

Emerging Science Challenges for Integrated Assessment

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The World Bank

Challenge 1 – A more granular approach to climate change impacts



LATINO

Puerto Rico lost \$43 billion after Hurricane Maria, according to govt. report

“Given the magnitude of the natural disaster, the economic sectors will keep feeling the impact for an undetermined amount of time,” the report says.





MARKET INSIDER

Hurricane Florence damage estimated at \$17 billion to \$22 billion and could go higher — Moody's Analytics

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KEY POINTS

- Property damage from Hurricane Florence is estimated at \$17 billion to \$22 billion, and that forecast could be conservative, depending on further flooding, says Moody's Analytics.
- Economists so far see a minimal impact to growth from the hurricane, which Moody's sees shaving 0.2 percentage points from third-quarter GDP.





WORLD • HURRICANE IRMA

Hurricane Irma's Damage Could Cost Us \$300 Million, Antigua and Barbuda PM Says



Increased flooding may cost the world \$1 trillion by 2050

John Roach

Published 4:42 AM ET Mon, 19 Aug 2013



Getty Images

Reyes Garcia wades through floodwater to inspect flood damage to a building April 19, 2013 in Des Plaines, Illinois.



ASSET LOSSES

1. Hazard

2. Exposure

3. Vulnerability



Avoiding disasters/impacts

ASSET LOSSES

1. Hazard

2. Exposure

3. Vulnerability



WELL-BEING LOSSES

1. Hazard

2. Exposure

3. Vulnerability

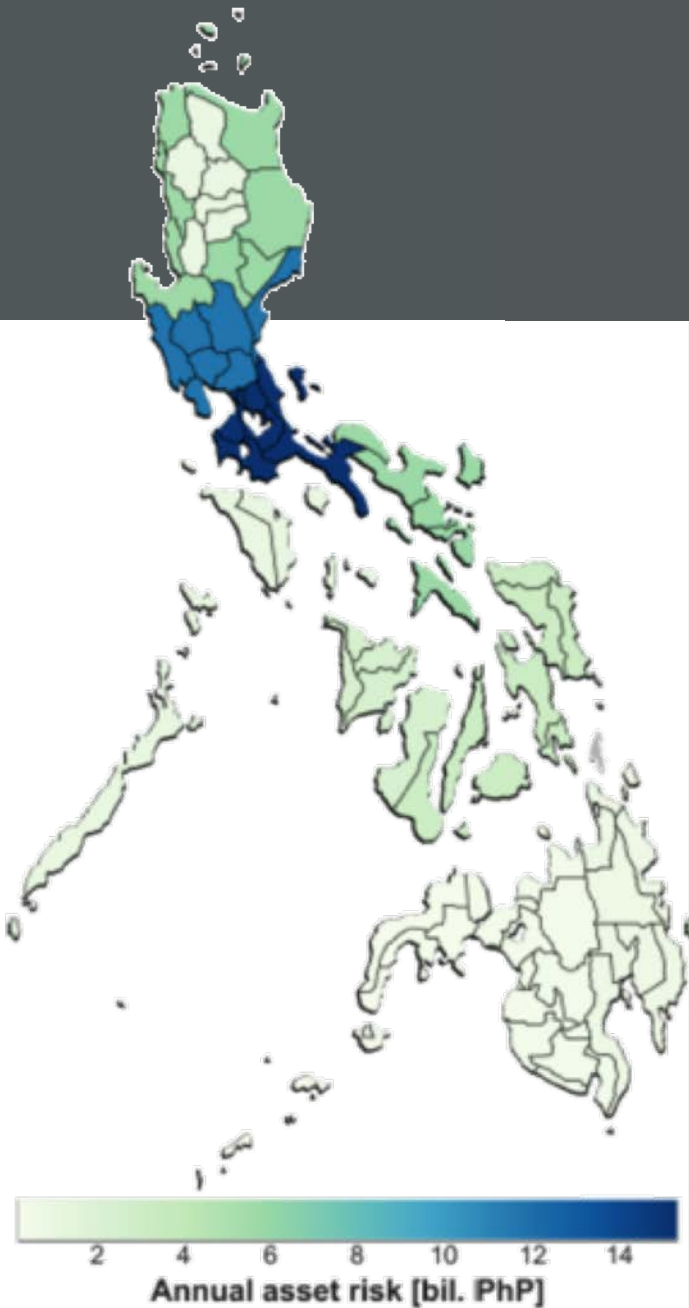
4. Socioeconomic resilience



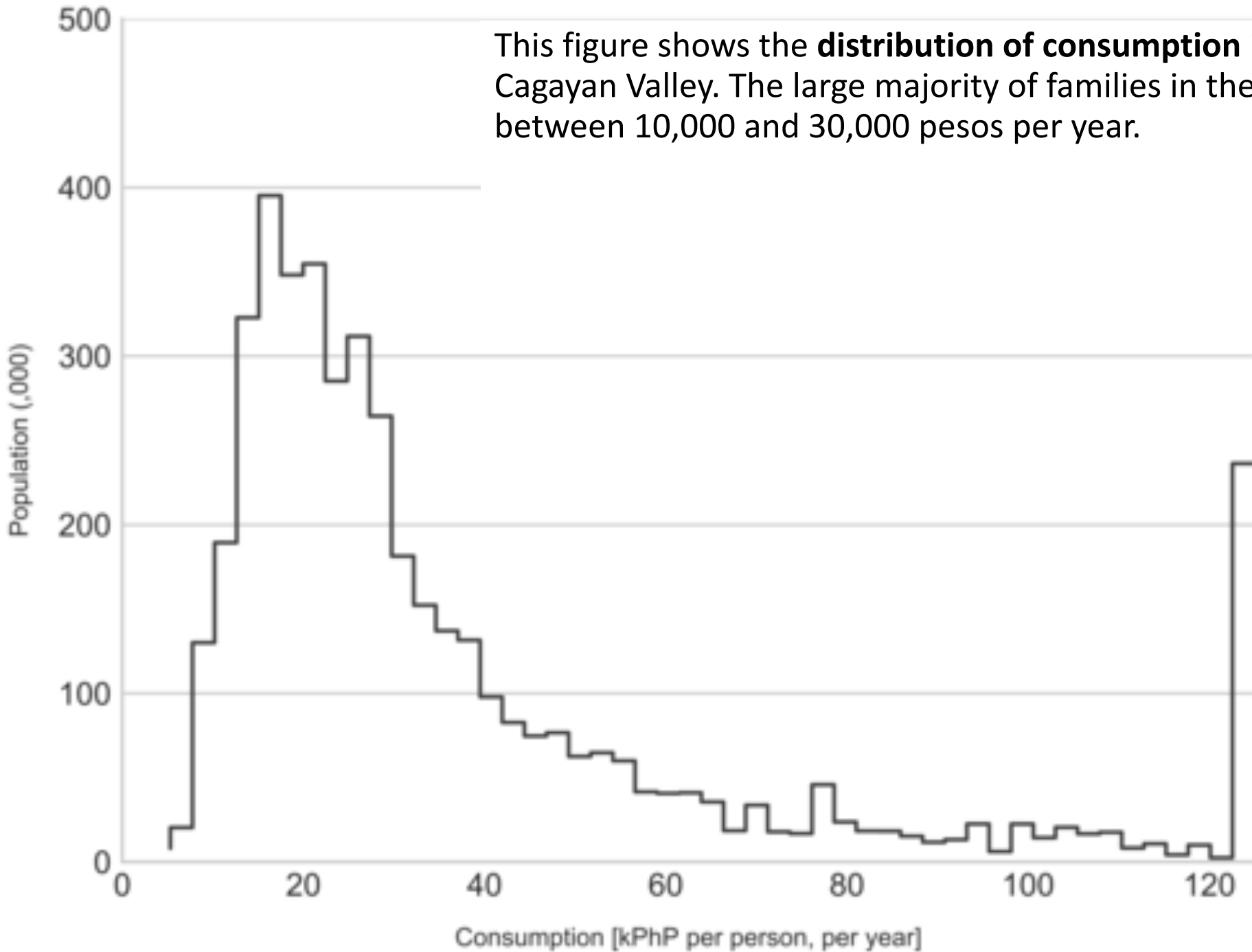
Managing residual risk/impacts

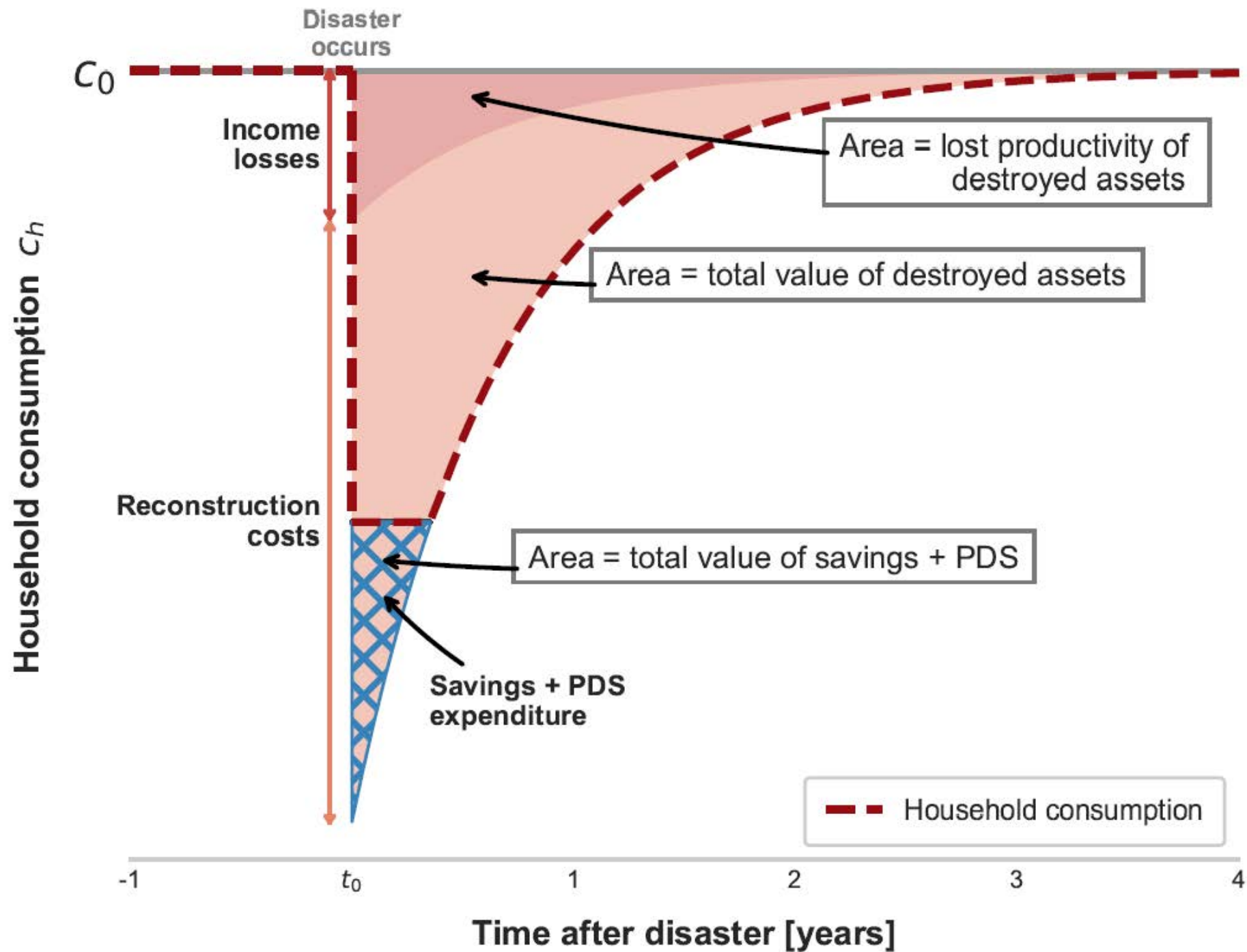
UNBREAKABLE

» Building the Resilience of the Poor in the Face of Natural Disasters

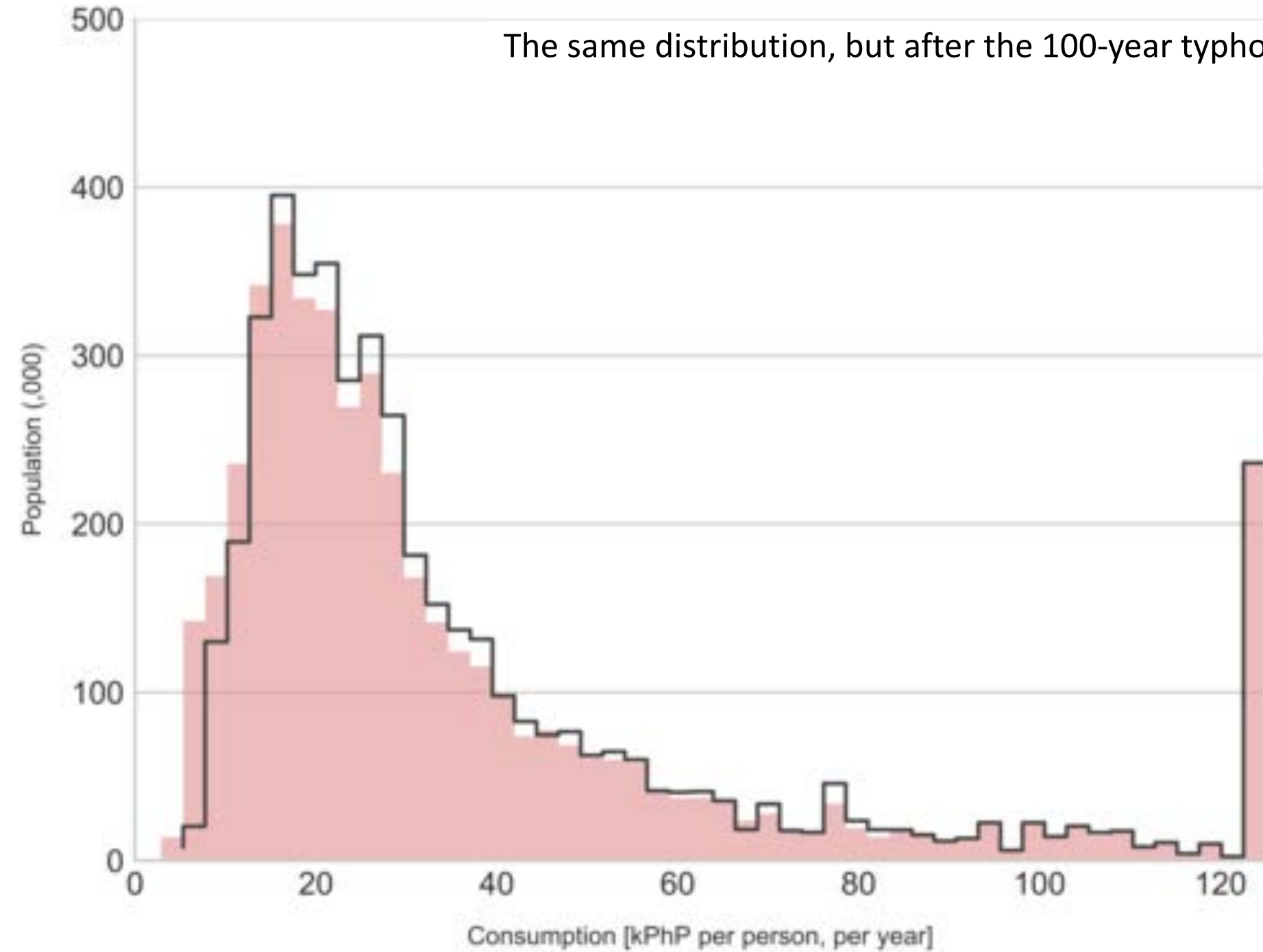


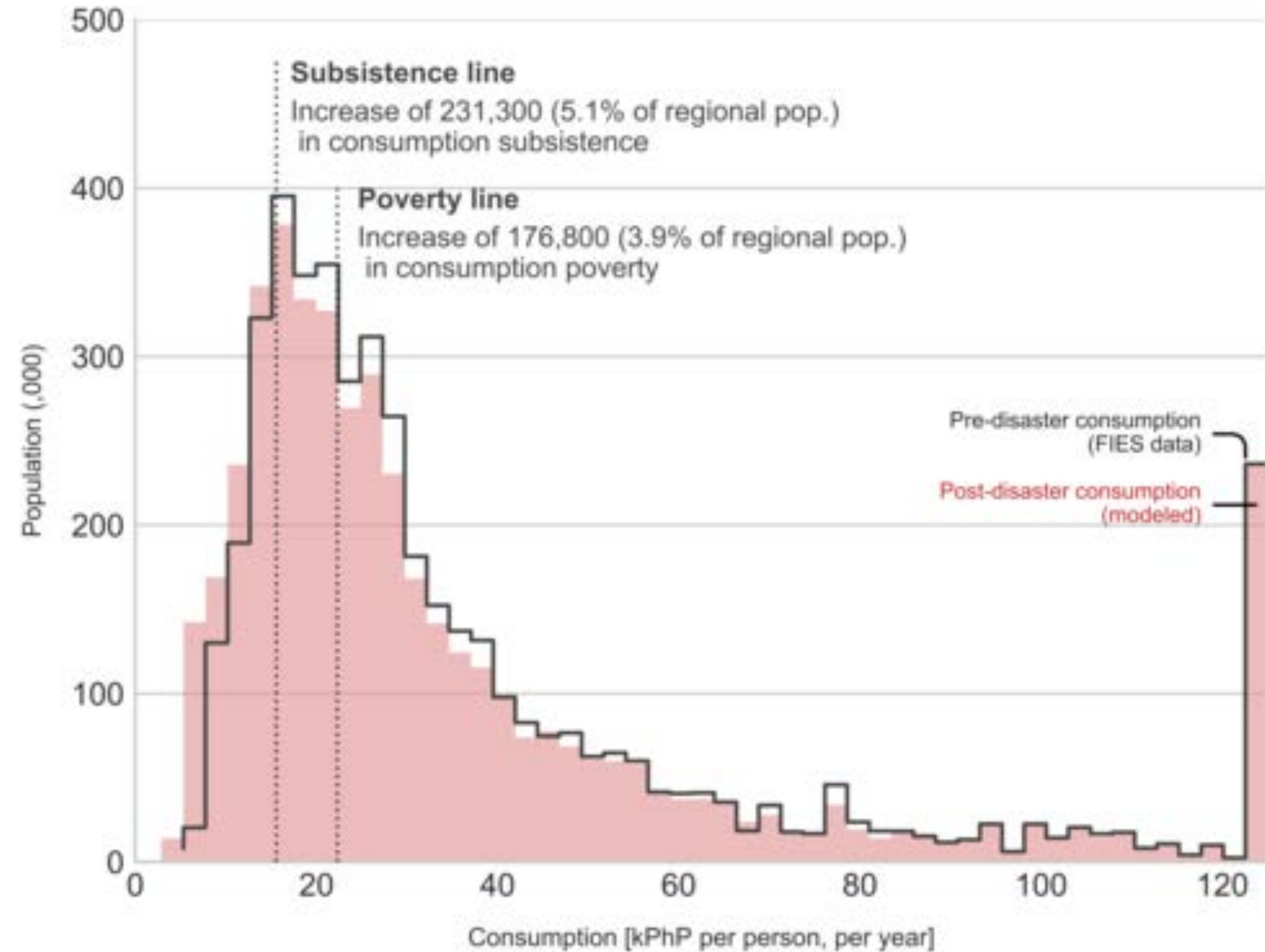
This figure shows the **distribution of consumption** in the region II – Cagayan Valley. The large majority of families in the region consume between 10,000 and 30,000 pesos per year.





The same distribution, but after the 100-year typhoon hit the region

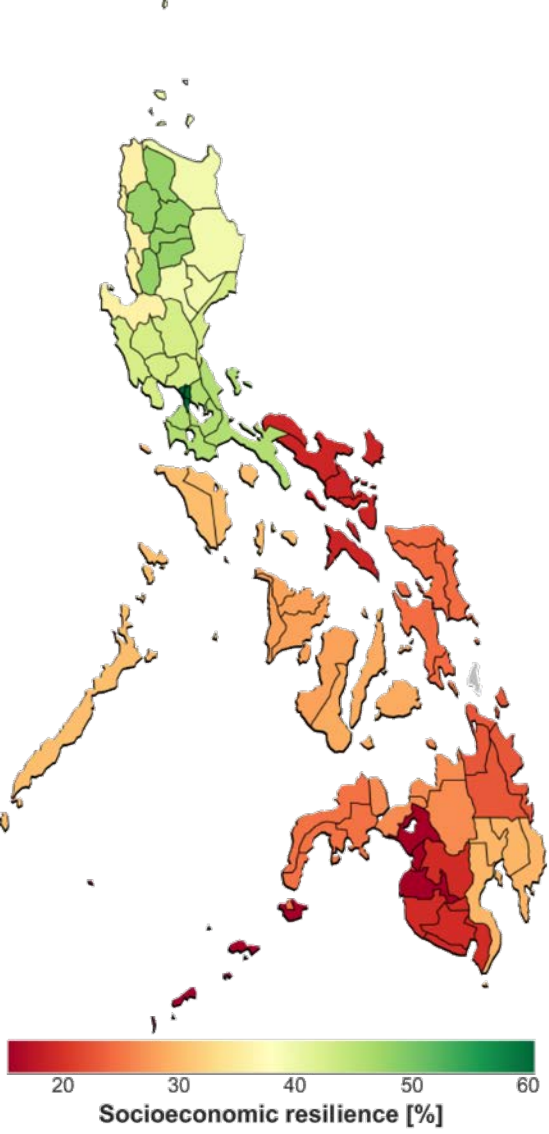
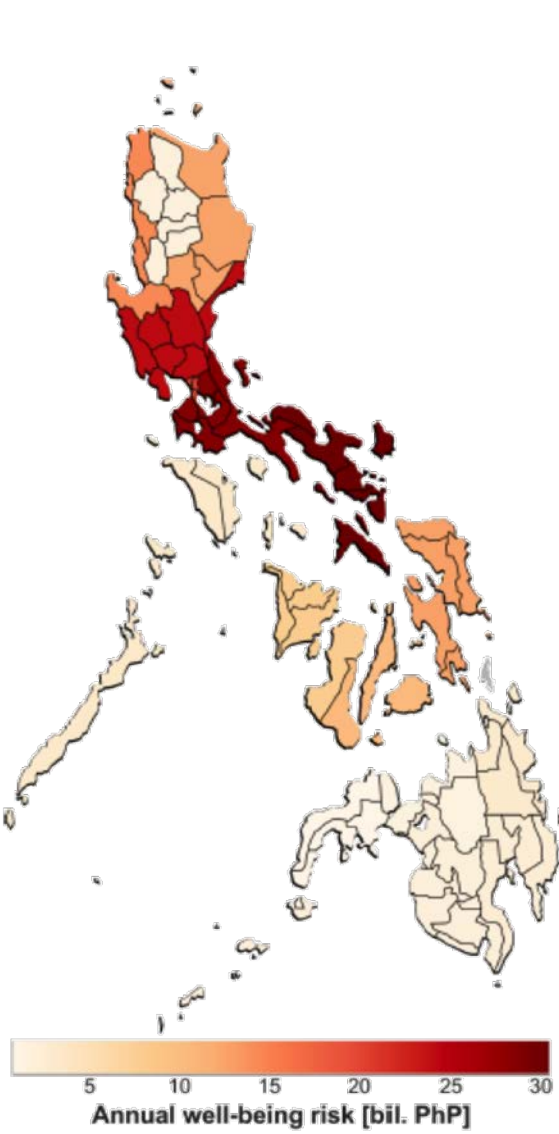
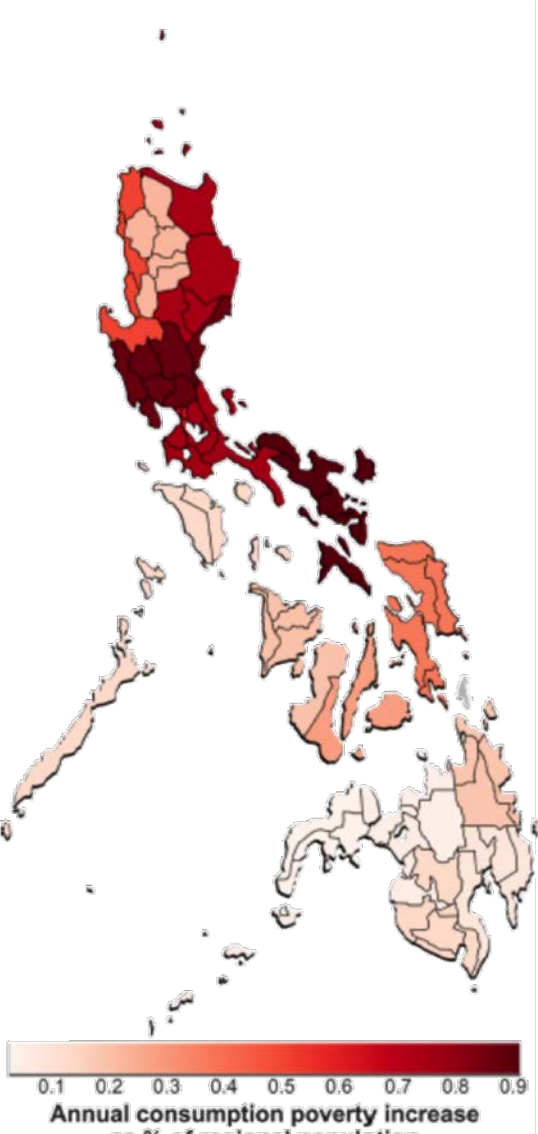
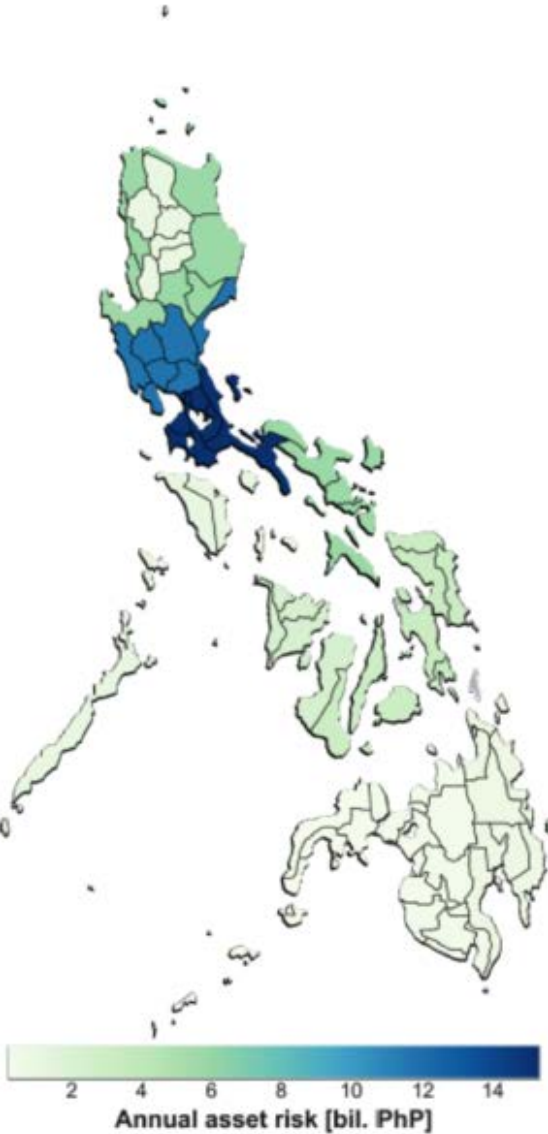




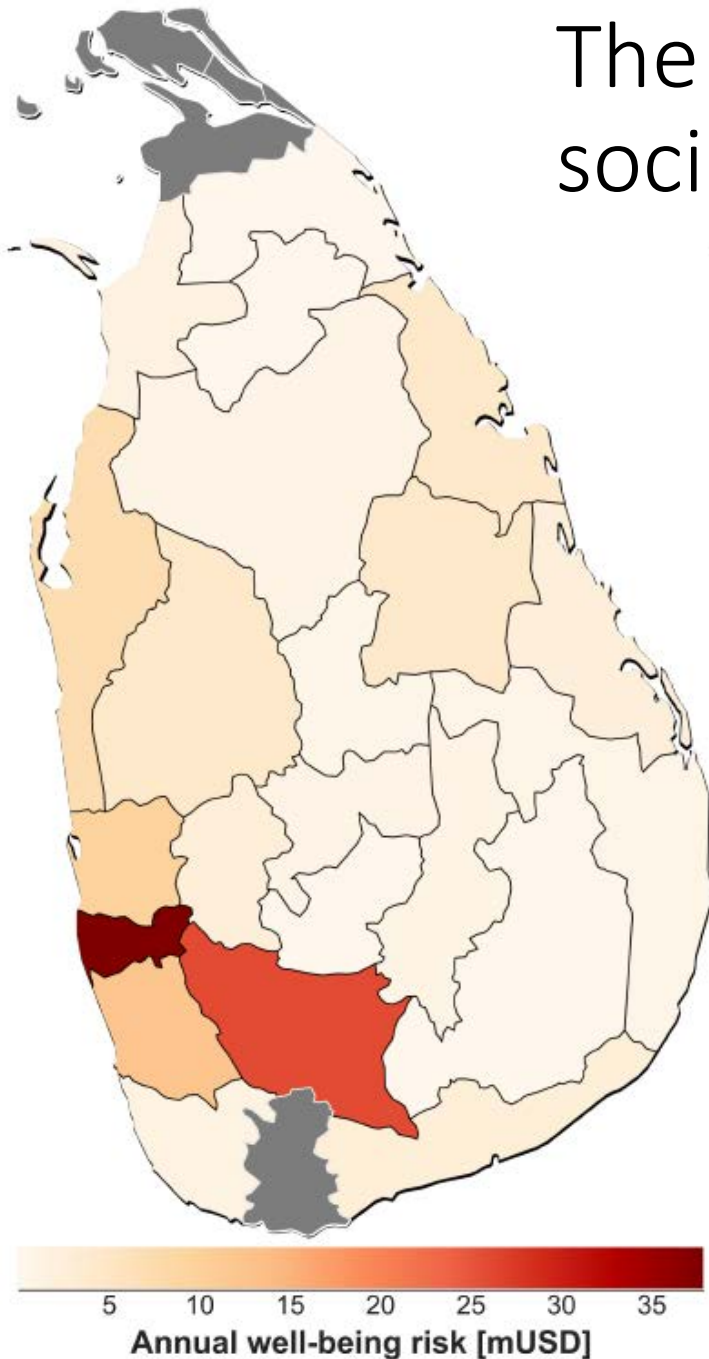
In the case of the 100-year typhoon, around 176,000 people fall in poverty, and 230,000 even fall below the subsistence line.

Stress testing all regions for all hazards, we find that about half a million Filipinos face transient consumption poverty every year due to their exposure to disasters.

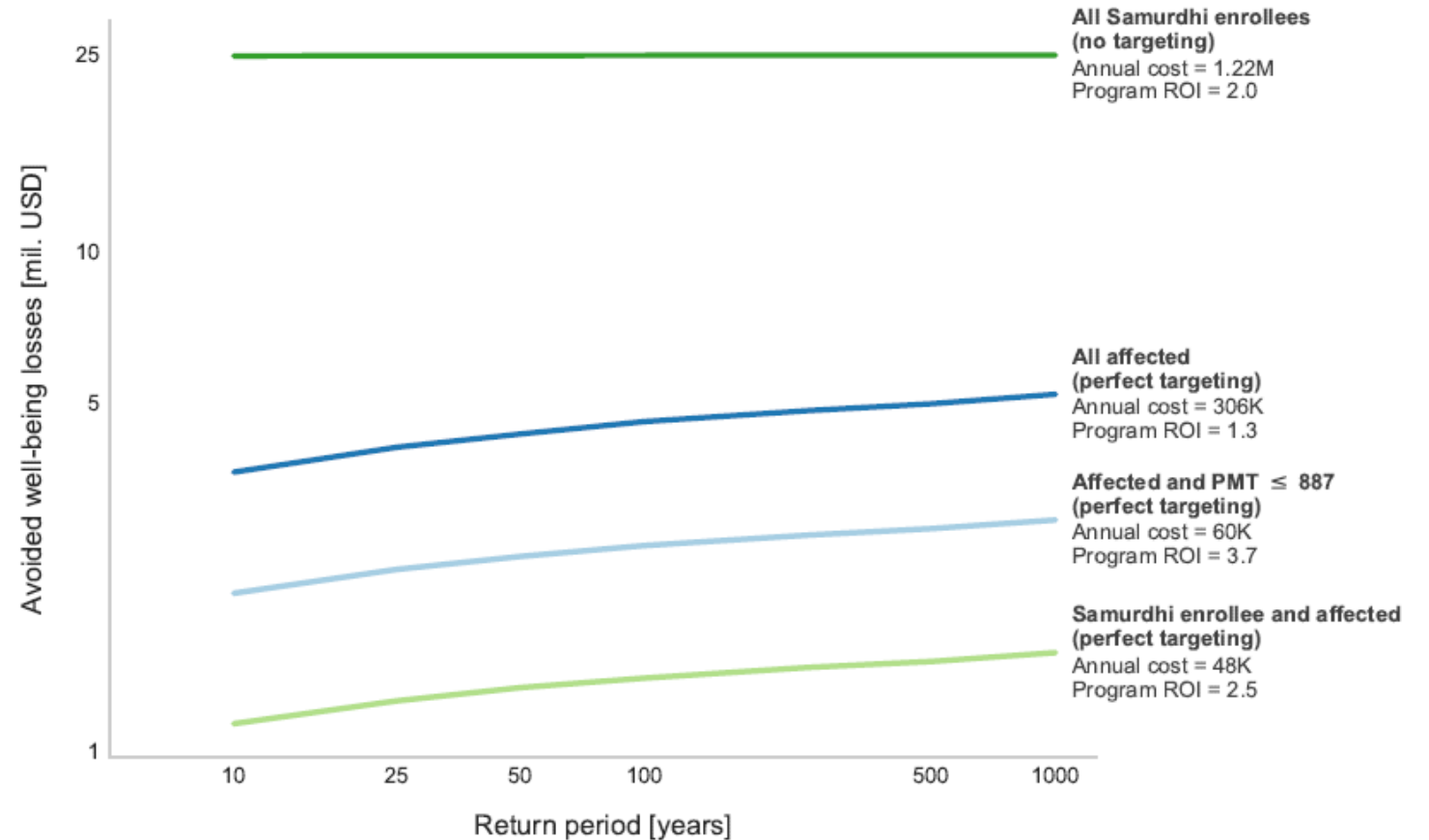
the regions identified as priorities for risk-management interventions differ depending on which risk metric is used. Each metric translates in quantitative form a different set of policy objectives.



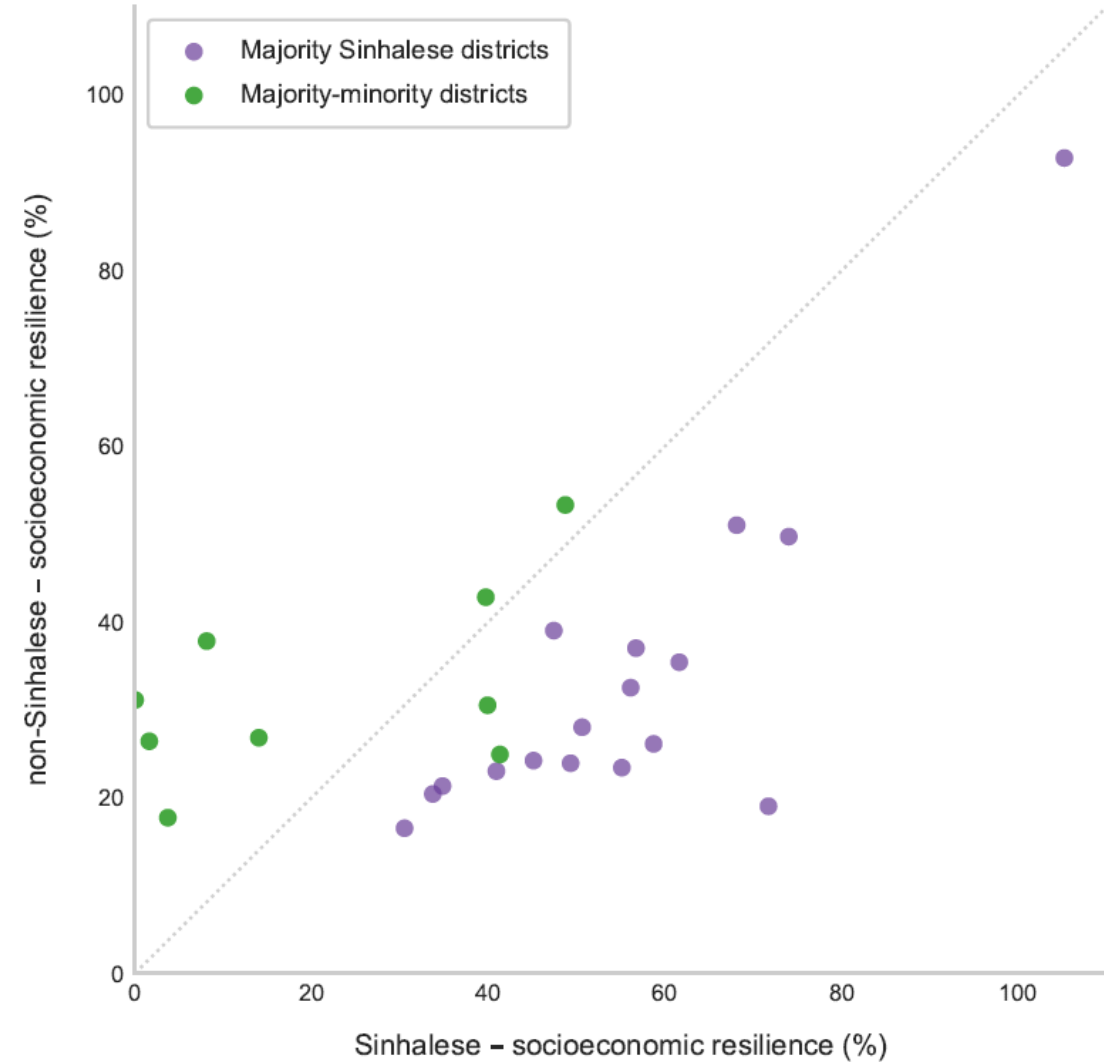
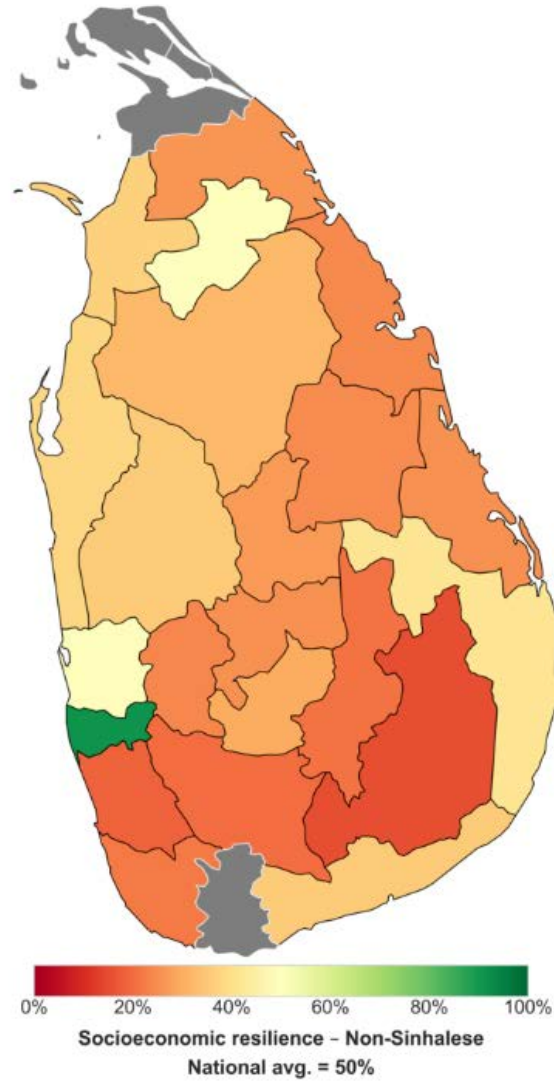
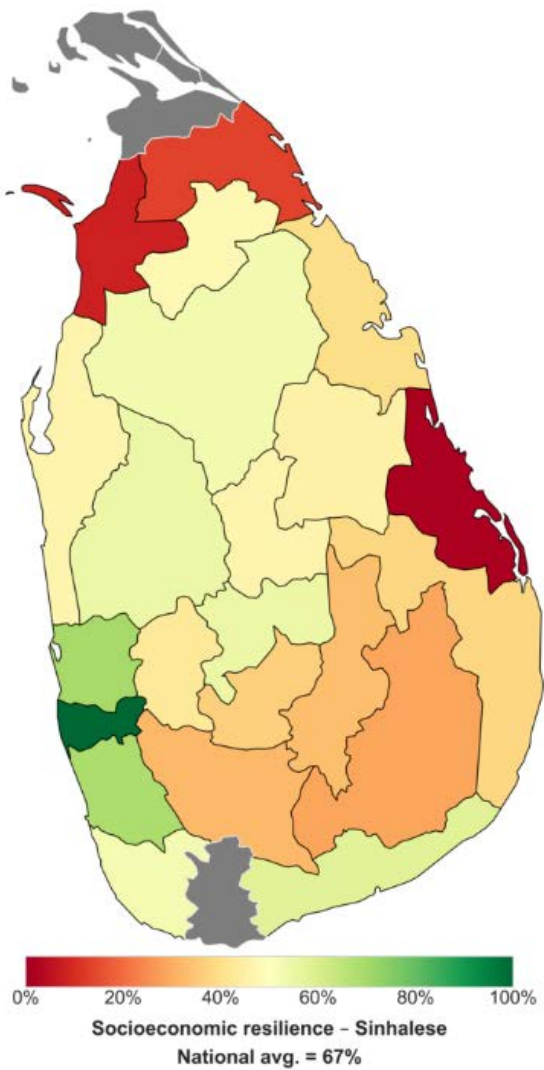
The potential from (and cost of) adaptive social protection in Sri Lanka



Expected benefit of ASP (payout = 1 month of Samurdhi) in Sri Lanka, by RP and beneficiary group



The important link with conflicts and stability



Challenge 2 – Political economy and distributional impacts

NO
CARBON DIOXIDE
TAX

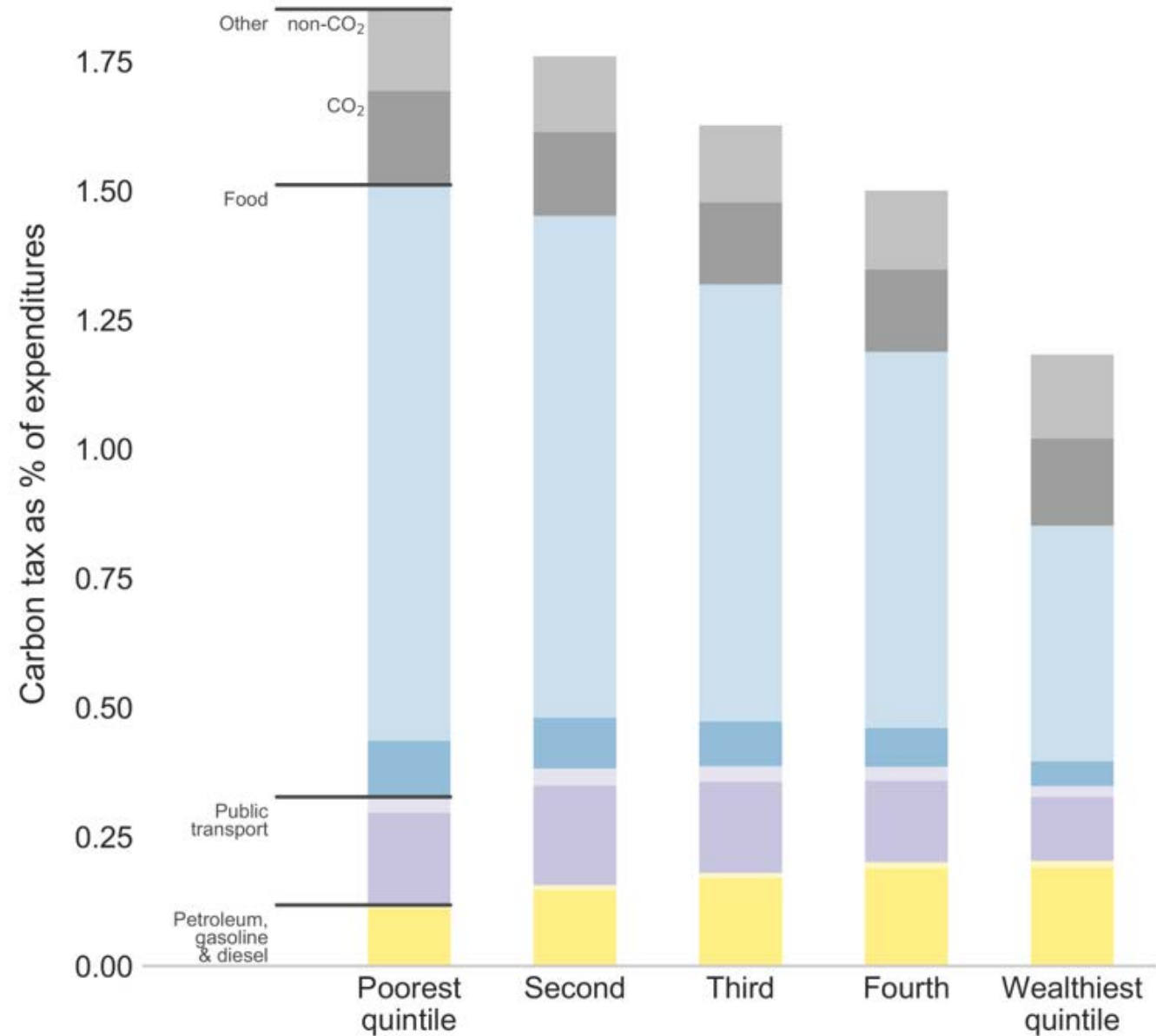
Australian
Labor
Toxic and
Costly Policies



Now a lot of great studies on the distributional impact of climate policies...

Making carbon taxes pro-poor using cash transfers in Latin America and the Caribbean

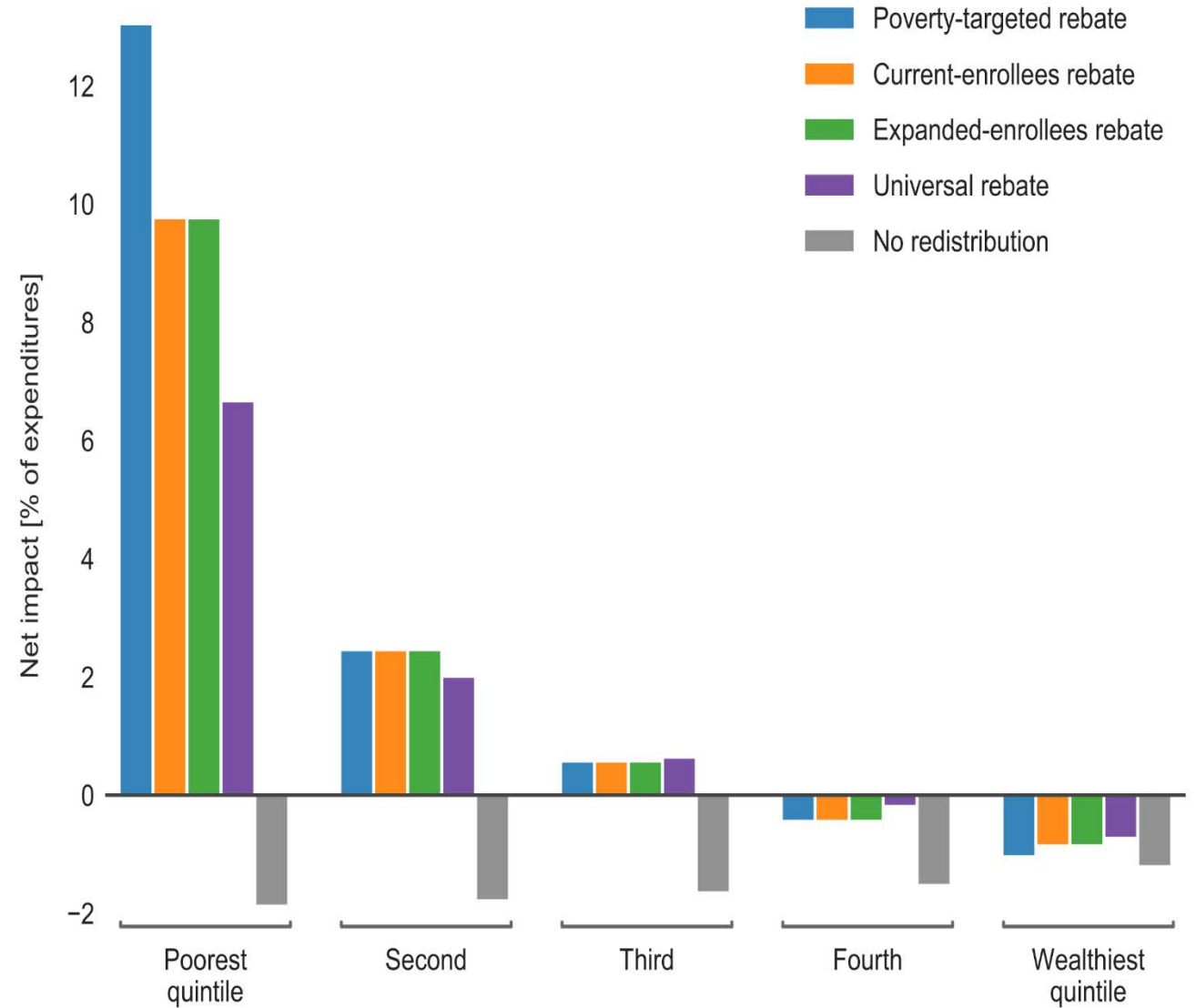
Adrien Vogt-Schilb¹, Brian Walsh¹, Kuishuang Feng^{2,3*}, Laura Di Capua¹, Yu Liu⁴, Daniela Zuluaga¹, Marcos Robles¹, Klaus Hubaceck^{3,5,6,7}



... and on what to do about them.

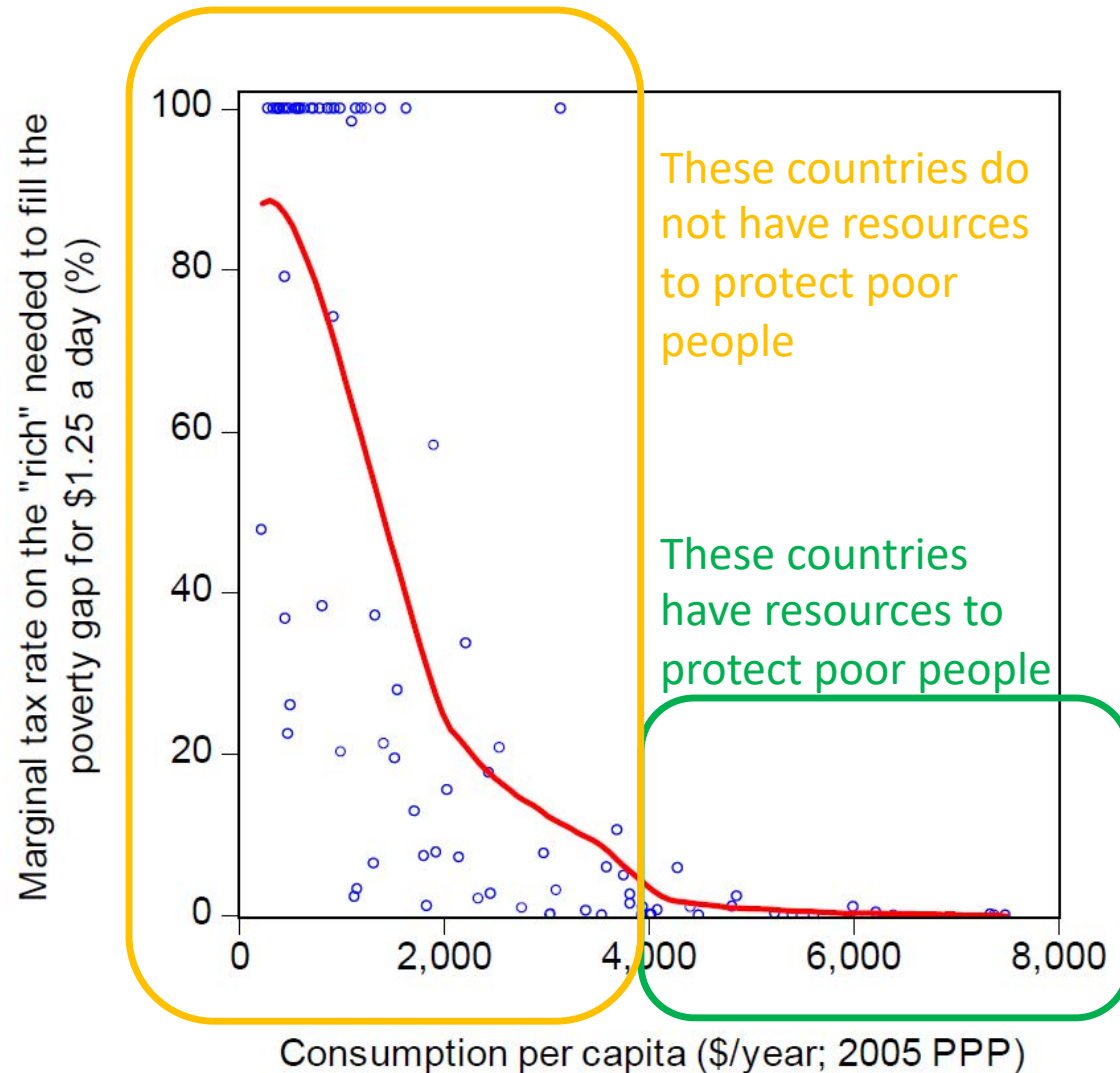
Making carbon taxes pro-poor using cash transfers in Latin America and the Caribbean

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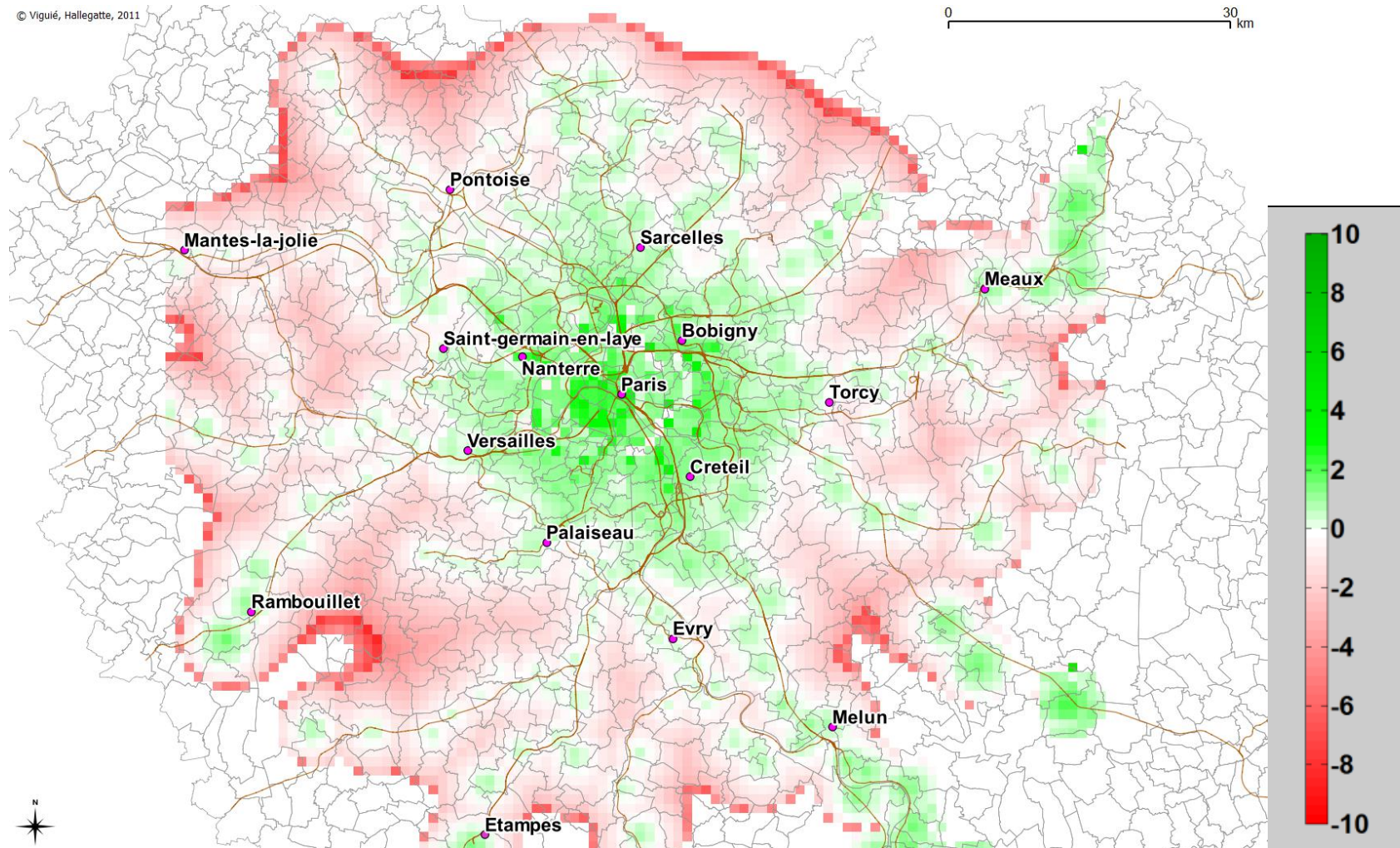
But very poor countries cannot protect poor people

For low-income countries, only international support has to prevent a trade-off between emissions reduction and poverty alleviation



Distributional issues are not only by income quantiles – large spatial impacts (including on home values)

Monthly rent
variation
(€/m²/month)



Impact of a €100/tC carbon tax



ETAT = ANCIEN
ETAT = NOUVEAU
PROX 15/19
200 AT-DANS
OVERANCE
W A TIC500

A 9 E 15
TOULOUSE
MONTPELLIER
PERPIGNAN
péage
BARCELONE
péage
S 13



A 9
N°43

GARE TO
ON T ATTEND !!
TOUS-UNIS



MACRON
SALETYPE



Climate policies in the real world

- Soaring housing prices and people excluded from city centers (and their good schools, opportunities, public transit, etc.)
- Reduction in discretionary household spending, reduced rainy-day savings, and more fragmented society (less informal risk sharing)
- Working poor and less stability (gig economy), less organized labor and union, winner-takes-all economy, automation, and trade
- Feeling of elite capture in most western democracies
- Usually, poor people have no voice in the political process. Opposition comes from the urban middle-class and powerful interest groups.

Specific industries and regional impacts

Failure to manage rapid economic change in Europe and in the US:

- coal mines
- heavy industries
- fisheries

Few positive examples:

- Japan and Korea in the 50s and 60s
- Ship building in Sweden



The important link with conflicts and stability



Challenge 3 – More validation for more credibility





These are big numbers...
can we trust them?

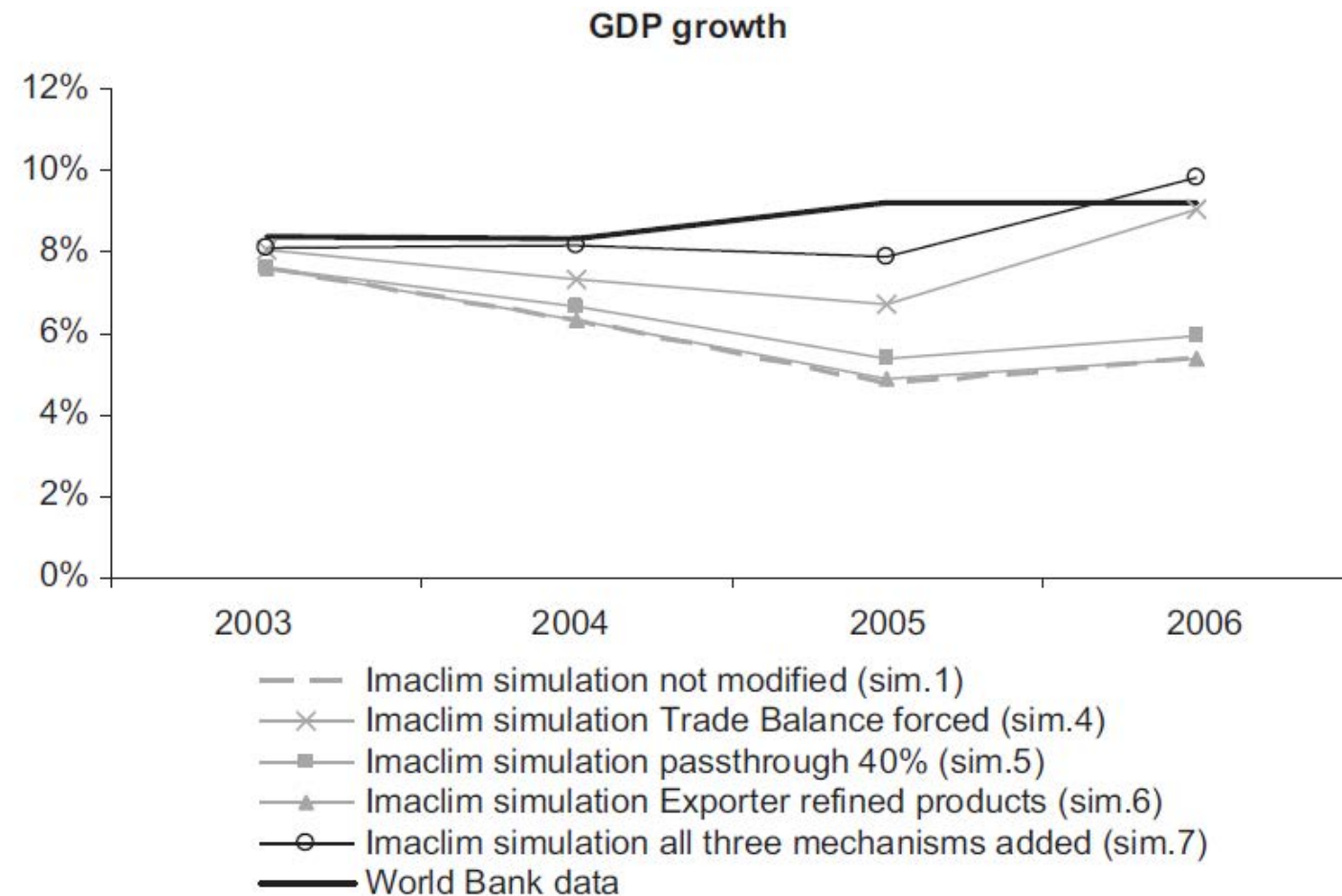
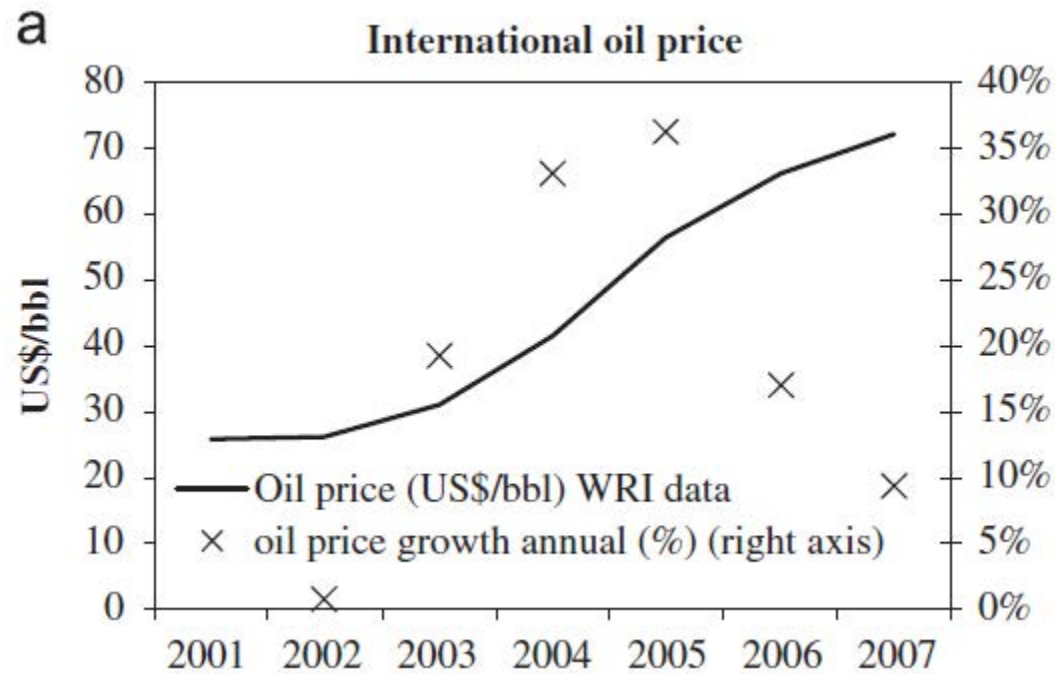
+ \$4.2 TRILLION
The net benefit of investing in the resilience of infrastructure in low- and middle-income countries, with \$4 in benefit for each \$1 invested

#LIFELINES

DOWNLOAD THE REPORT:
[WORLD BANK.ORG/CLIMATE](https://www.worldbank.org/climate)

The resilience of the Indian economy to rising oil prices as a validation test for a global energy–environment–economy CGE model

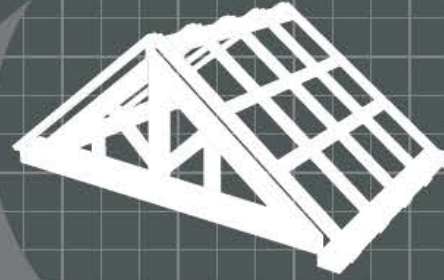
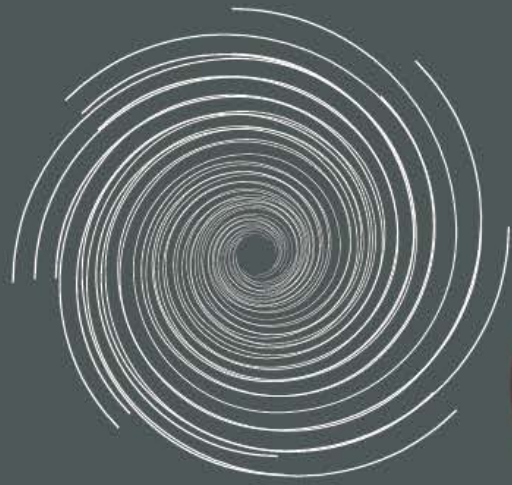
Céline Guivarch^{a,*}, Stéphane Hallegatte^{a,b}, Renaud Crassous^{a,c}



Accra Poverty-DRM Survey

- 1010 households interviewed
- Focused on the 2015 flood in Accra
- SWIFT methodology to estimate household expenditures and poverty
- Data collection – early June 2017
 - Interview time – 1 hour to 1.5 hours





WELL-BEING LOSSES

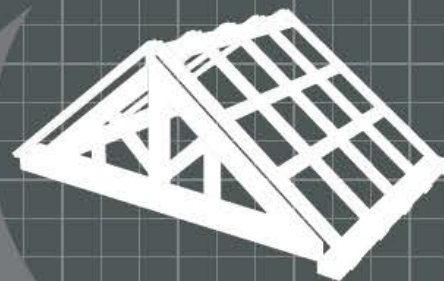
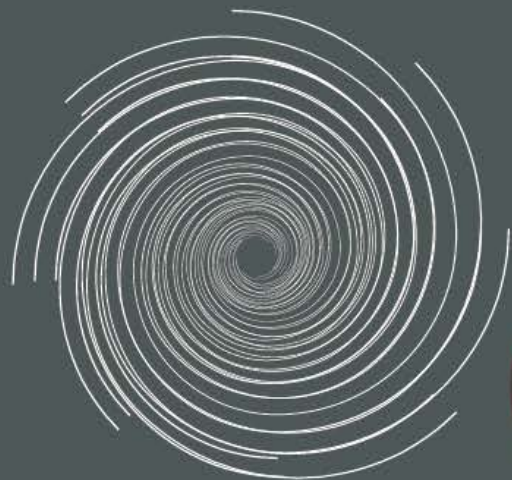
1. Hazard

2. Exposure

3. Vulnerability

4. Socioeconomic
resilience

Who's affected?



WELL-BEING LOSSES

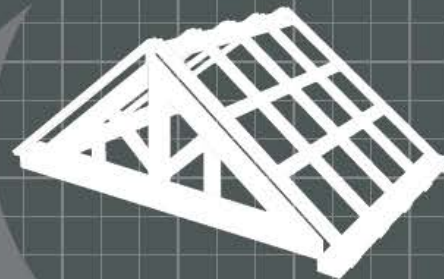
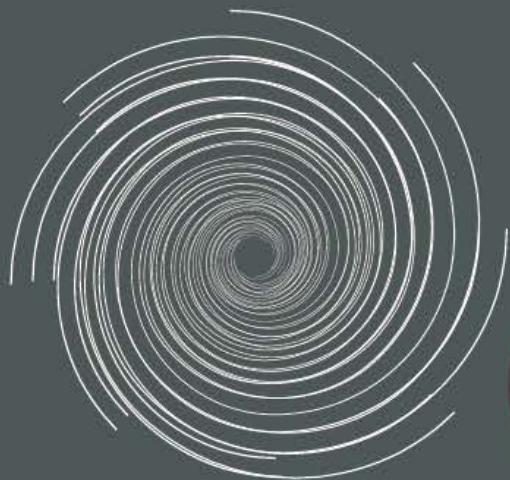
1. Hazard

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How much did they lose?



WELL-BEING LOSSES

1. Hazard

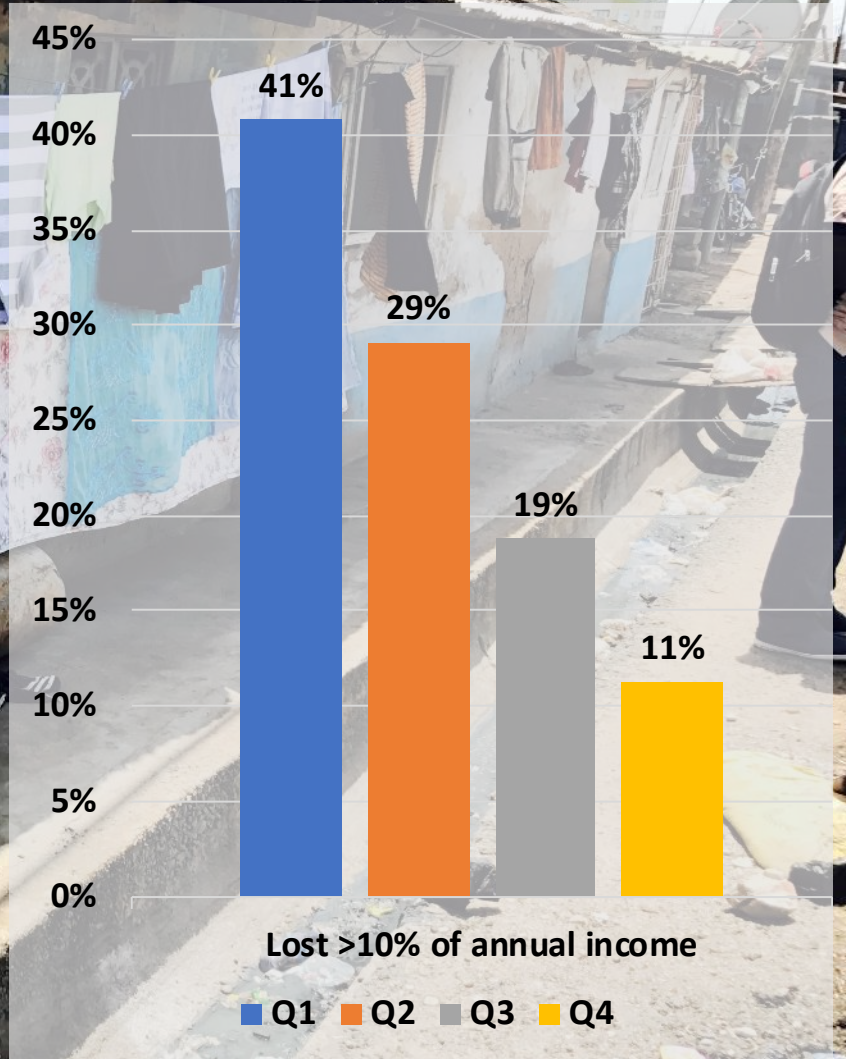
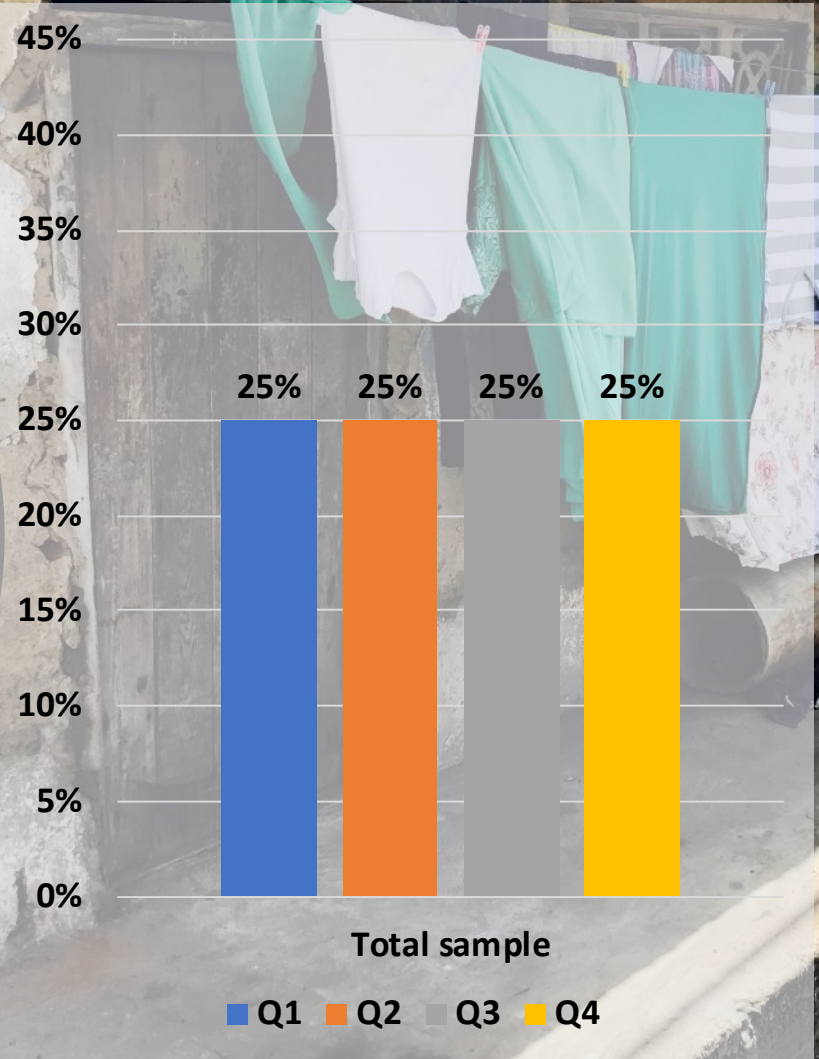
2. Exposure


3. Vulnerability

4. **Socioeconomic
resilience**

What is their ability to
recover?

Vulnerability:
*poorer households
are more vulnerable
to flood exposure
than the rest of the
population*



A photograph of a man in a white shirt riding a bicycle through a slum. The background shows makeshift buildings, one with a religious mural, and a dirt path. Several callout boxes are overlaid on the image, listing factors of socioeconomic resilience. A red diagonal line is drawn across the bottom right corner.

Socioeconomic
resilience is
more than
income

Size of relative
losses

Access to
coping
mechanisms

Source of
stable income

Level of annual
expenditures

Data collection exercises on the impact of disasters on poverty, supported by the GFDRR team

