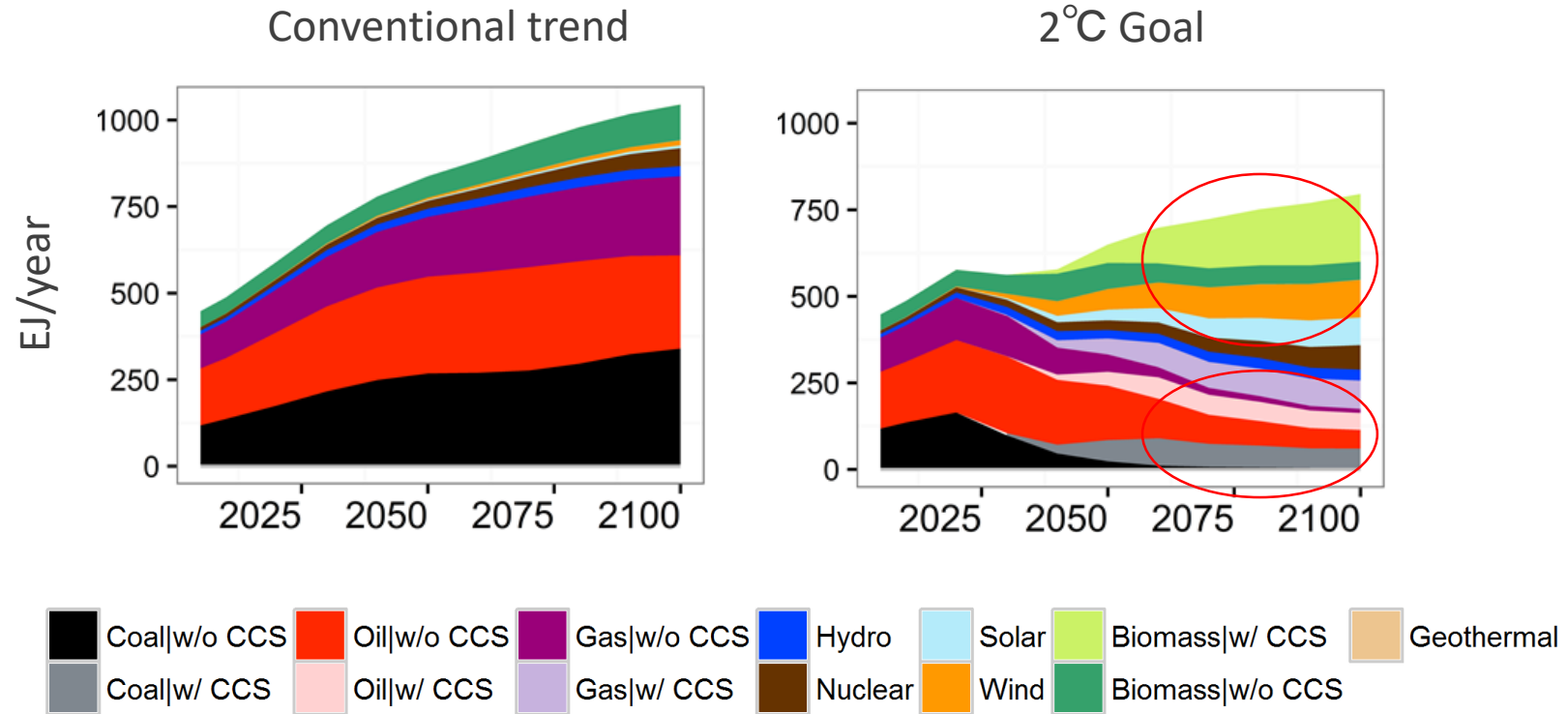
1.5 °C scenarios



IPCC (2019) Special report on 1.5 degree

- Degree of overshoot \leftrightarrow degree of negative emissions

Energy system transformation



- Heavy usage of fossil fuel in the current system
- Mitigation scenario relies on renewables and CCS

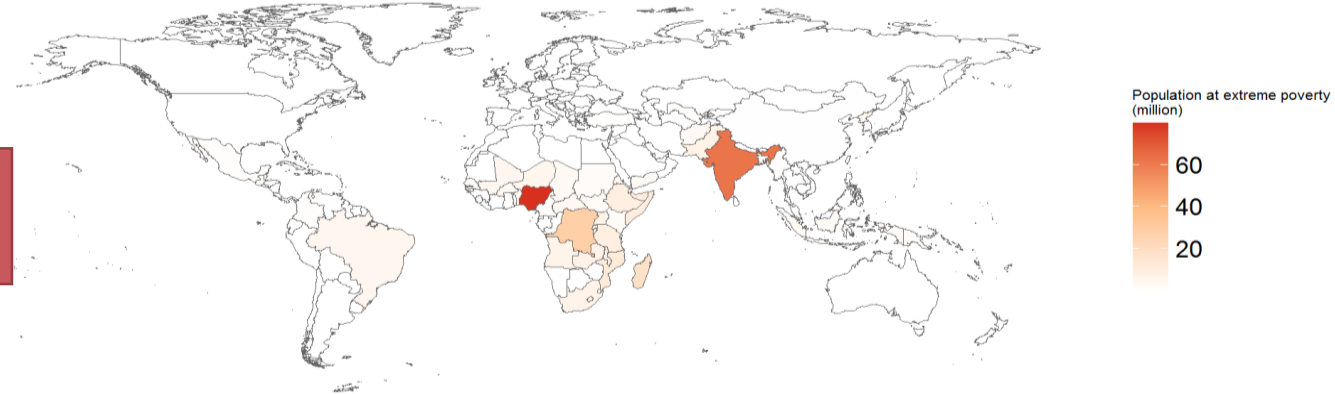
SDGs and climate change



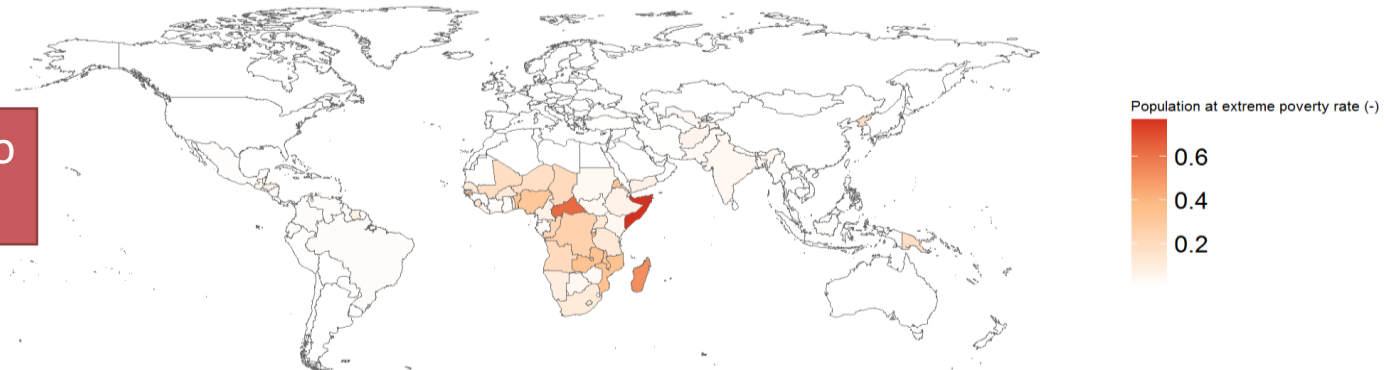
Country-wise poverty implications



Population under
extreme poverty



Extreme poverty ratio
to total population

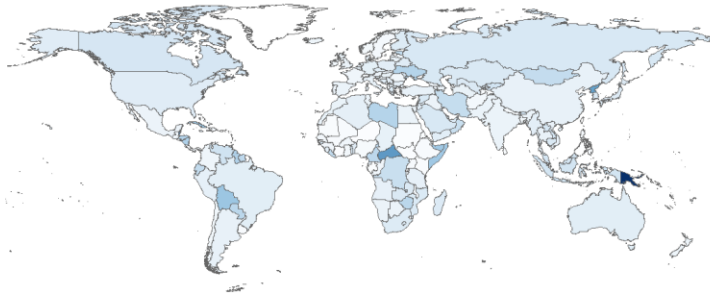


- Absolute numbers; India, Nigeria, and Congo Rep.
- Poverty ratios; Somalia, Central Africa and Madagascar

Country-wise poverty gap and carbon tax comparison (per GDP)



a



Carbon tax revenue/GDP(-)
0.02 0.04 0.06

Carbon tax per GDP

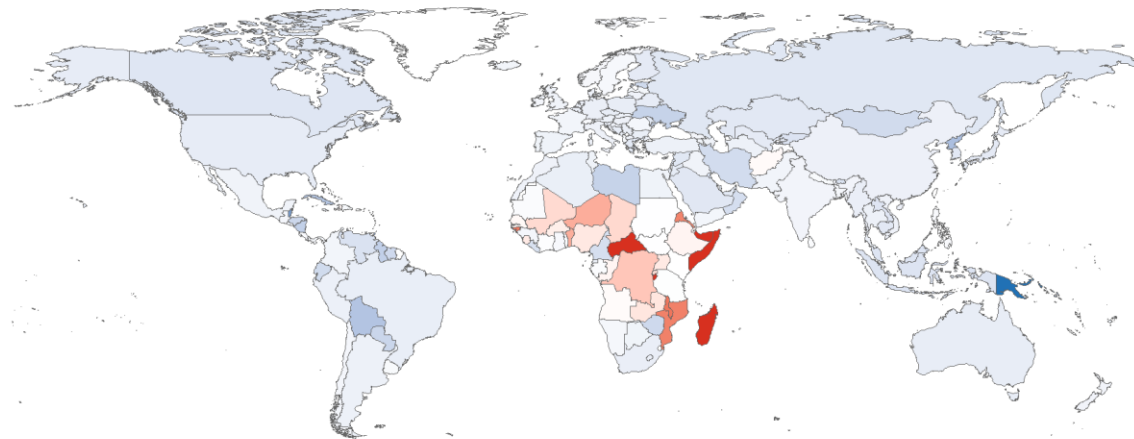
b



Poverty gap/GDP(-)
0.1 0.2

Poverty gap per GDP

c

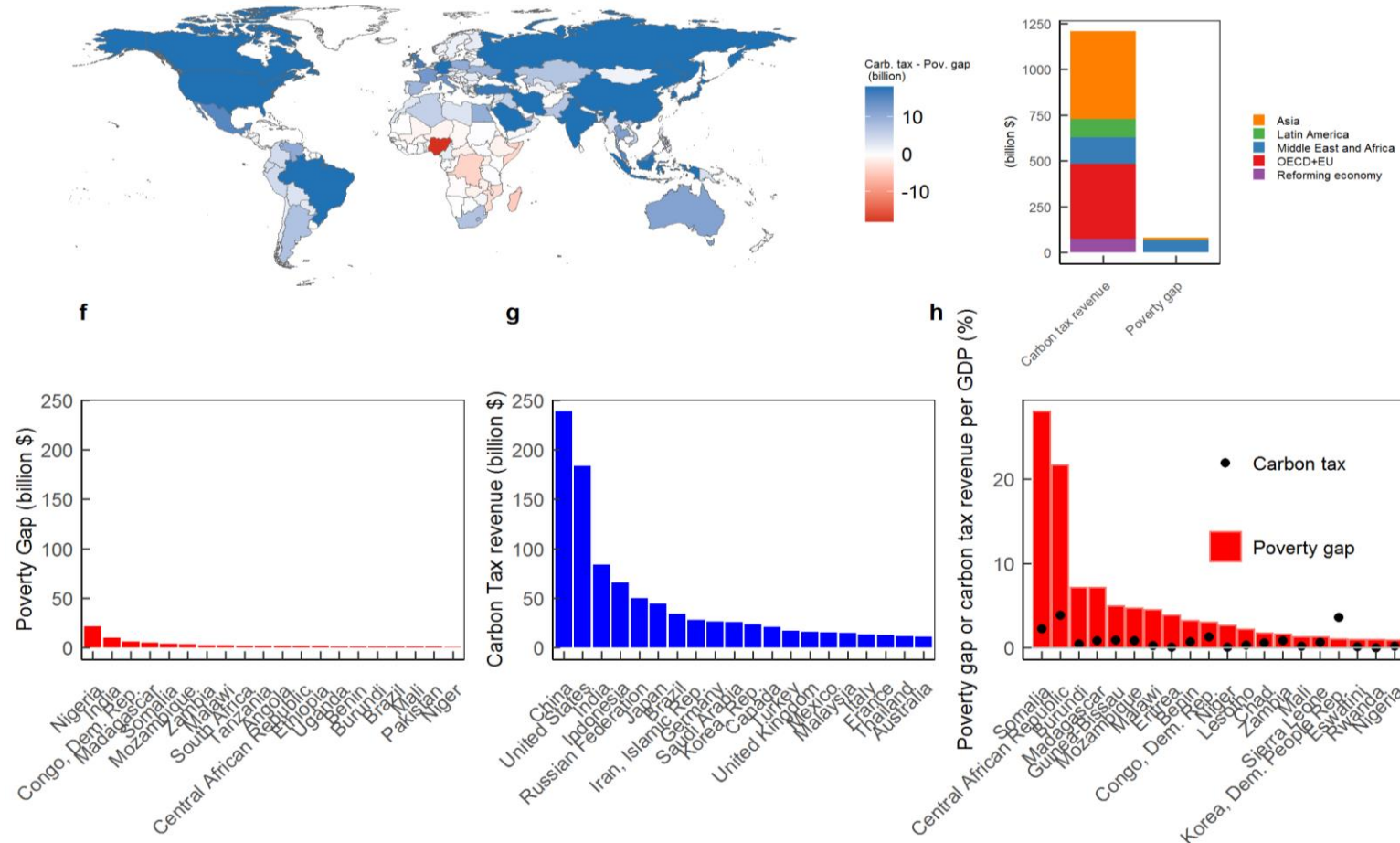


(Carb. tax - Pov. gap)
per GDP (-)
0.03
0.00
-0.03

(Carbon tax – poverty gap) per GDP

Fujimori et al. (2020) *Environ. Resear. Lett.*

Country-wise poverty gap and carbon tax comparison (bil. \$)



- Carbon tax is much larger than poverty gap
- Small portion of carbon tax via International transfer might help poverty eradication

Fujimori et al. (2020) *Environ. Resear. Lett.*

Final remarks

- There are challenges in emissions reductions
 - ✓ Shifting the energy sources and electrification
 - ✓ CCS, renewable energy sources
- Side-effects would happen in other sectors
 - ✓ Synergies and trade-offs
 - ✓ Enhancing the synergetic effects and deal with trade-offs smartly