Impacts on Food Security, Health & Equity

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Revisiting Development Strategy Under Climate Uncertainty

Importance of Agriculture-Led Growth

Evidence: Agricultural growth is better at reducing poverty (hence a focus of dev. strategies in LICs)

Concern: Supporting studies do not account for climate risks

Two scenarios: Accelerate economywide growth via increases in sectoral productivity

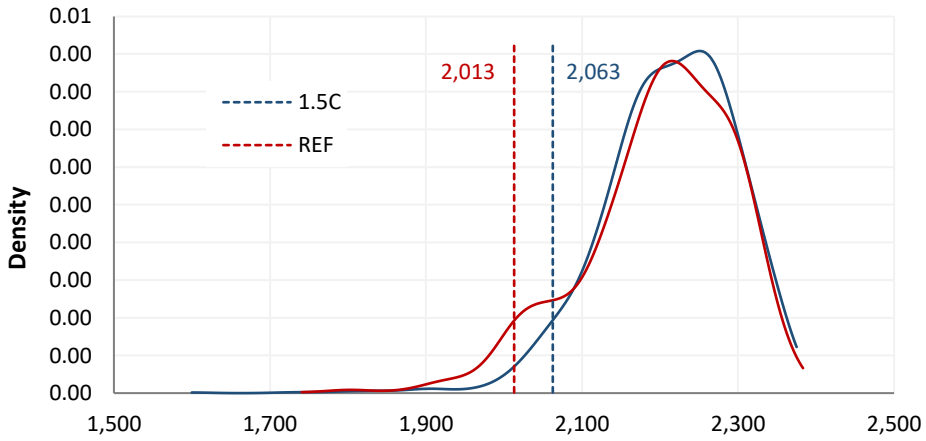
- **Agrifood system growth** (AFS): Perhaps better at reducing poverty/hunger, but also more exposed to climate risks
- **Growth outside agrifood system** (Non-AFS): Reduces climate risk, but may lead to smaller reductions in poverty/hunger

Malawi Case Study (Mukashov et al. 2023)

Modeling framework

MIT-IGSM climate model → IFPRI DSSAT gridded crop models → RIAPA country economic models

Estimated maize yields in Malawi (2040s)
(dashed lines show 5th percentile)



Climate scenarios

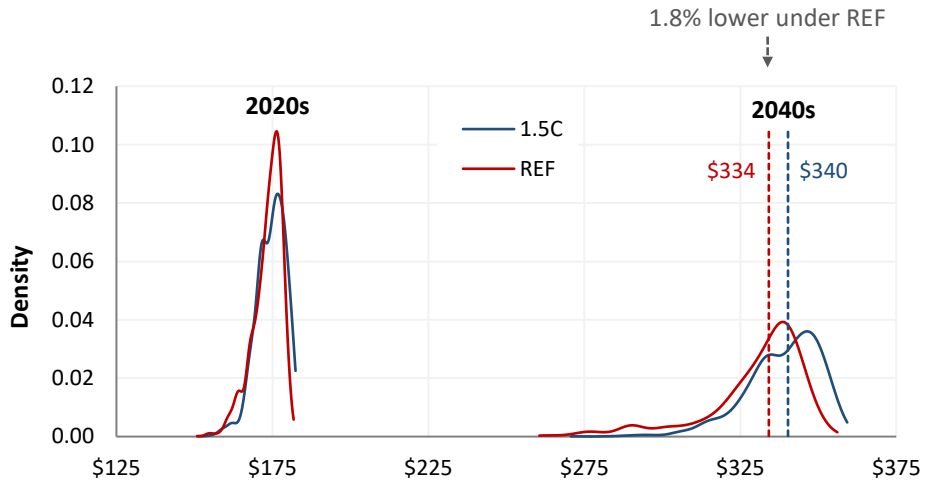
1.5°C = global warming above pre-industrial levels

REF = No explicit climate mitigation policies

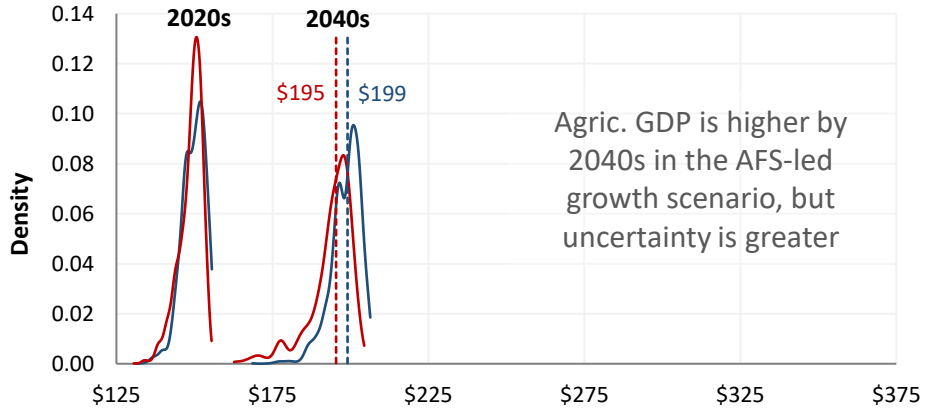
Results | GDP Impacts

Agricultural GDP per capita

AFS-led growth



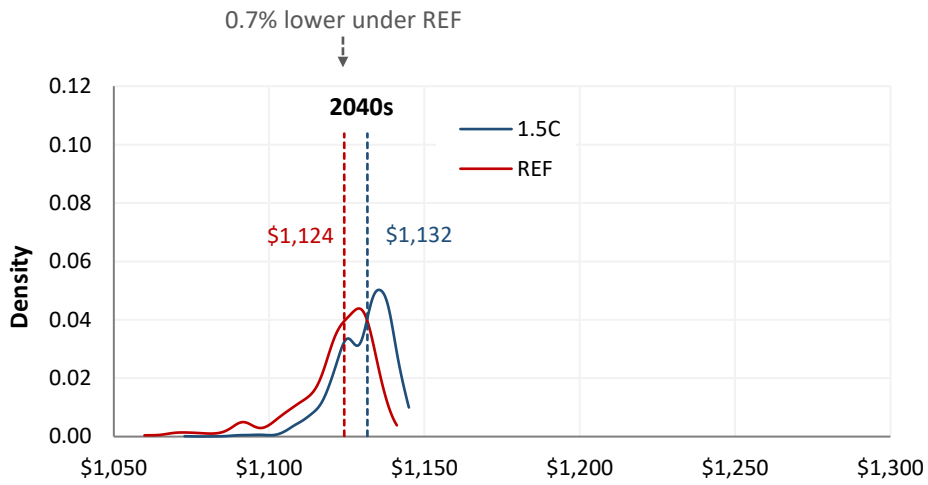
Non-AFS-led growth



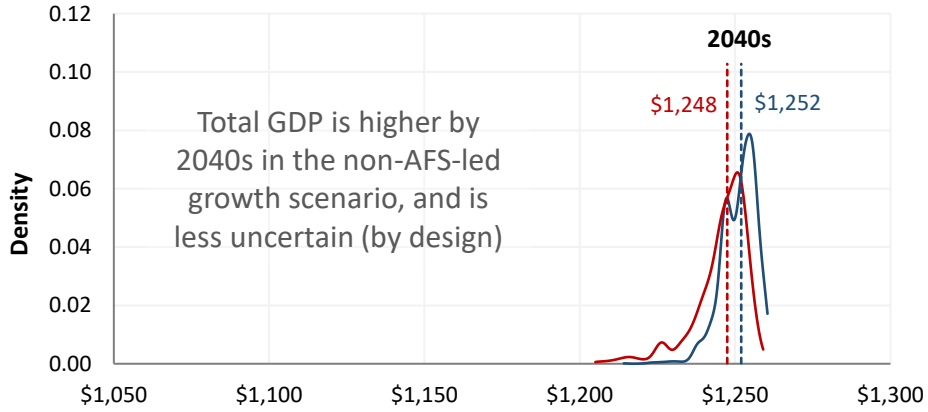
Agric. GDP is higher by 2040s in the AFS-led growth scenario, but uncertainty is greater

Total GDP per capita

AFS-led growth



Non-AFS-led growth

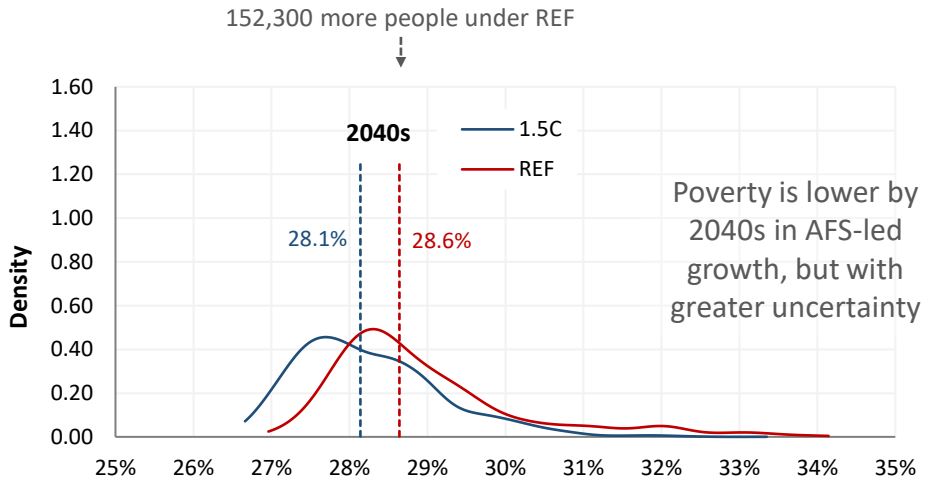


Total GDP is higher by 2040s in the non-AFS-led growth scenario, and is less uncertain (by design)

Results | Poverty & Food Security Impacts

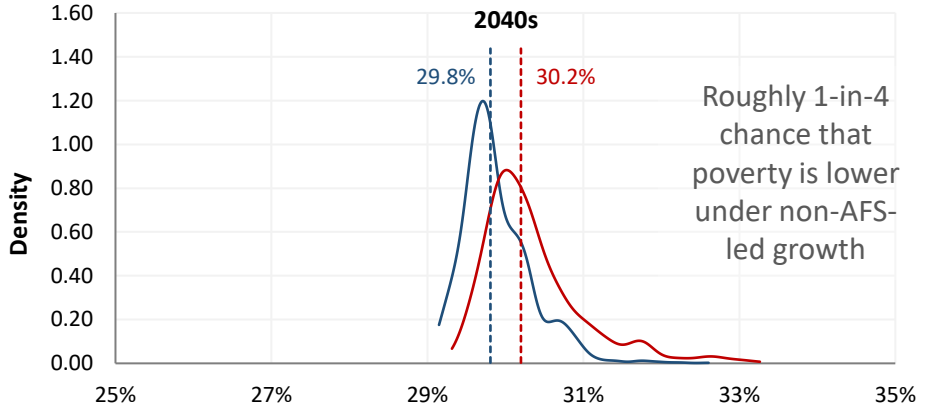
Poverty Headcount Rate (consumption below $1.90 per day)

AFS-led growth



Poverty is lower by 2040s in AFS-led growth, but with greater uncertainty

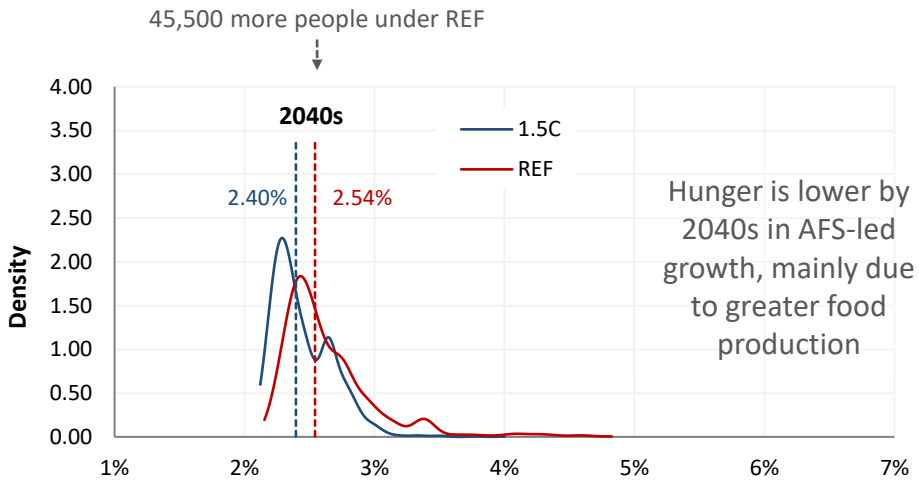
Non-AFS-led growth



Roughly 1-in-4 chance that poverty is lower under non-AFS-led growth

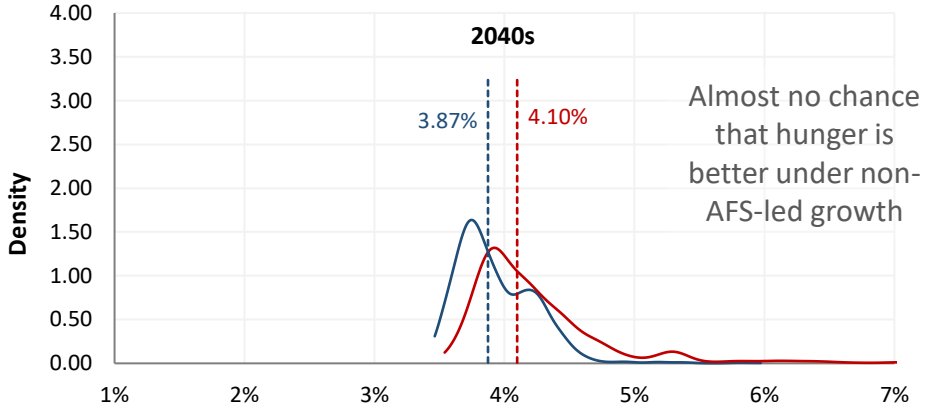
Prevalence of Undernourishment (pop. below min. calorie threshold)

AFS-led growth



Hunger is lower by 2040s in AFS-led growth, mainly due to greater food production

Non-AFS-led growth



Almost no chance that hunger is better under non-AFS-led growth

Tilting the Field, Not Changing the Game

AFS-led growth is…

- Associated with higher economic uncertainty (see caveats)
- More effective at reducing poverty, even under climate uncertainty
- Almost always better at reducing hunger

Climate change weakens, but does not negate agriculture's key role in Malawi's strategy to reduce poverty and food in security

Caveats

Specific country case: Malawi is a poor agrarian economy and so findings may not apply to other countries, even other LICs

Single source of climate risk: Focused only on climate risks within agriculture – accounting for other sources of risk could alter findings (e.g., labor hear stress, flooded roads, hydropower)

Way Forward

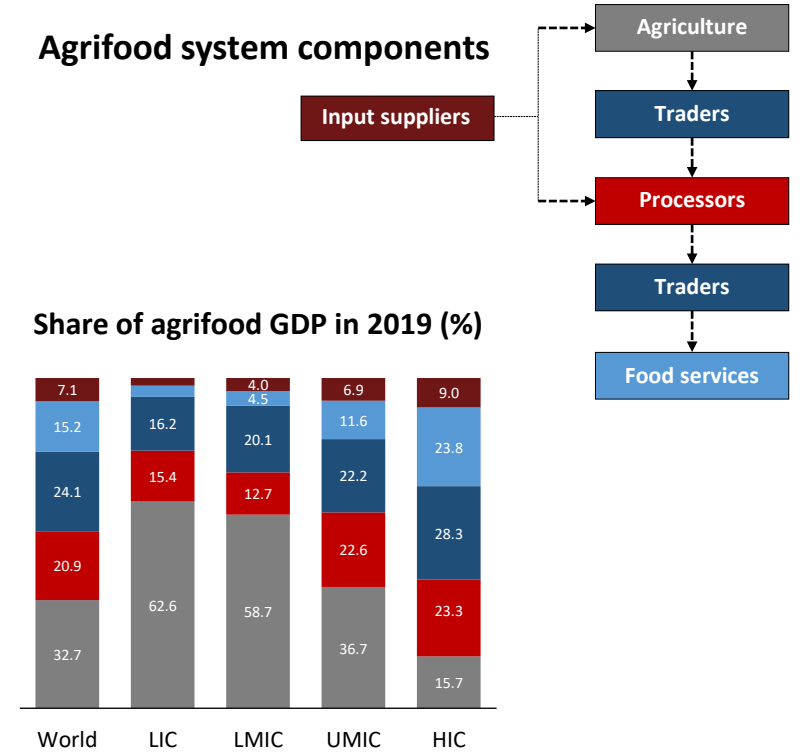
From agriculture to food systems

- Measuring climate risks beyond the farm
  (e.g., labor heat stress, road washouts, hydropower, etc.)

From products to people

- Tracking policy-relevant outcomes
  (e.g., poverty, inequality & food security, not just GDP & food production)

From strategy to policy

- “Stress testing” policies under extreme events
  (i.e., resilience & recovery)

Unpacking Agrifood Systems