

# Modeling Climate Change for Policy Action

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Partnering to Strengthen Capacity for Applied Policy Research with Impact: Accomplishments Under PRCI, Lessons, and Next Steps

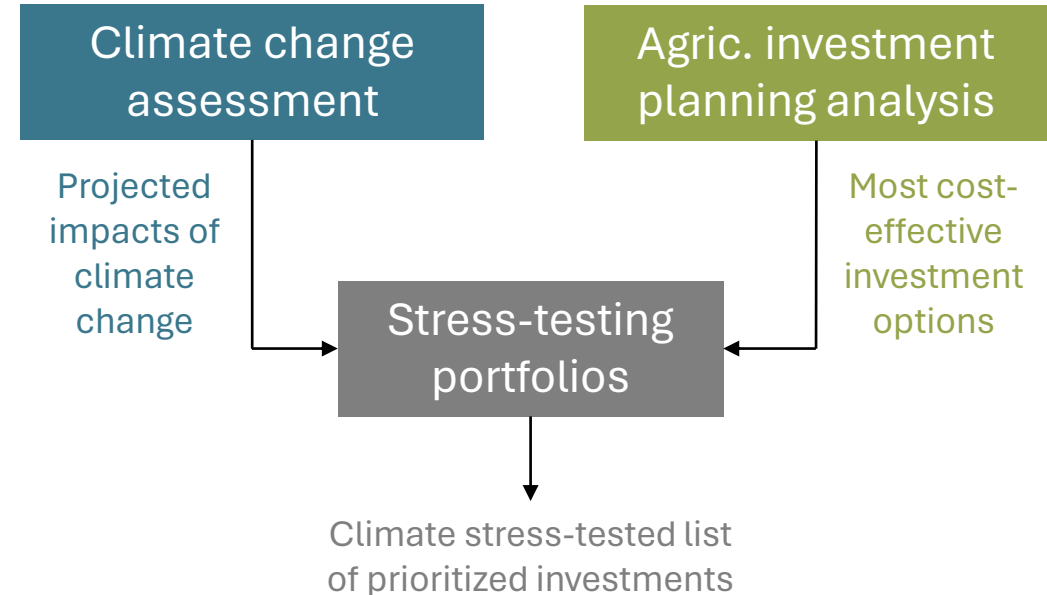
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# Planning Under Climate Uncertainty

- **Divergent research and policy streams:**
  - Climate assessments focus on long-term impacts and large-scale assets
  - National investment plans typically focus on the next 5-10 years and cover all spending
- **Mainstreaming climate change into investment planning is a priority**
  - But it is technically challenging
- **Integrated approach**
  - Stress-testing investment plans under a range of climate change scenarios

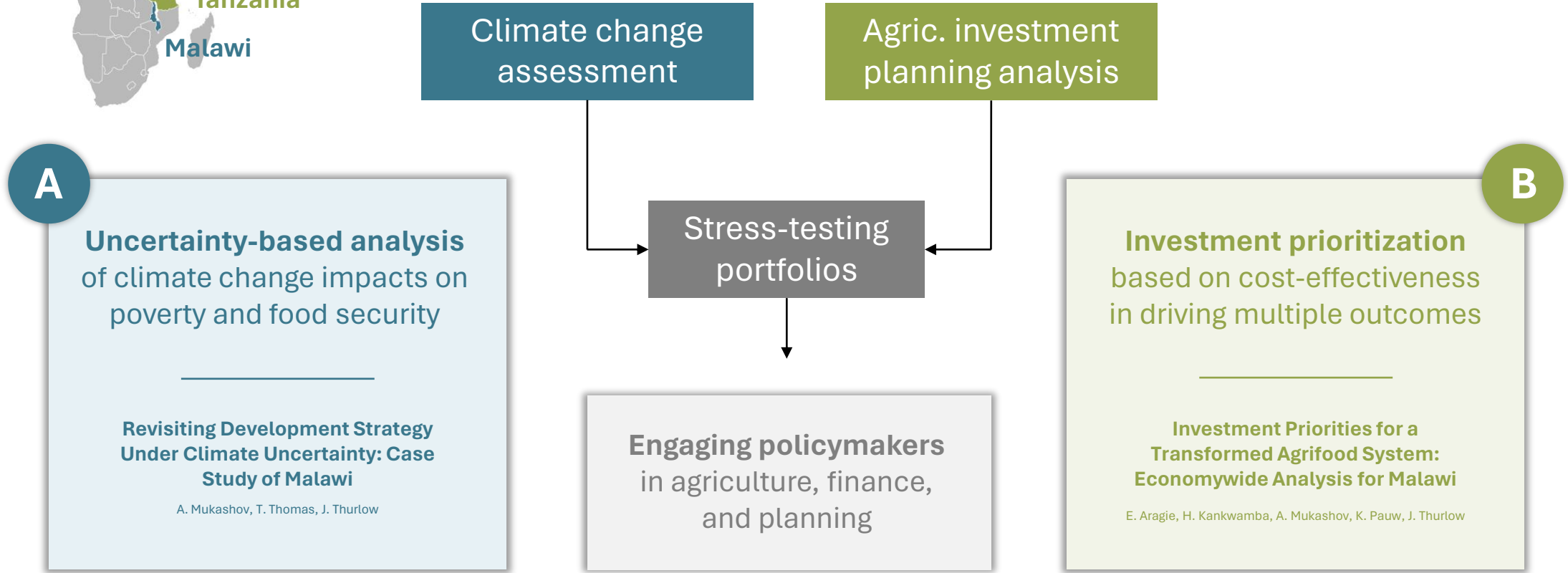
## Integrated Analytical Approach



# Country Case Studies

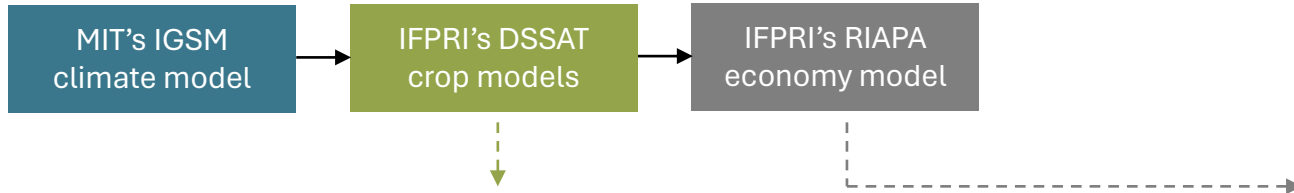


## Integrated Analytical Approach



# A Projecting Climate Change Impacts

## Agricultural impact channel...



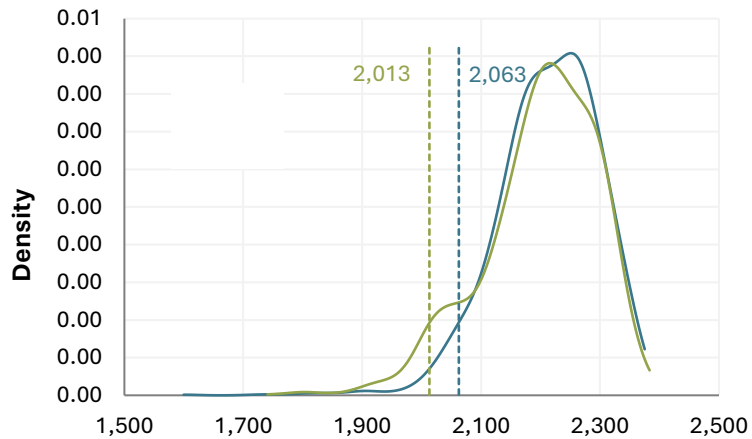
## Climate scenarios

**1.5°C** = global warming above pre-industrial levels

**REF** = No explicit climate mitigation policies

## Estimated maize yields in Malawi (2040s)

(dashed lines show 5<sup>th</sup> percentile)



Consider full distribution of climate projections

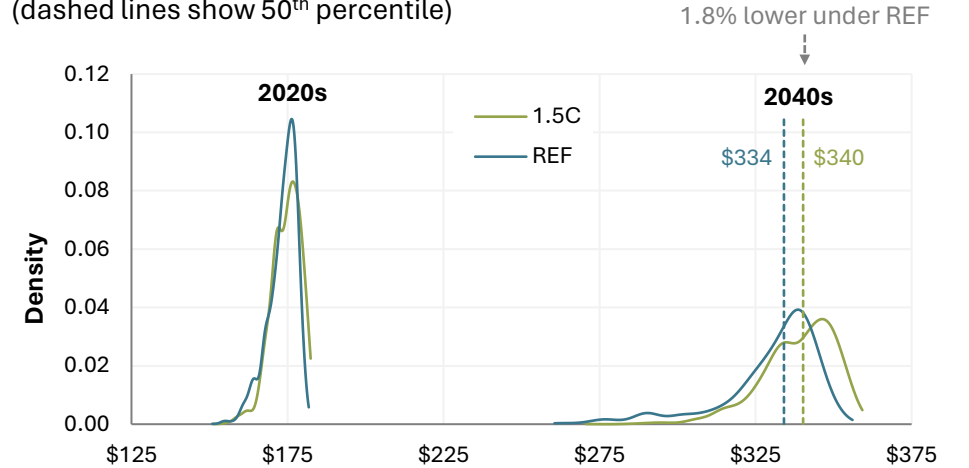
Select stress-test scenarios for public investments

## In Malawi...

Climate change reduces agricultural production and leads to worse poverty outcomes by 2040s

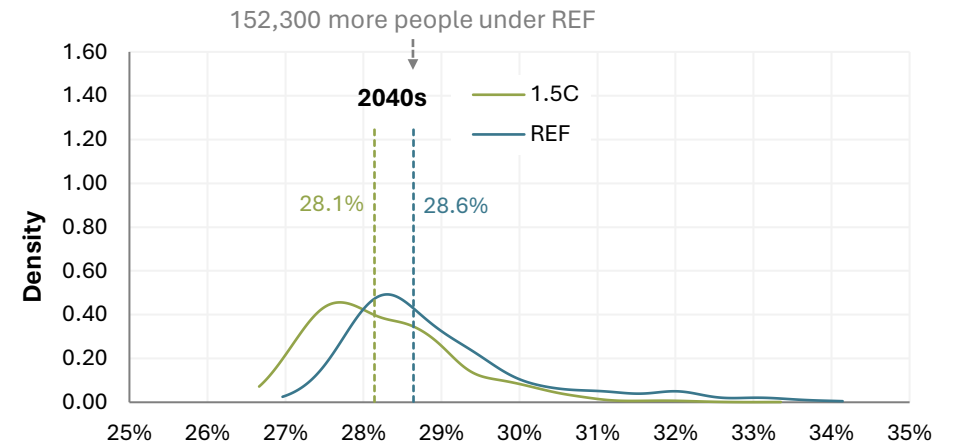
## Agric. GDP per capita in Malawi

(dashed lines show 50<sup>th</sup> percentile)



## Poverty rate in Malawi

(dashed lines show 50<sup>th</sup> percentile)



# B

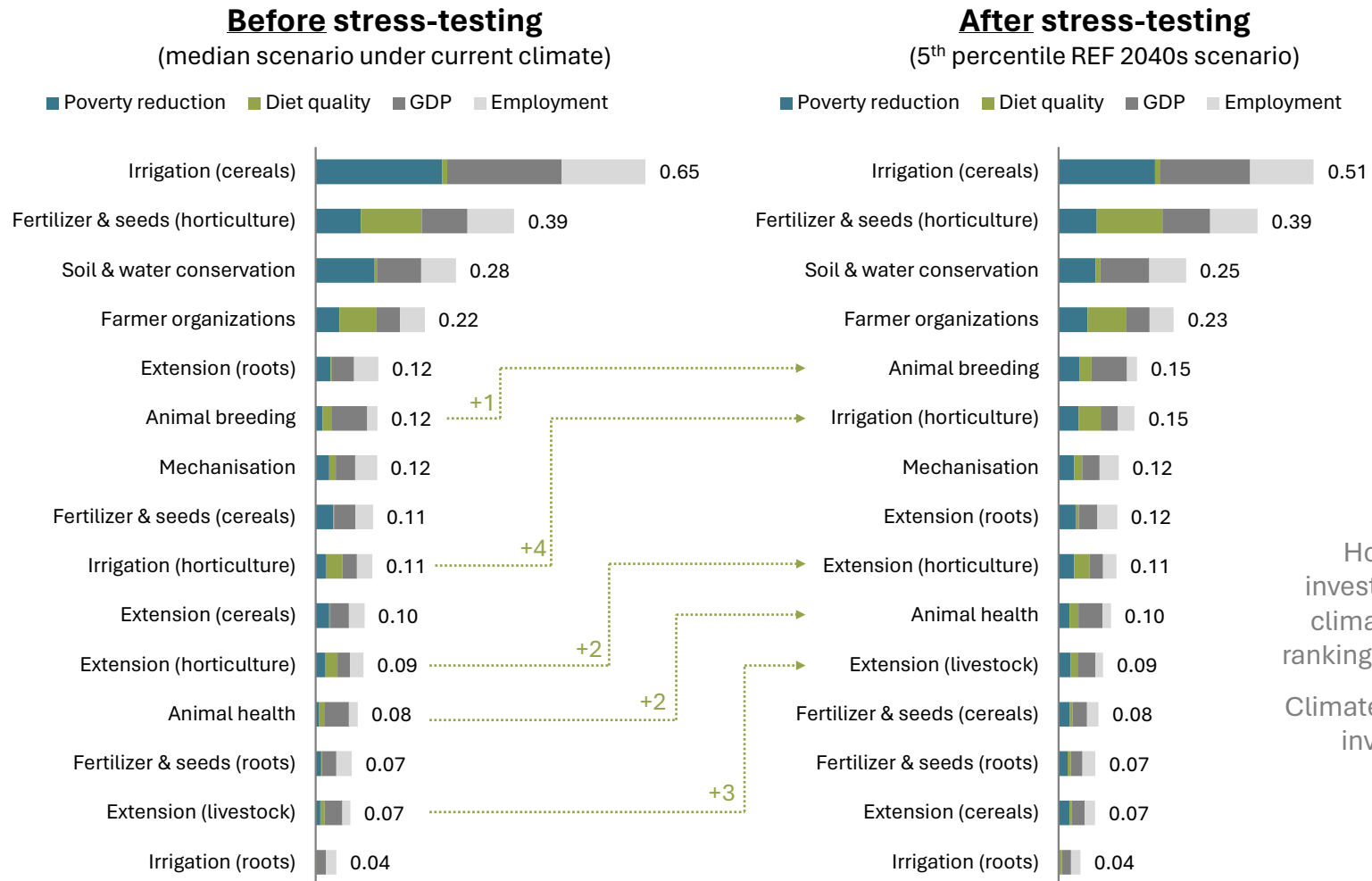
## Prioritizing and Stress-Testing Investment Choices

**Estimate benefit-cost ratios** for different investment options

**Rank investments** based on their cost-effectiveness in achieving different outcomes

### Ranked list of public investments (normalized score | 1 = most cost-effective option)

**Re-estimate benefit-cost ratios** under selected climate stress scenarios



**In Malawi...**

Irrigating cereals is most cost-effective overall, but is less effective than horticultural input subsidies at improving diets

**In Malawi...**

Horticulture and livestock investments are less exposed to climate stress and move up the ranking (opposite is true for cereals)

Climate risks do not change the top investments in the ranking

# Lessons and Next Steps

- **Mainstreaming climate risks into planning is a crucial next step towards climate action**
  - We have the necessary data and tools
- **Climate risks are difficult to analyze and communicate**
  - Focus on extreme events and stress-testing investment options
  - Capture climate change by altering frequency and severity of events
- **Climate is one driver of change amongst many**
  - Should be situated alongside other risks and policy needs
- **Broad stakeholder engagement is key**
  - Prioritization is contentious
  - Uncertainty undermines evidence
  - Research and policy engagement should be locally-driven

