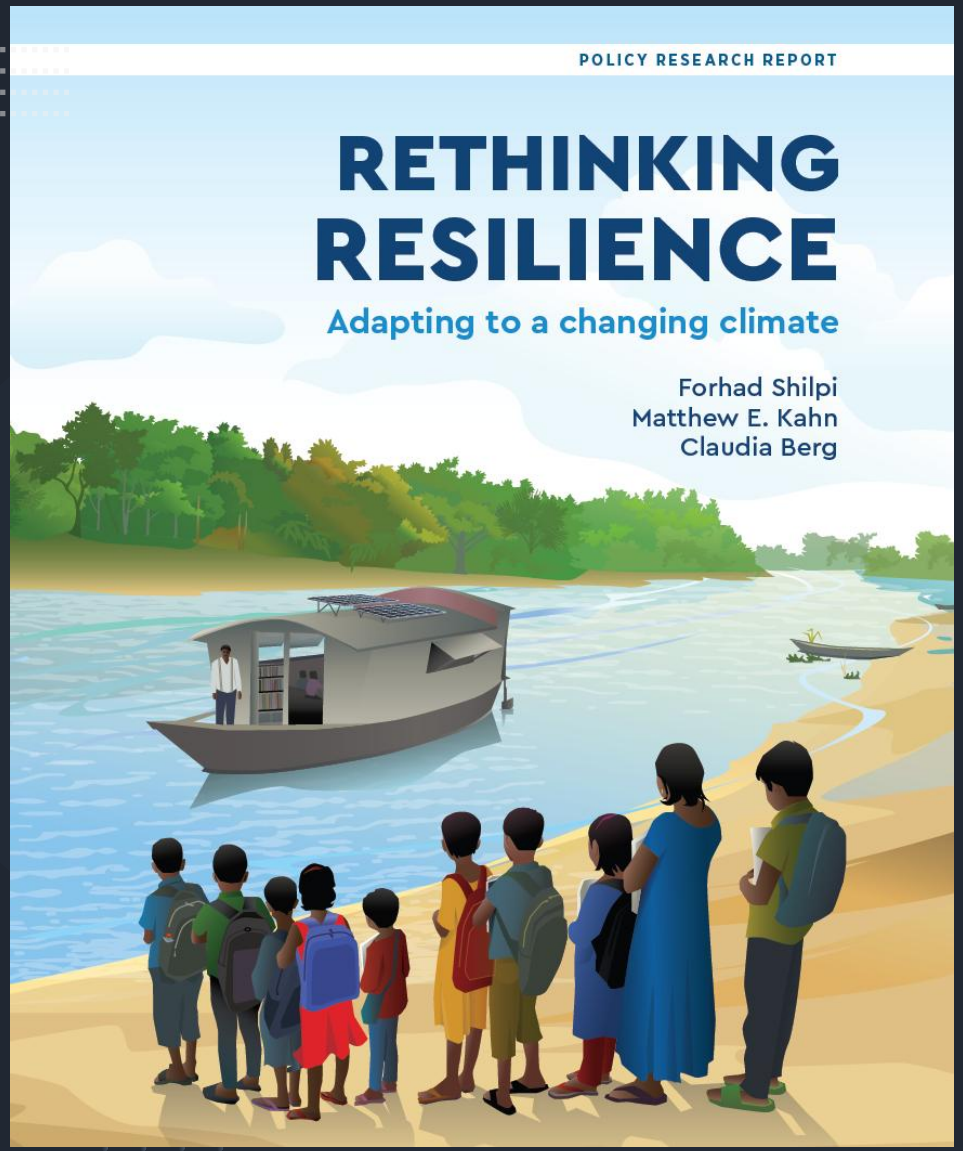


Rethinking Resilience: Adapting to a changing climate

Forhad Shilpi

Policy Research Talk

December 2, 2025

Rethinking Resilience

- **Rising climate shocks, lagging resilience: how can the poor become more resilient?**
- **Effective resilience will depend on private actions**
- **Climate Resilience = 2/3*Economic Development + 1/3* Adaptation**
- **Resilience is considered the same as government-led adaptation and coping**
  - Over-reliance on government actions—public infrastructure and social interventions
  - The 5 pillars of building resilience in this order of importance: income, information, insurance, infrastructure, interventions

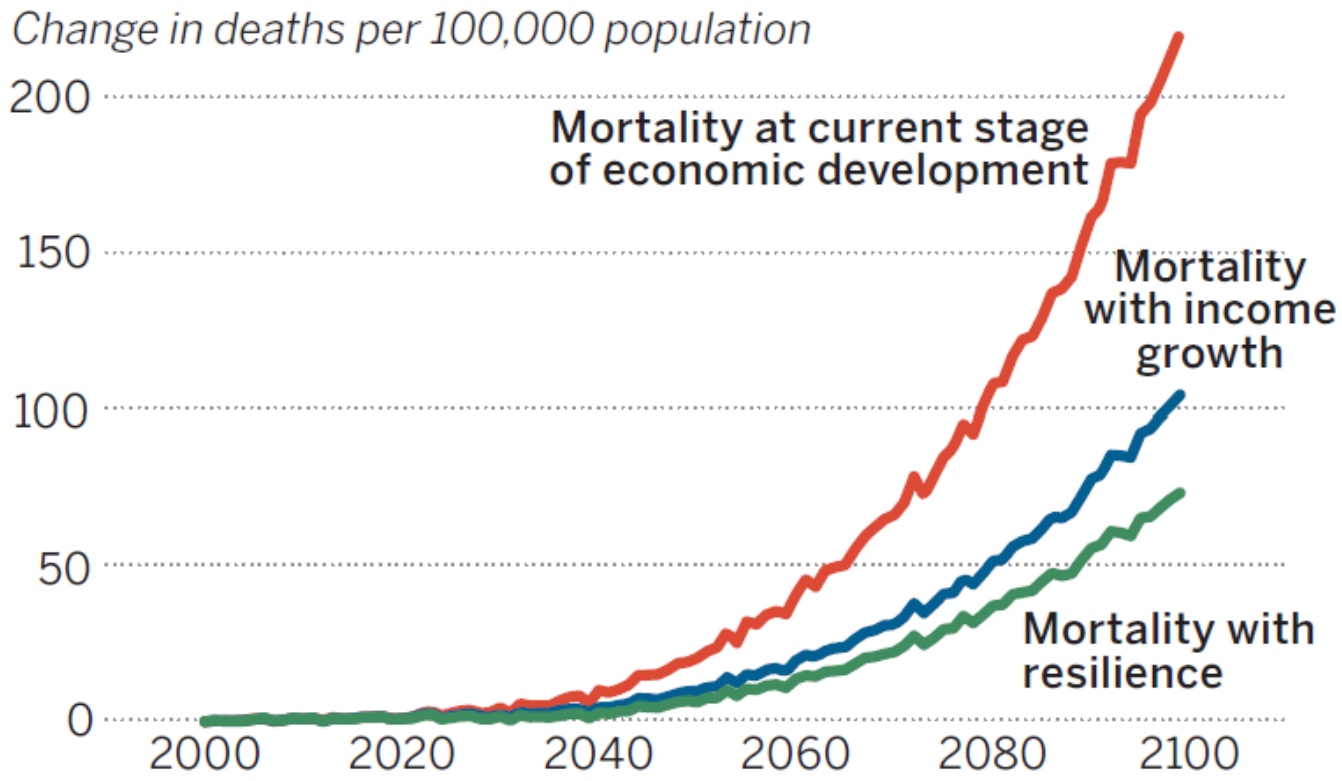
Floating schools in Bangladesh

Effective resilience will depend on adaptation actions of millions of people – families, farms and firms

Surest way of resilience building is inclusive development

- Climate resilience: ~80% income rise, and ~20% learning from experience.
- And resilience, in turn, is a key ingredient to economic development.
- Devastating cyclones can wipe out decades of economic growth in mere hours, and it can take more than two decades to recover from them.

Income growth is the main way to reduce adverse impacts of climate change



Source: Carleton et al. 2022.

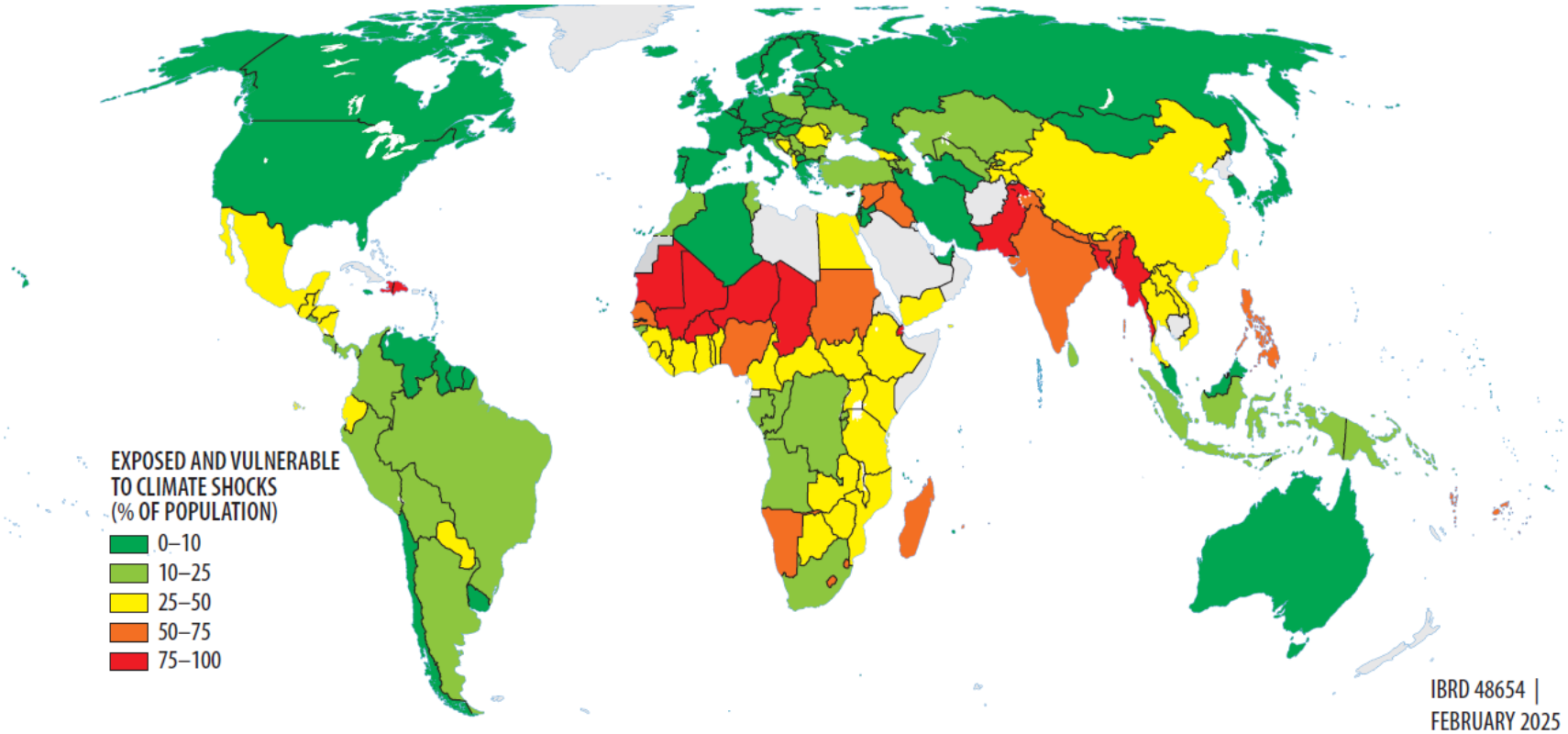
Outline

1. Challenges of climate resilience
   - Climate vulnerability and resilience
   - Deep climate uncertainty and resilience outcomes
     - Individuals' responses and constraints they face.
     - Markets' inability to supply resilience tools.
   - Government responses undermining long term resilience.
2. Rethinking resilience policies
     - The 5I's strategy.
     - Bundling and layering.
     - Data and research for tracking resilience progress.

Challenges of climate resilience

Rising climate uncertainty, lagging resilience

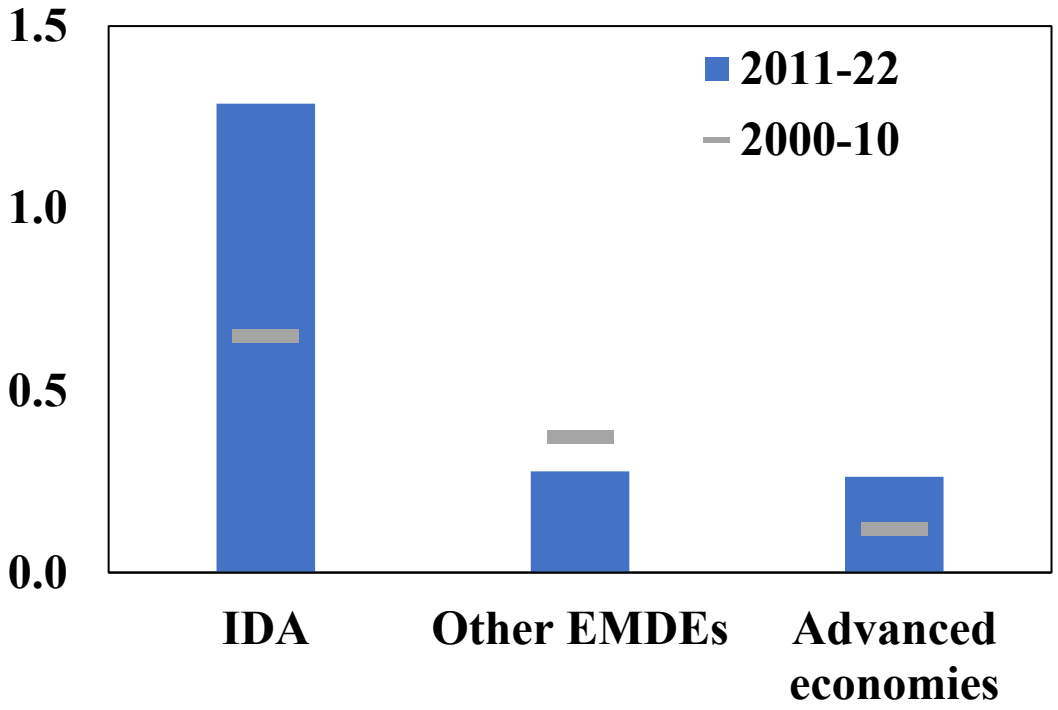
- Severe climate shocks will only get worse
- Poorer countries and poorer people are more vulnerable



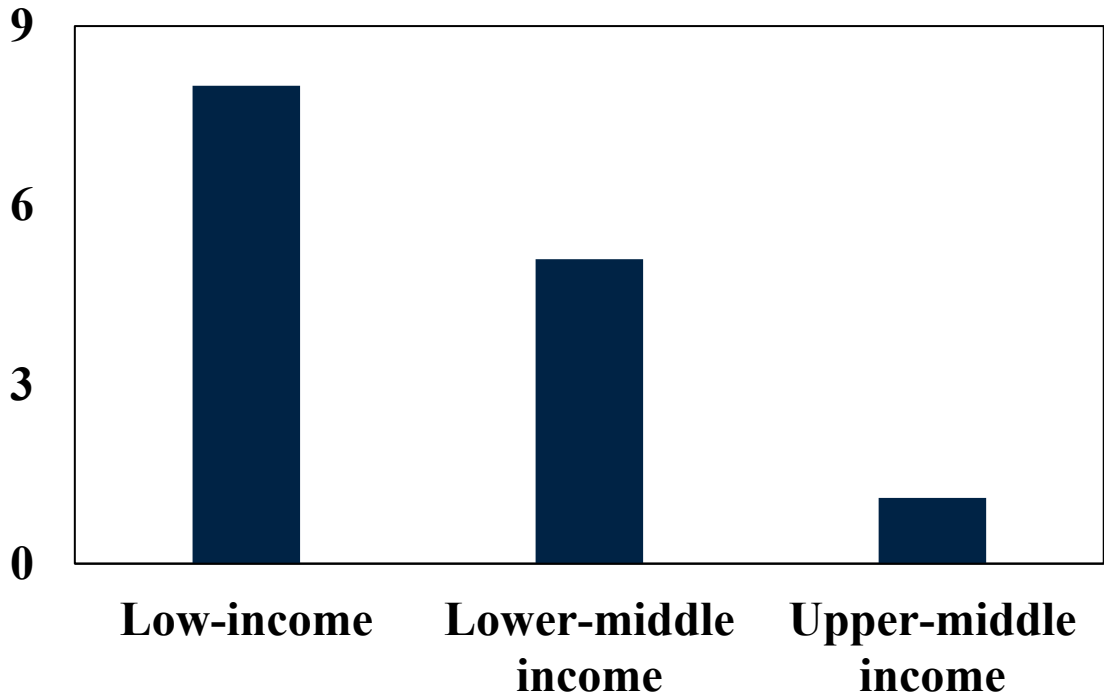
Source: World Bank calculations based on Doan et al. (2023).

Costs of natural hazards are higher in poor countries

Costs of natural disasters
(Percent of GDP)



Investment needs for a resilient pathway, 2022-30
(Percent of GDP, per year)

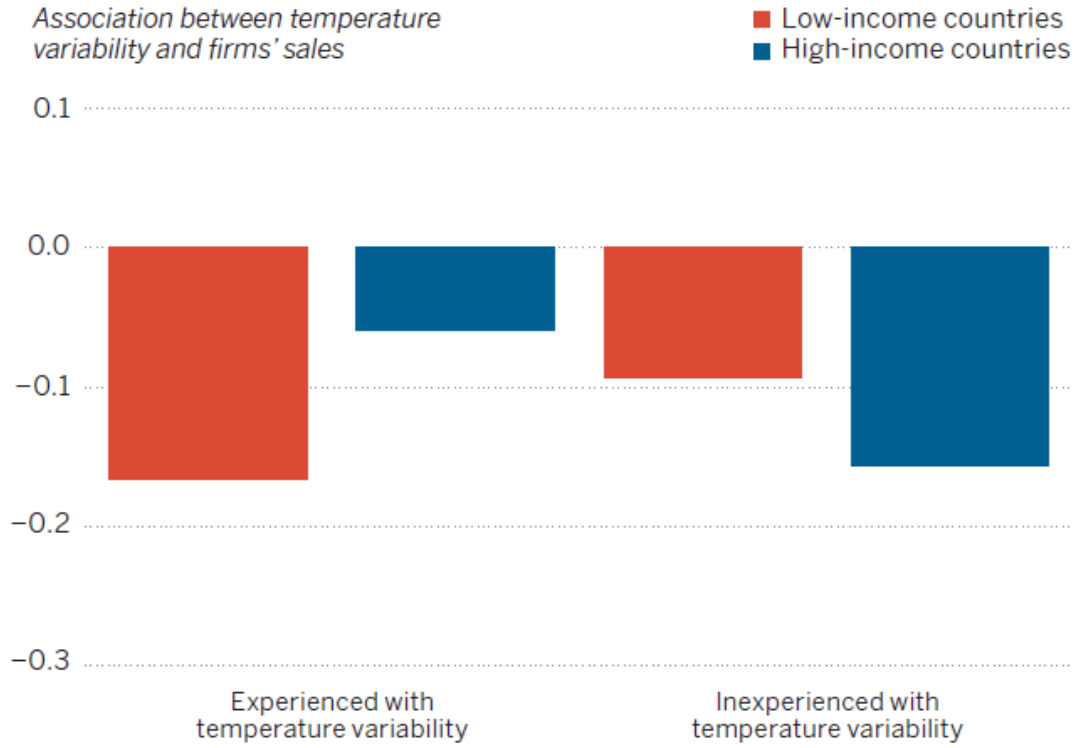


Sources: EM-DAT (database); Notre Dame Global Adaptation Initiative; World Bank (2022); World Bank.

Weak adaptation in poorer countries

- If people adapt, they should experience smaller losses when exposed to the same shocks overtime.
- Adaptation is lagging in poor countries, poor areas and among poor people.
- Recovery takes much longer in poorer countries.

Firms in poor countries experience greater declines in sales if they are in areas with high long-term exposure to temperature variability



Based on WB's Enterprise survey data from 135 countries

Source: Berg et al (2025)

Climate uncertainty and resilience outcomes

Source: Cartoonbias

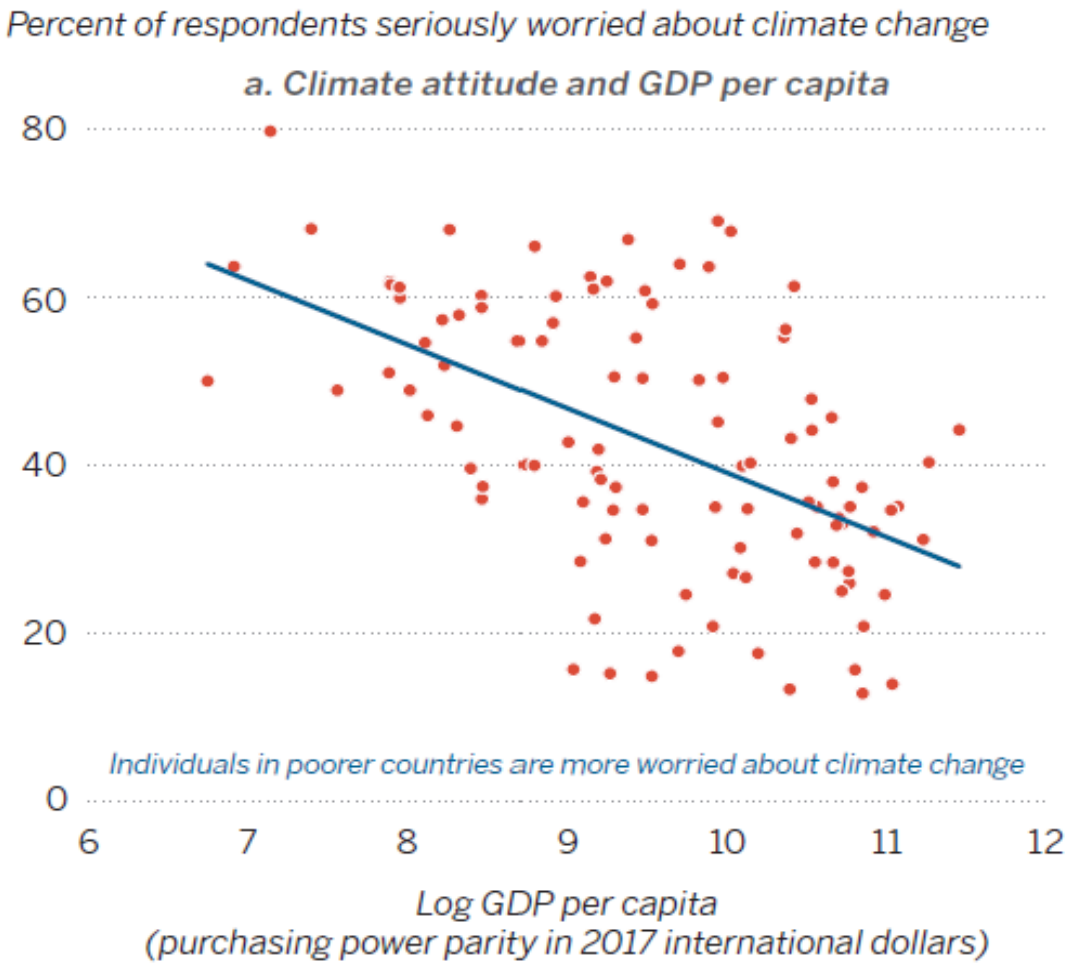
Climate uncertainty can lead to over-reaction by most people

People (Households, farmers and firms, market players, policymakers) are averse to climate uncertainty (ambiguity averse).

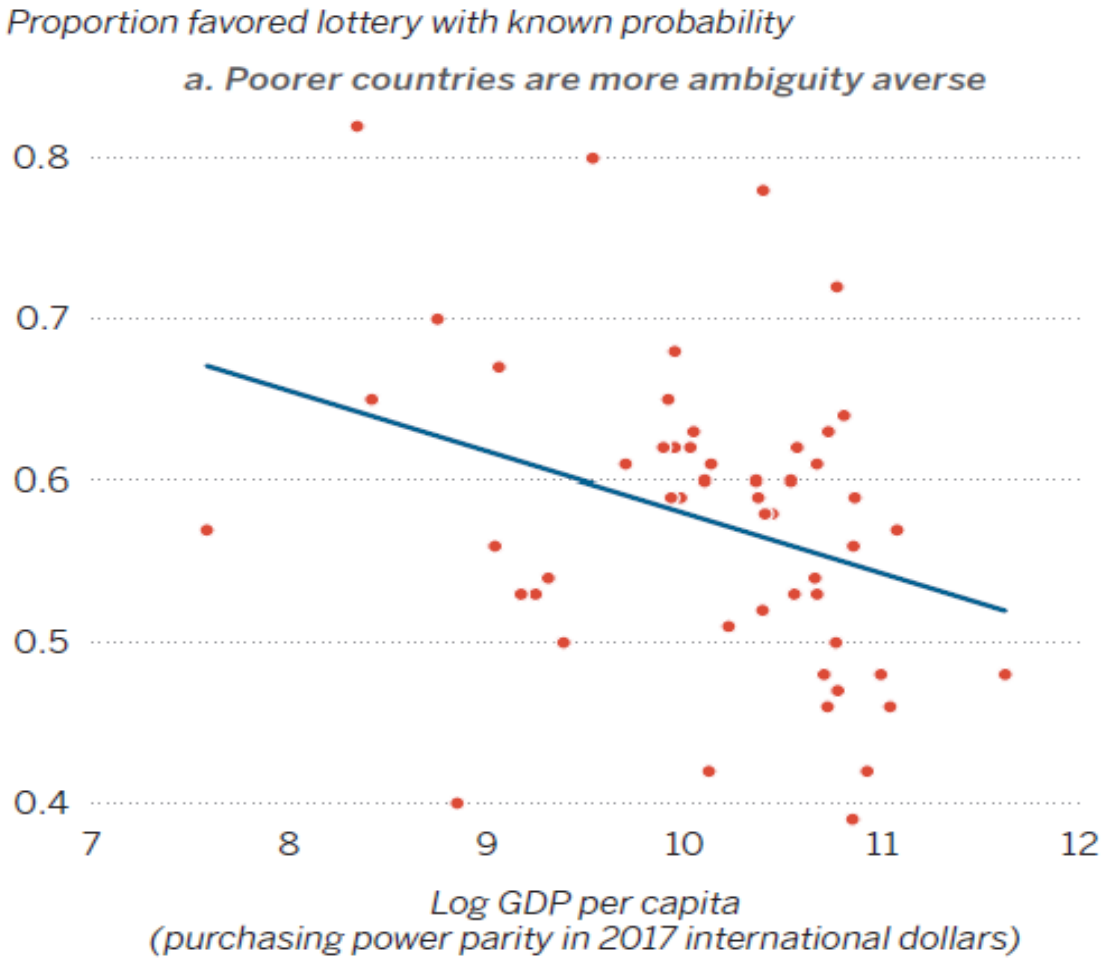
Greater ambiguity aversion means stronger reactions to climate uncertainty, greater tendency to play it safe and greater priority for short term resilience measures.

Poor countries, people with higher stakes (the poor, firm managers, policymakers) have greater incentives to adapt, but too often lack the means to do so.

The poor are more worried about climate change and also more ambiguity-averse



Source: Attitude data from Facebook climate attitude surveys, 2022, dataset, and GDP data from World Development Indicators.

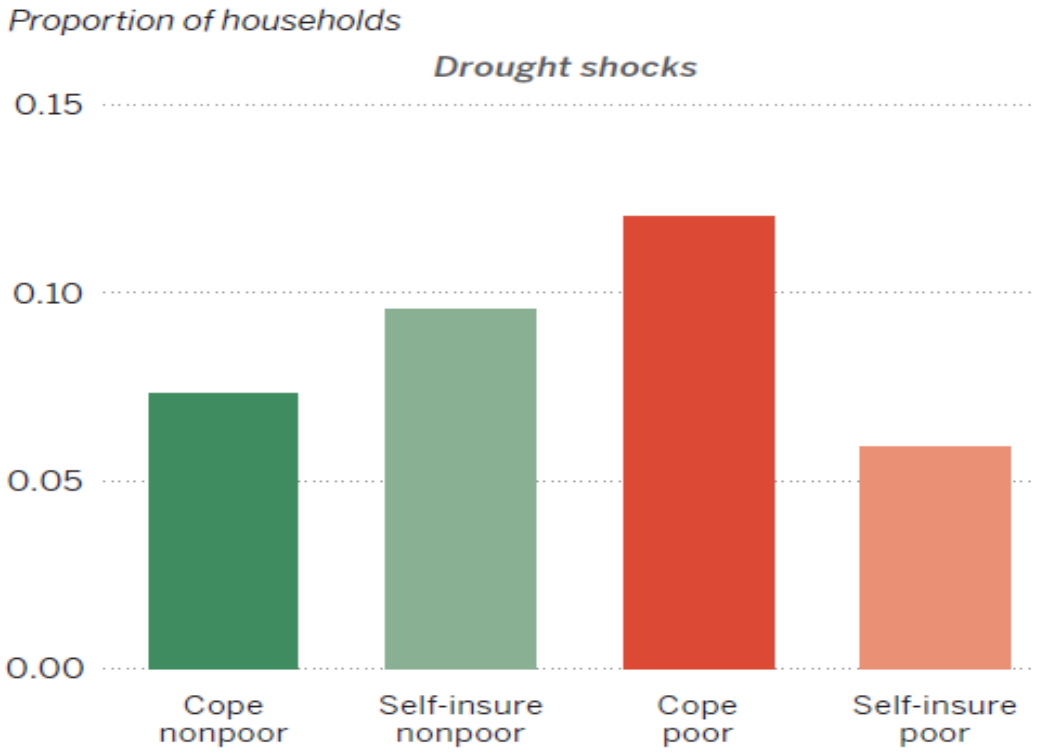


Source: Ambiguity aversion data from Rieger et al. (2017),

Adaptation lags due to poverty and lack of affordable tools

- Depending on their capability, they use self-protection (weather proofing), self-insurance (precautionary savings), and market insurance to prepare for shocks, and try to cope with existing resources in their aftermath.
- The biggest constraint is overall lack of economic development that keeps people poor and deprive them of financial resources for resilience building.

The poor in Nigeria rely mostly on coping than on self-insurance



Source: Shilpi and Berg (2024), using data from the Nigeria Living Standards Measurement Study Integrated Surveys on Agriculture (n = 16,723 observations over four waves of the survey).

Markets and missing resilience tools

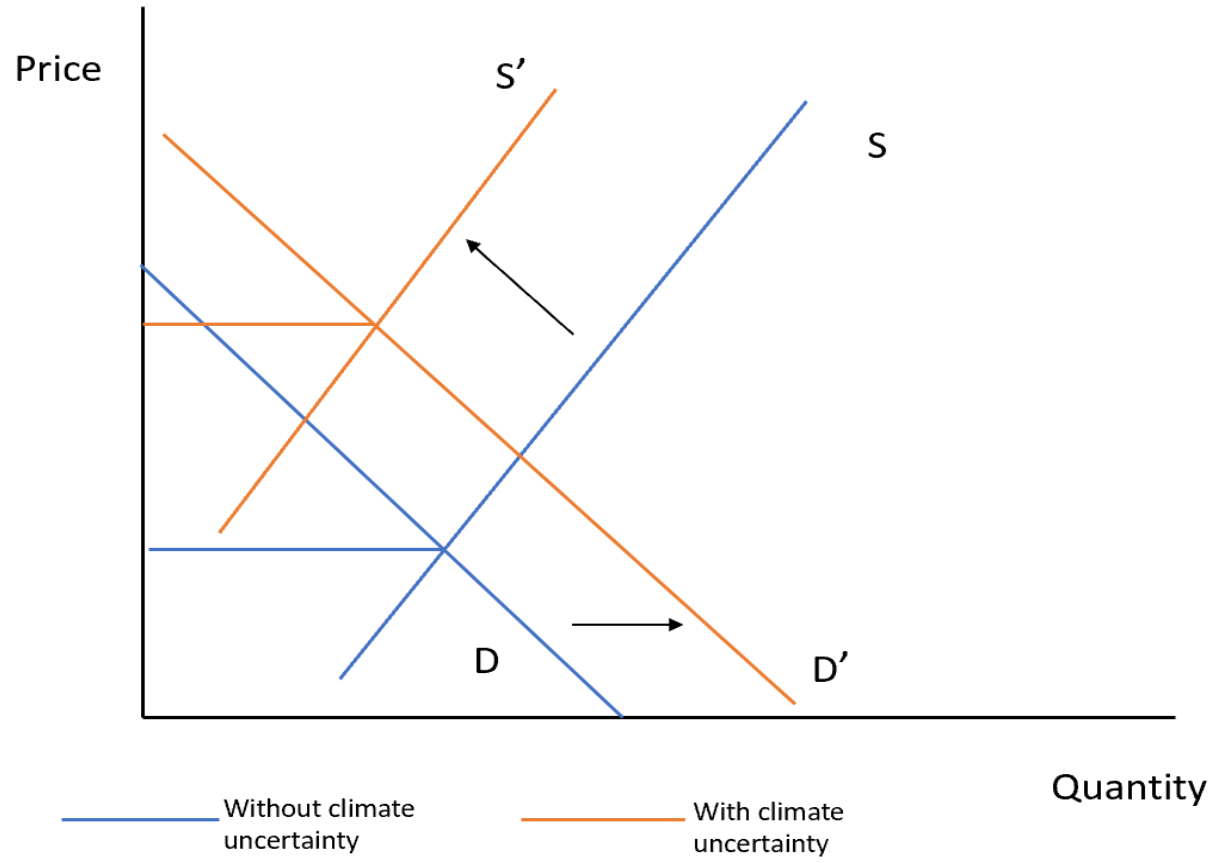
Climate uncertainty limits supply of resilience tools

Climate ambiguity shifts the supply curve leftward as firms demand high uncertainty premiums, causing markets to shrink or even disappear.

Insurance products such as Index insurance for farmers are ambiguous due to basis risk.

Poor physical infrastructure leads to poorly integrated markets, depriving individuals of another important layer of insurance.

Uncertainty aversion drives up prices of resilience tools

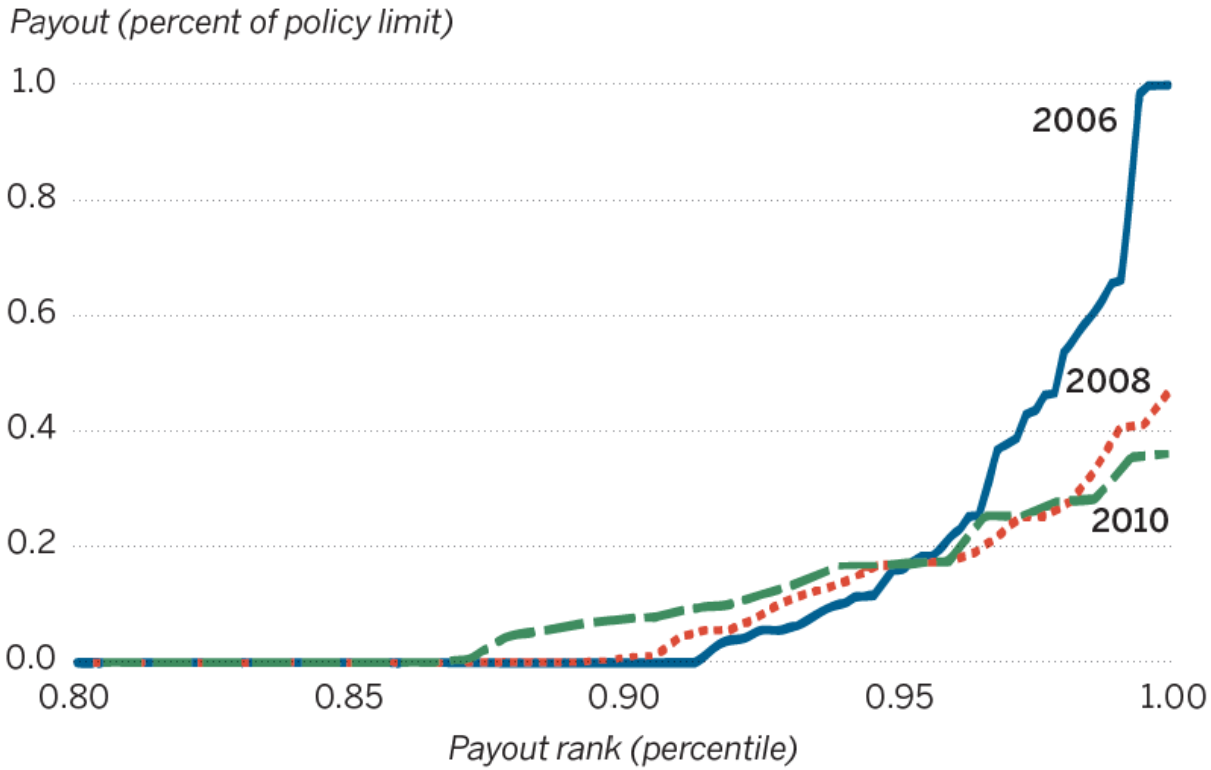


Insurance products for extreme events are disappearing

Insurance markets in India are moving away from covering extreme climate events.

- 2006 policy designed to primarily insure against extreme rainfall events, with payouts above the 92nd percentile.
- 2010 policy designed to pay out more regularly, providing income during periods of moderately deficient rainfall.
- Farmers in 2010 value the 2006 policy most but only have the 2010 policy available.
- Insurance for extreme events not being offered

Policy payout distribution in India



Source: Cole et al (2024)

Governments often make climate resilience harder

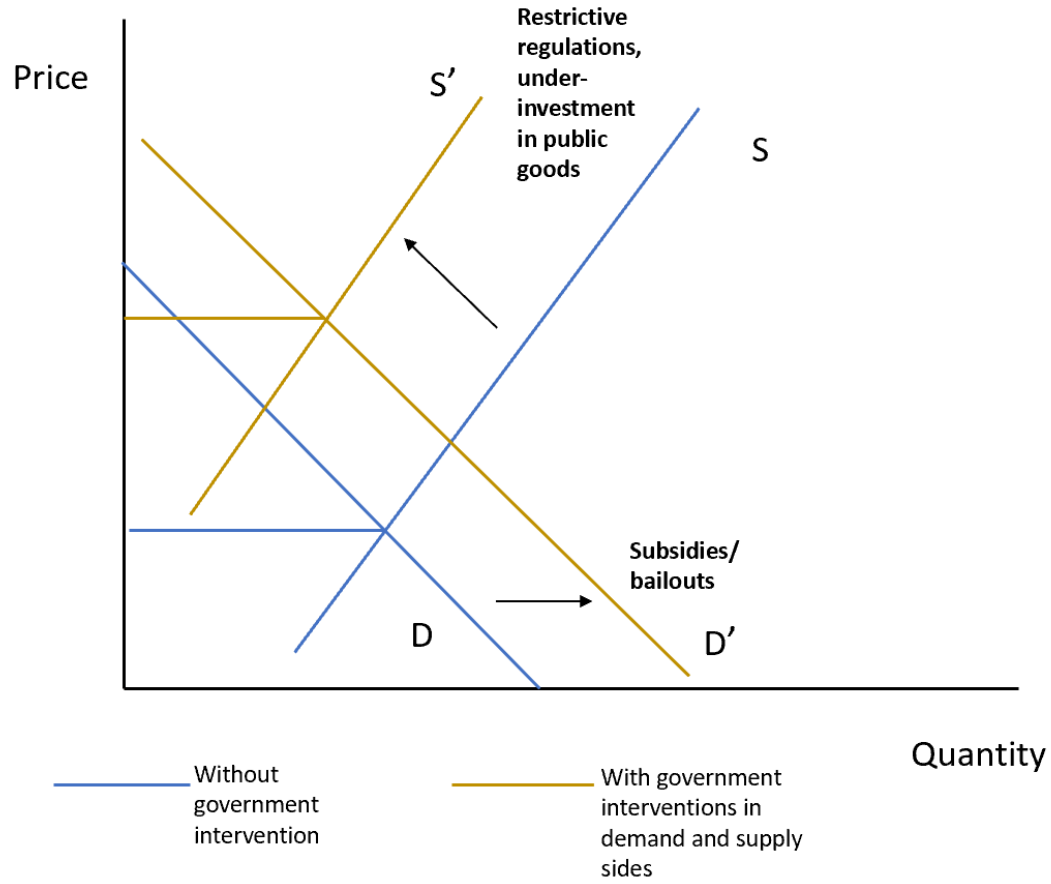
Government policies can make resilience tools unaffordable.

Insurance subsidies can lock people into climate vulnerable activities and places.

Social protection can act as a disincentive to migrate from climate vulnerable places.

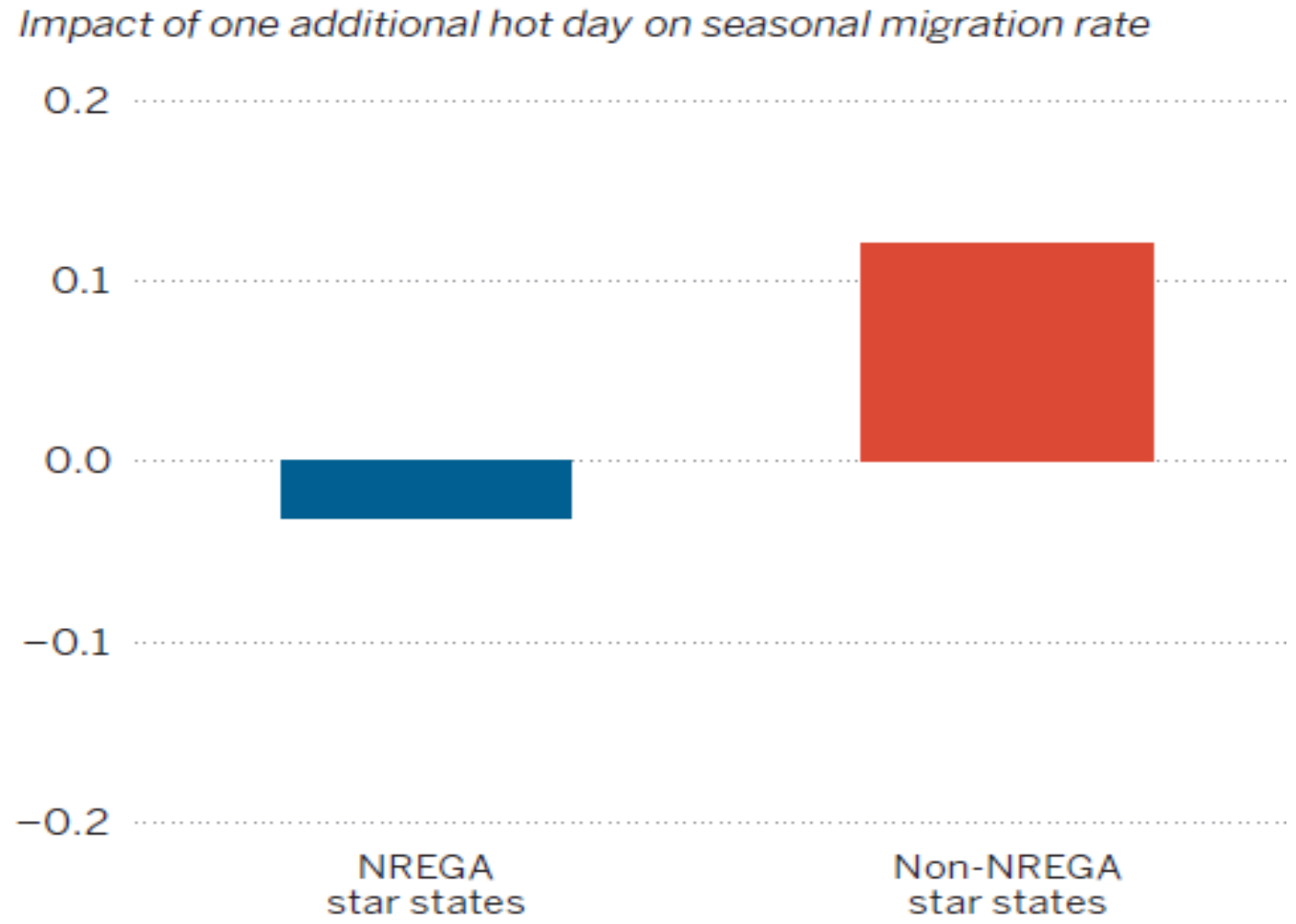
Regulations and policies (e.g., land use), even when well-intended, can undermine longer term resilience actions.

Regulations can restrict supply and subsidies can inflate demand, making resilience unaffordable



Social protection helps with short-term recovery but can undermine long term resilience

Generous social protection reduces heat induced seasonal migration in India



NREGA is Rural Employment Guarantee Act of 2005.

Source: Kochhar et al (2024)

Rethinking climate resilience policies

The 5 I’s for building resilience

Income, followed by information, insurance, infrastructure, and interventions

Income

Unlock all invest in resilience and reduce vulnerability

Information

Convert uncertainty into risk, improve every decision that follows

Insurance

Finance recovery and sustain productive risk-taking.

Infrastructure

Reduce risks, save lives and sustains economic functions

Interventions

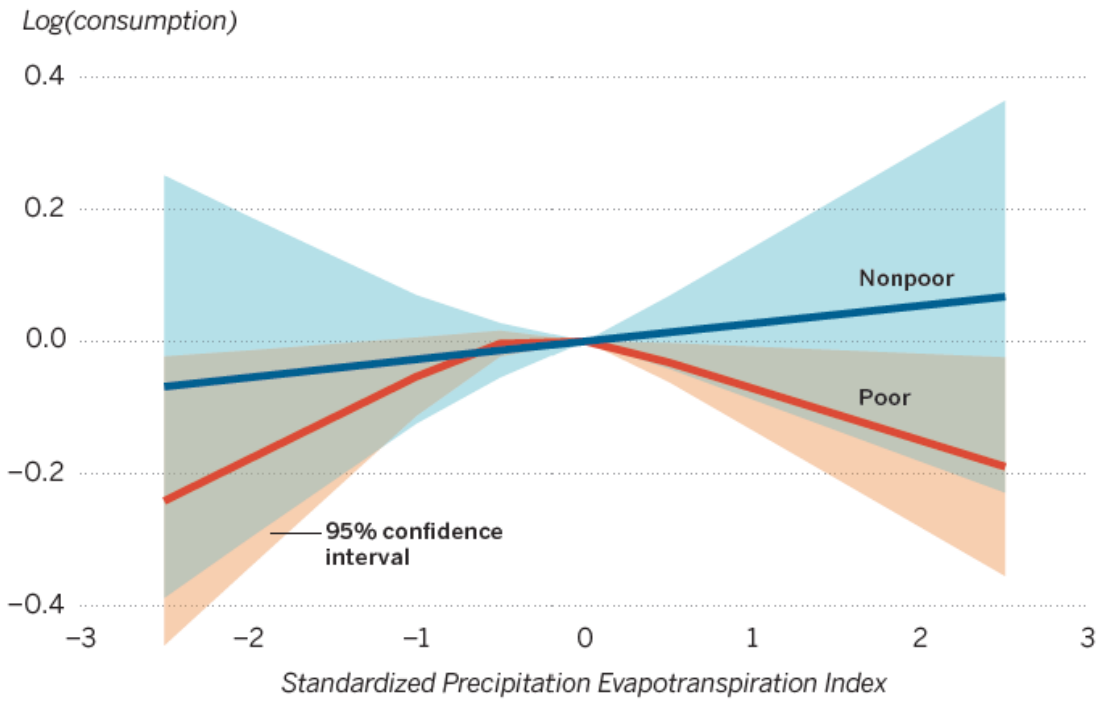
Design smartly to finance coping and recovery

Inclusive income growth to empower climate resilience

- Inclusive economic growth enables countries, governments, firms and people to invest in resilience and recover quickly after a weather shock.
- Prioritize policies that are good for *both* growth and resilience: human capital, infrastructure, institutions etc.
- World Development Report 2024: The Middle-Income Trap
- Global Economic Prospects

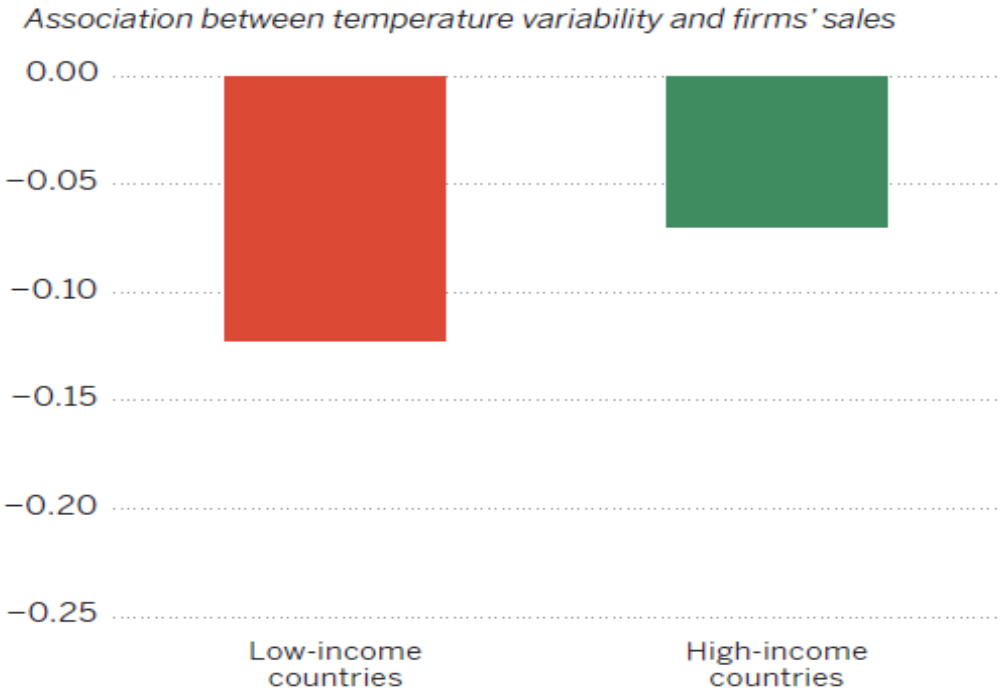
Rich can invest in resilience and cope better in the aftermath

Droughts and excessive rainfalls reduce consumption for households in poorer areas in Nigeria



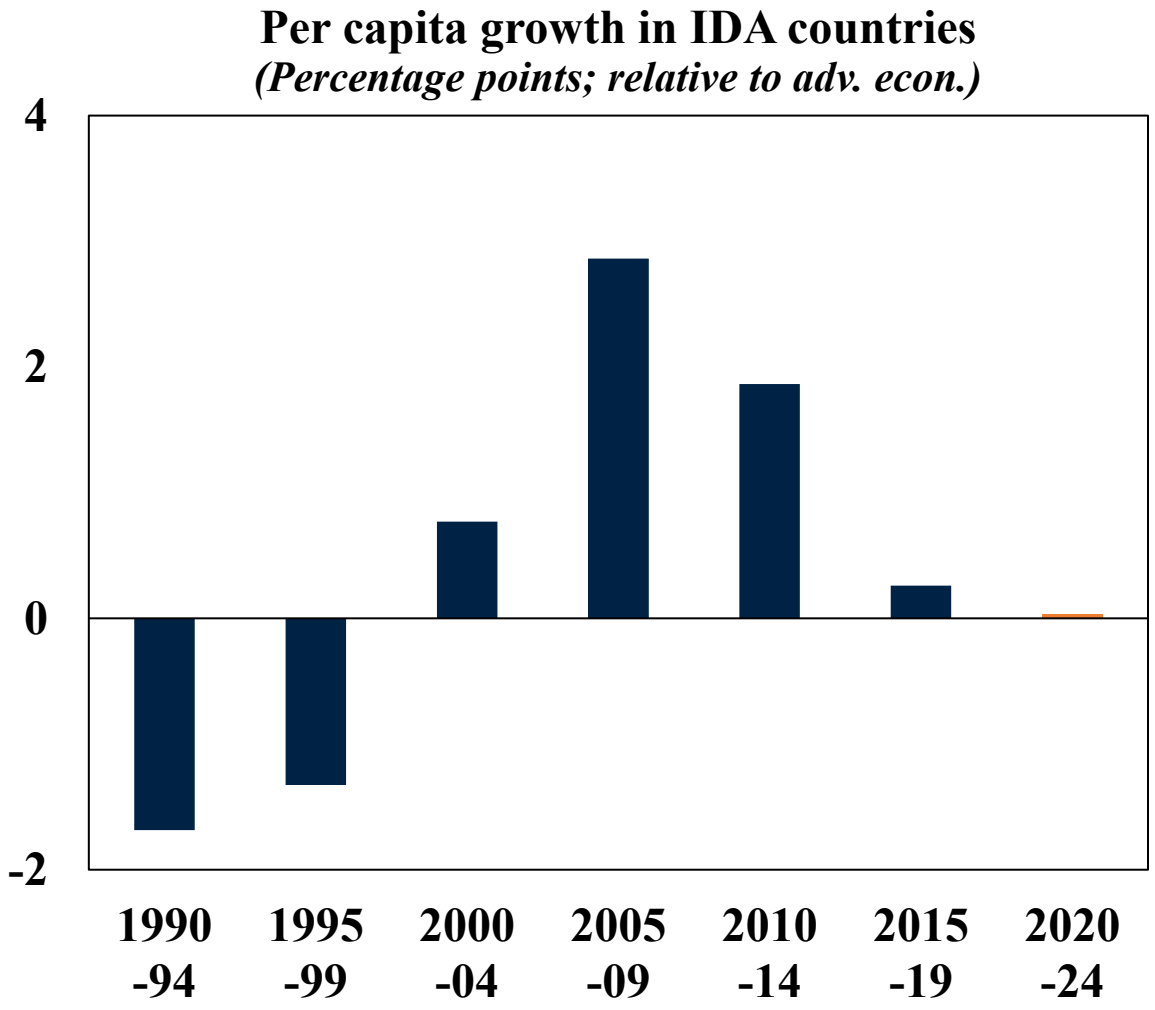
Source: Shilpi and Berg (2024), using data from the Nigeria Living Standards Measurement Study Integrated Surveys on Agriculture (n = 16,723 observations over four waves of the survey).

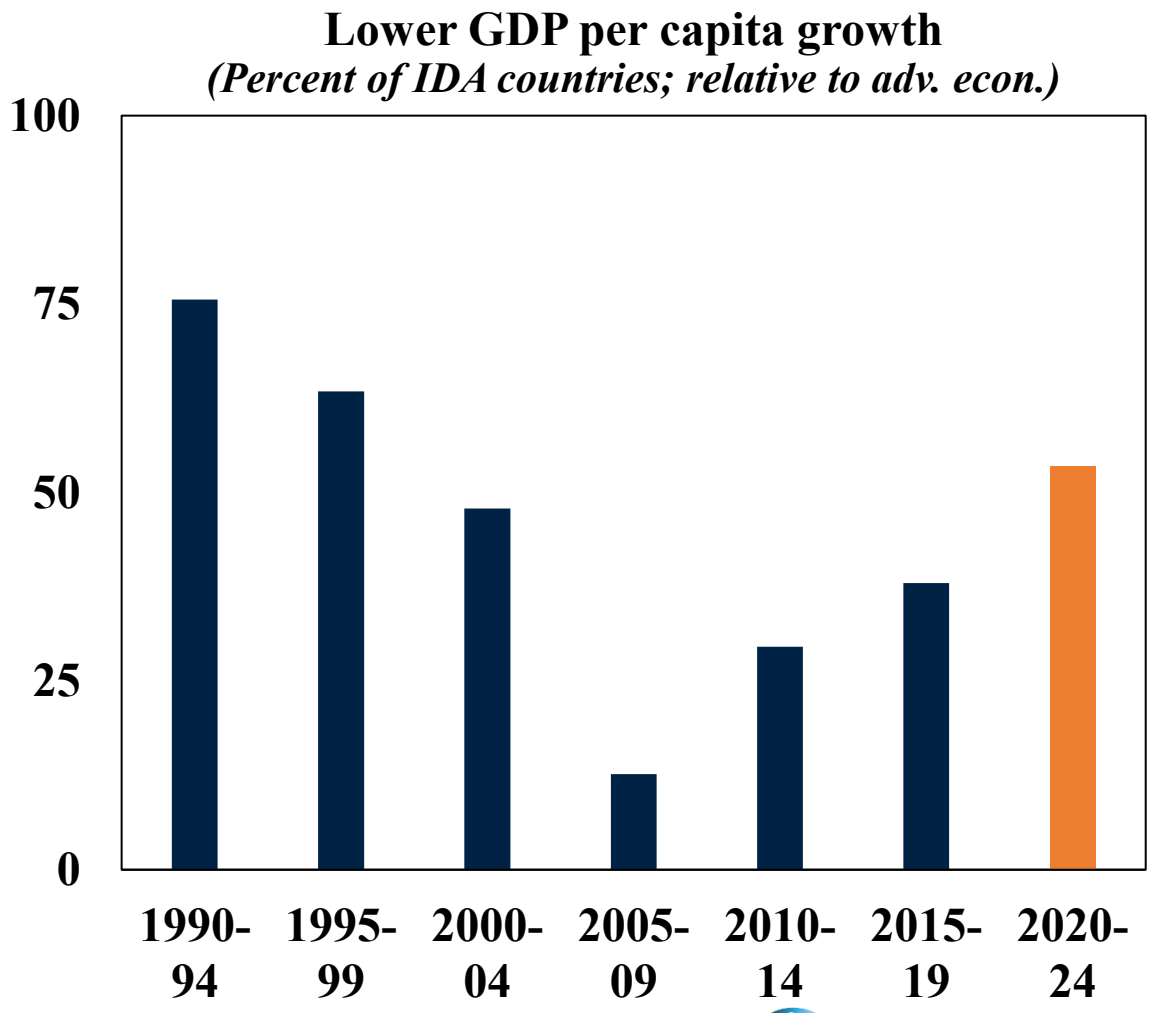
Firms in poorer countries experience higher decline in sales revenue due to higher temperature variability.



Source: Lang et al. (2024), a background paper for this report, using data from World Bank Enterprise Surveys conducted between 2010 and 2023 and covering 135 countries.

Income growth has slowed down





Sources: World Bank; World Population Prospects Database (UN).
Note: IDA = IDA-eligible countries. GDP aggregates are calculated using real U.S. dollar GDP weights at average 2010-19 prices and market exchange rates. Left Panel. Average annual change in GDP per capita growth in IDA countries relative to advanced economies over the non-overlapping 5-year periods. Right panel. Average share of IDA countries with GDP per capita growth lower than in advanced economies over the non-overlapping 5-year periods.

Information to turn fragility into foresight

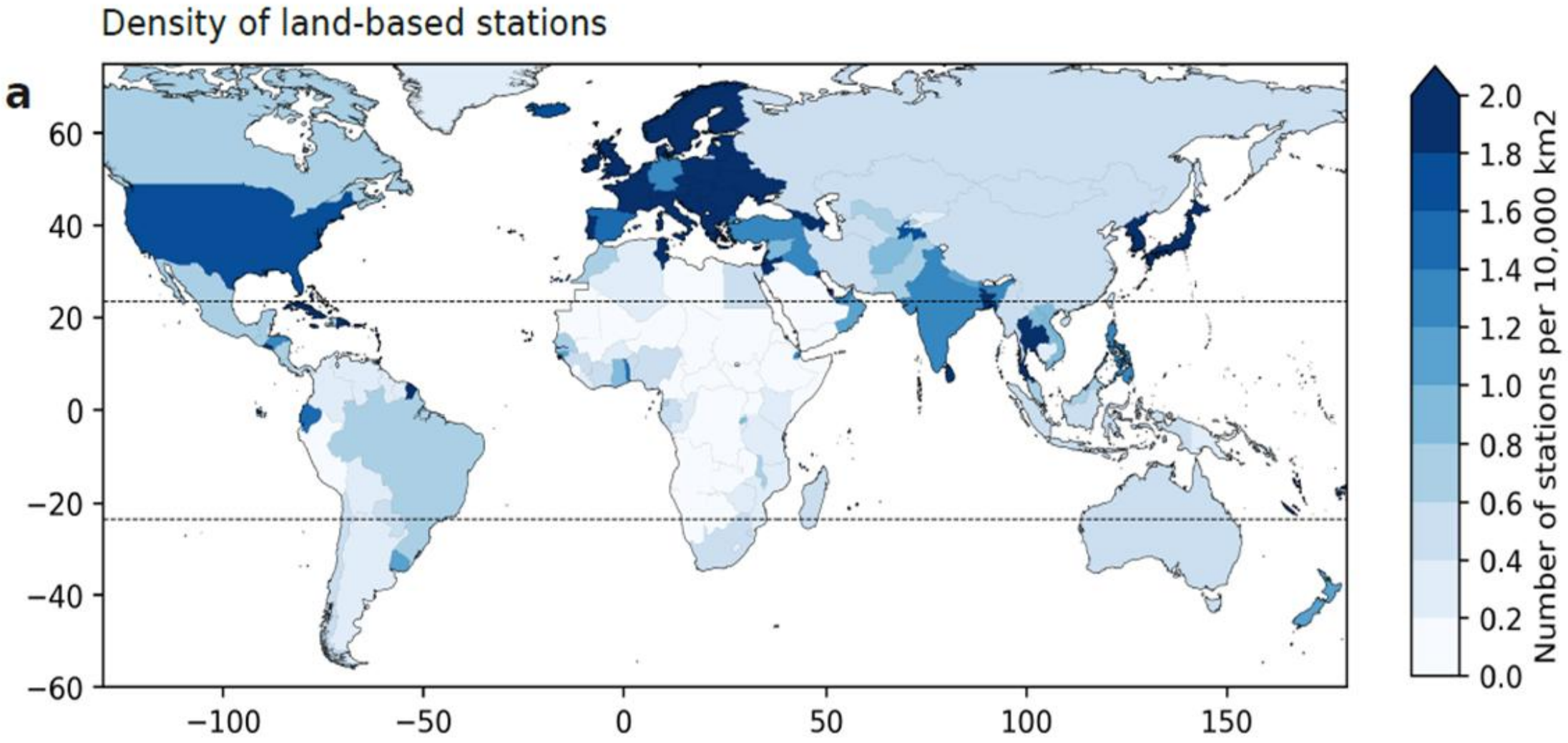
Convert uncertainty into risk, improve every decision that follows

Early warning systems save life, contain damages, and have high benefit-cost ratios.

But reliable medium to longer term weather forecasting are needed.

Reliable weather data collection, human capital, and real time dissemination networks

Sub-Saharan Africa remains an information dessert



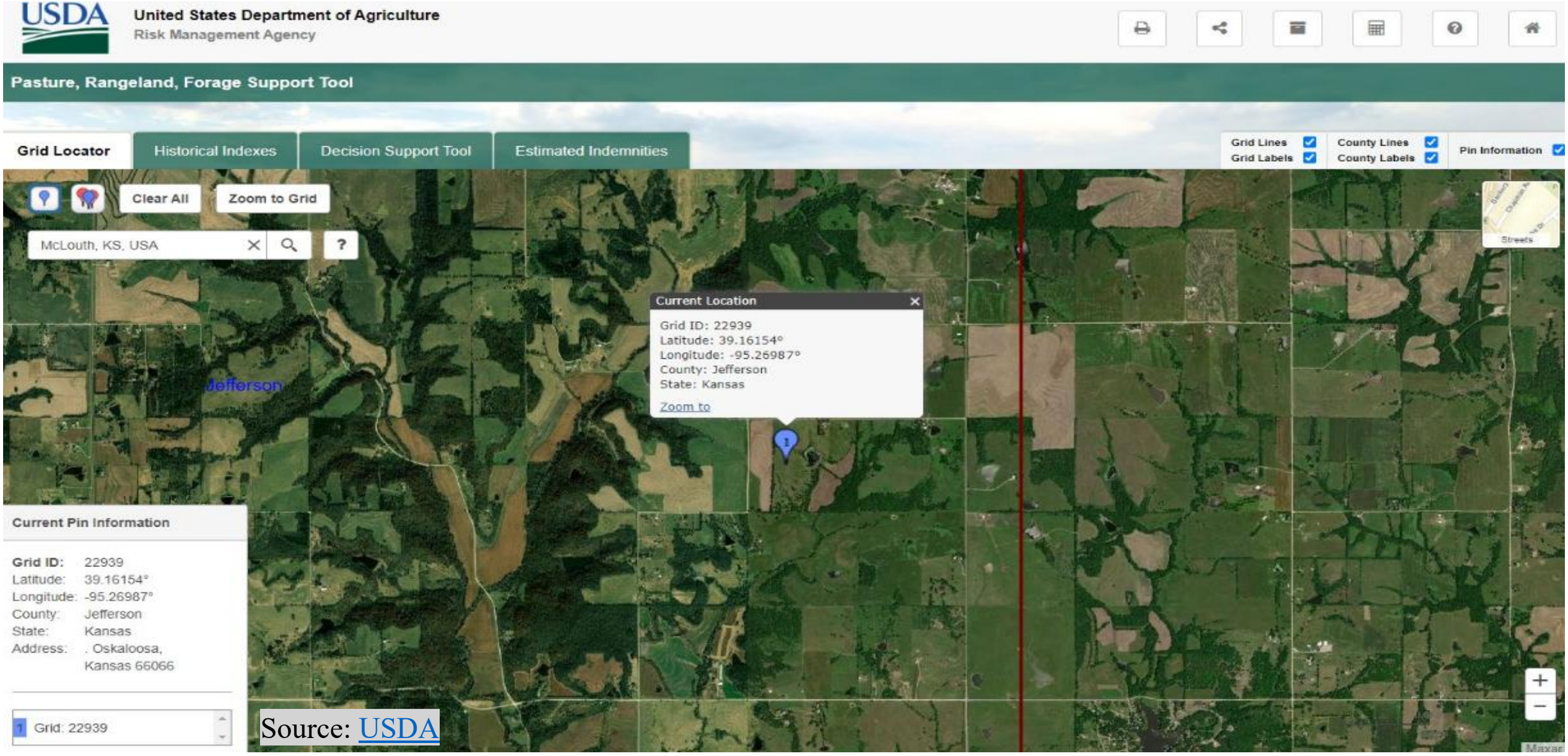
Source: Linsenmeier and Shrader 2023.

Insurance to leave less to chance

Finance recovery and sustain productive risk-taking

- Leverage the information and data revolution.
- Expand digital finance model to improve financial inclusion.
- Use digital finance model to reduce transaction costs:
  - Universal IDs for properties, locations;
  - Develop data platform for readily usable weather and climate trends, and hazards data, real time crop health information from satellite data;
  - Use existing extension networks or picture sent by customers to cross validate with local information.

USDA crop insurance program

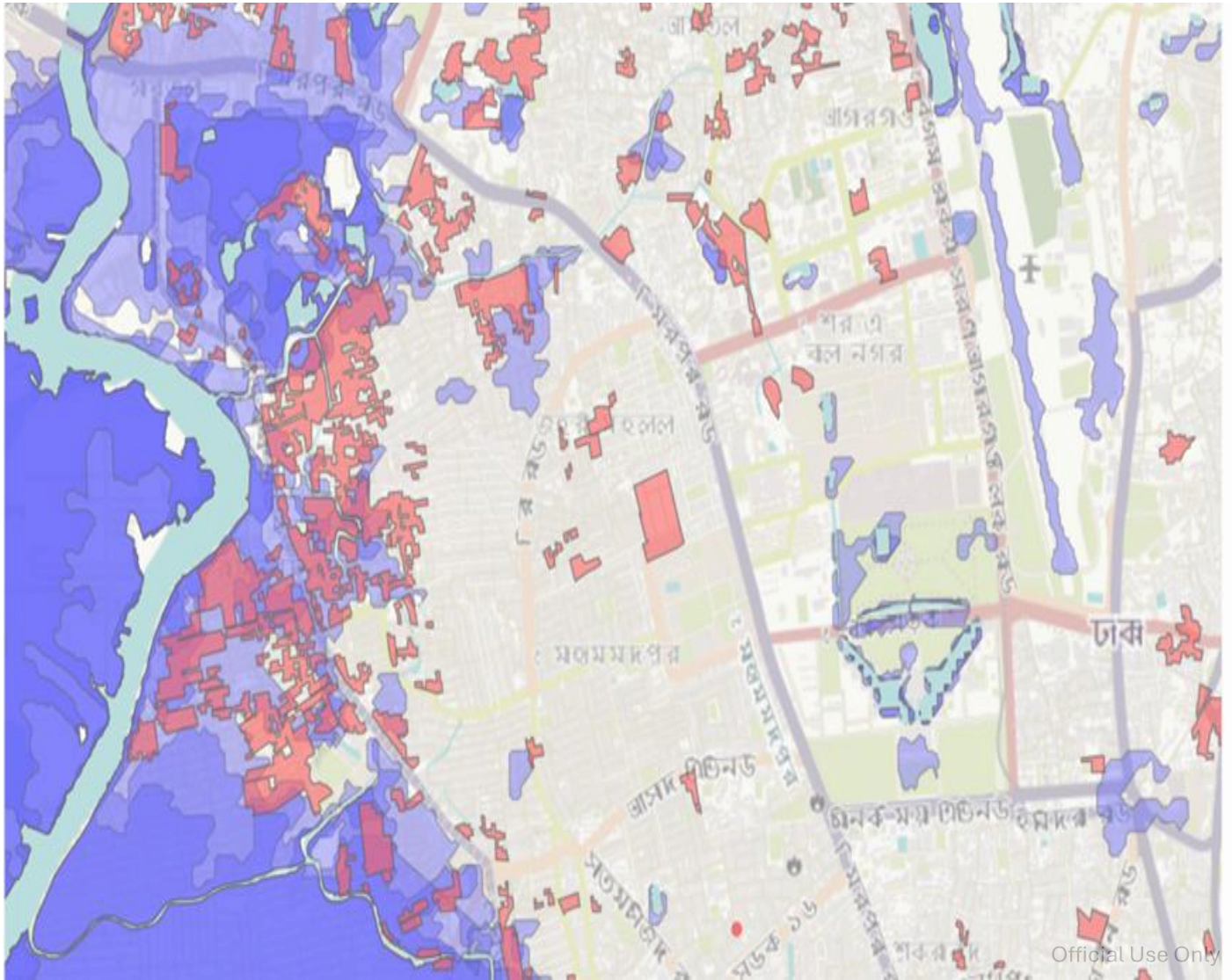


Source: [USDA]

Infrastructure to protect

Reduce risks, save life, and sustain economic functions

- Investment in risk reduction is needed for climate vulnerable *areas*.
- They should be based on rigorous cost-benefit analysis considering potential disincentives for people's resilience behavior.



Smart Interventions

To finance coping and recovery

- Social protection and subsidies should have five essential characteristics:
  1. designed to have individuals bear a part of the risks;
  2. contingent on behaviors good for climate resilience;
  3. whenever feasible, target it;
  4. portable (target people, not places); and
  5. rule-based, timely, and temporary.

Bundle and layer to improve effectiveness

Frequency and severity of climate-related loss	Individuals	Markets	Governments
Frequent but low impact event	Income (self-insurance or saving)	Information	
Less frequent but larger events	Income	Information and Insurance	Infrastructure
Rare but extreme events		Information and Insurance	Insurance and Interventions

Source: Policy Research Report team.

Data and research for tracking resilience progress

- Effective resilience policies cannot be designed without some metric to measure their impacts.
- Current emphasis is on tracking inputs – investment made and/or institutions reformed.
- Propose a simple three-step process for tracking outcomes and progress:
  - Decide a common set of measurable outcomes,
  - Estimate climate damage functions,
  - Track progress by estimating climate damage functions over time, across areas, climate zones, etc.
- Choose outcomes widely to capture all different types of circumstances.

Rethinking Resilience

- **The current approach emphasizes public action**
  - Public interventions to help the poor deal with climate shocks.
  - Public investments to reduce risks and make infrastructure more resilient to shocks.
- **The correct approach would enable private responses .**
  - Higher household incomes make people more resilient to shocks.
  - Availability of reliable information allows them to respond rationally.
  - Insurance markets are the most effective instrument to cushion climate shocks.
- **Resilience needs to be rethought.**
  - Resilience = (Mostly) Economic Development + (Some) Public Actions
  - Correct priorities: ***income, information, insurance, infrastructure, interventions—in that order***

Thank you!

- Report: Rethinking Resilience: Adapting to a changing climate
- Blogs
  - The five pillars of climate resilience | Brookings
  - Economic development is the surest path to climate resilience