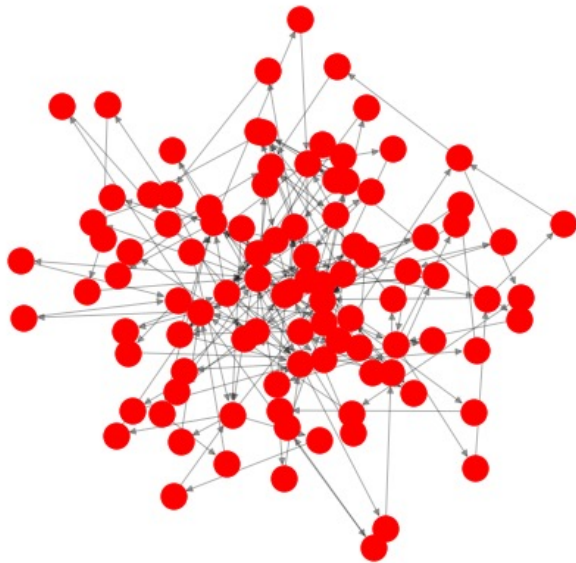


Accounting for Climate and Political Uncertainties in Migration Agent-Based Models



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Environmental & Climate Mobilities Network | 11 July 2023

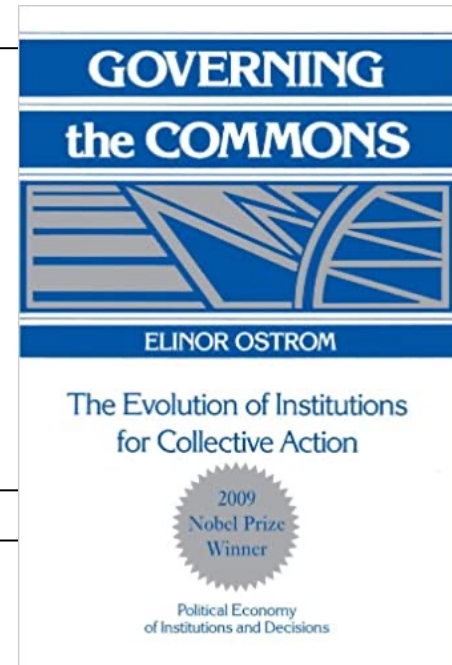
Motivation: Two Common Challenges with Migration Modelling

(1) Accounting for adaptive policymaking

- Are migration flows affected by dynamic policy adjustments?
- If so, what are the effects of time lags in signals → policy implementation?

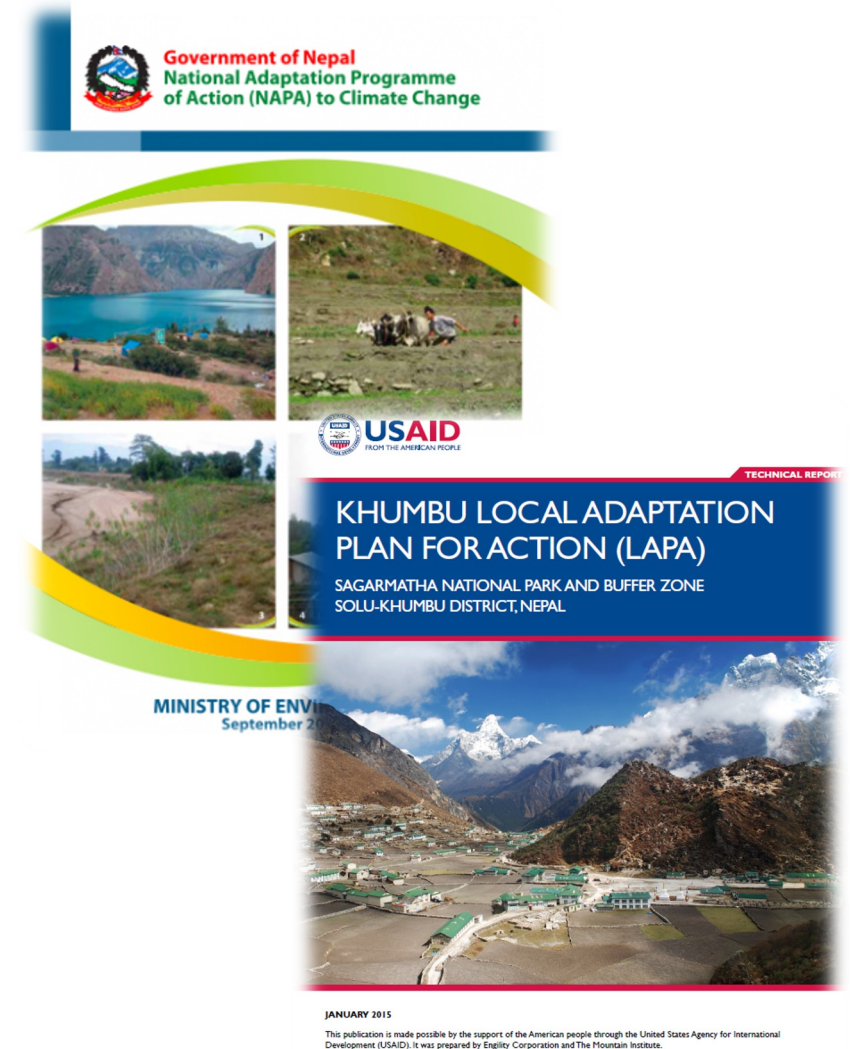
(2) Effects of multiple levels of governance and decision making

- How do local-scale decisions affect policy objectives at larger scales, and vice versa?
- What are tradeoffs between objectives at different scales?

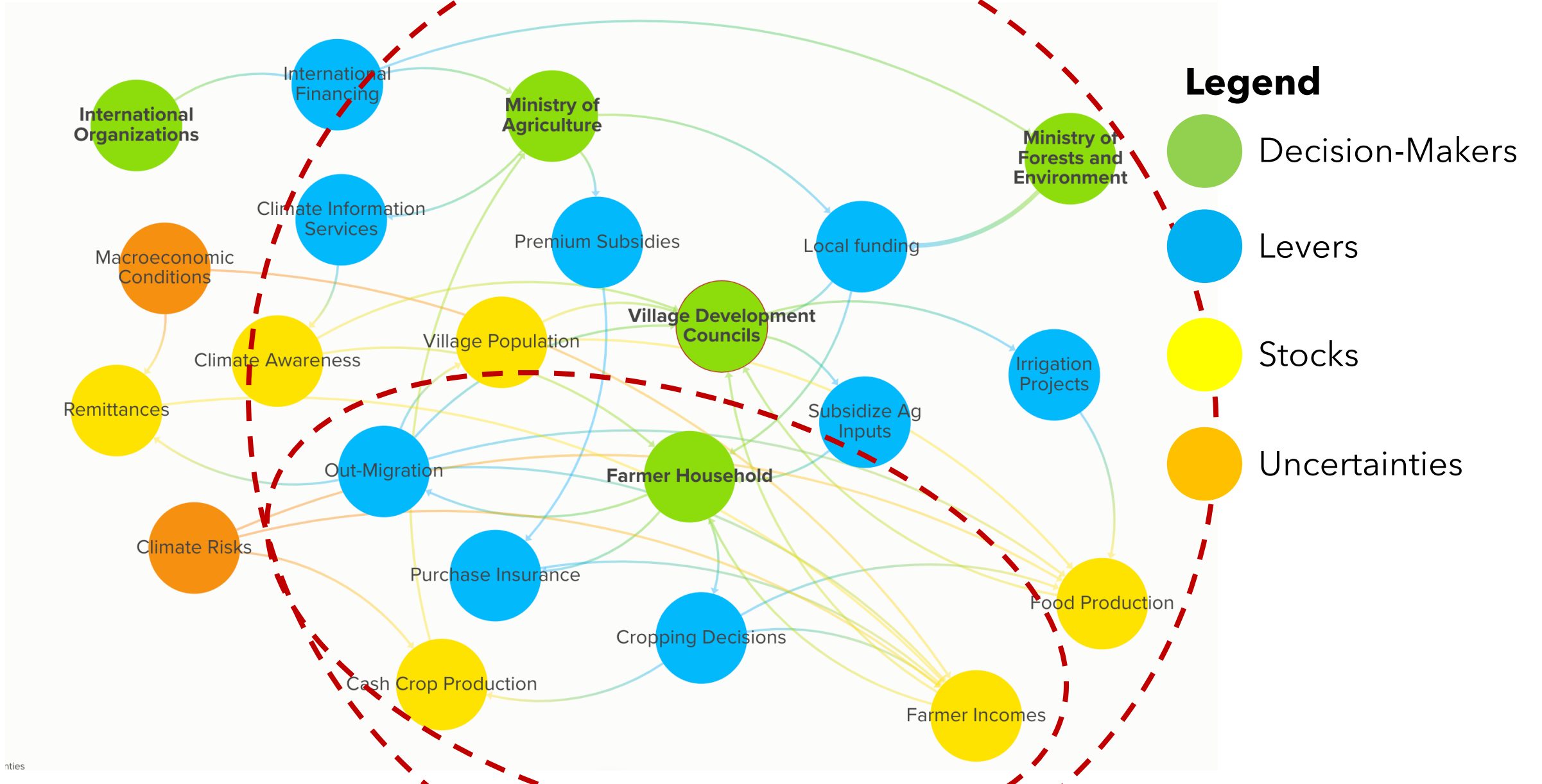


Motivation: Climate Adaptation and Migration in Nepal

- Do predicted migration rates differ substantially when accounting for **local institutions'** endogenous policy interventions?
- How do **sources of endogenous uncertainty** (including policy lags, policy goals) affect the ability of each stakeholder to meet its objectives, including migration rates?
- What **polycentric governance principles** increase policy robustness to exogenous uncertainty? Conversely, do some forms of polycentricity increase system fragility?



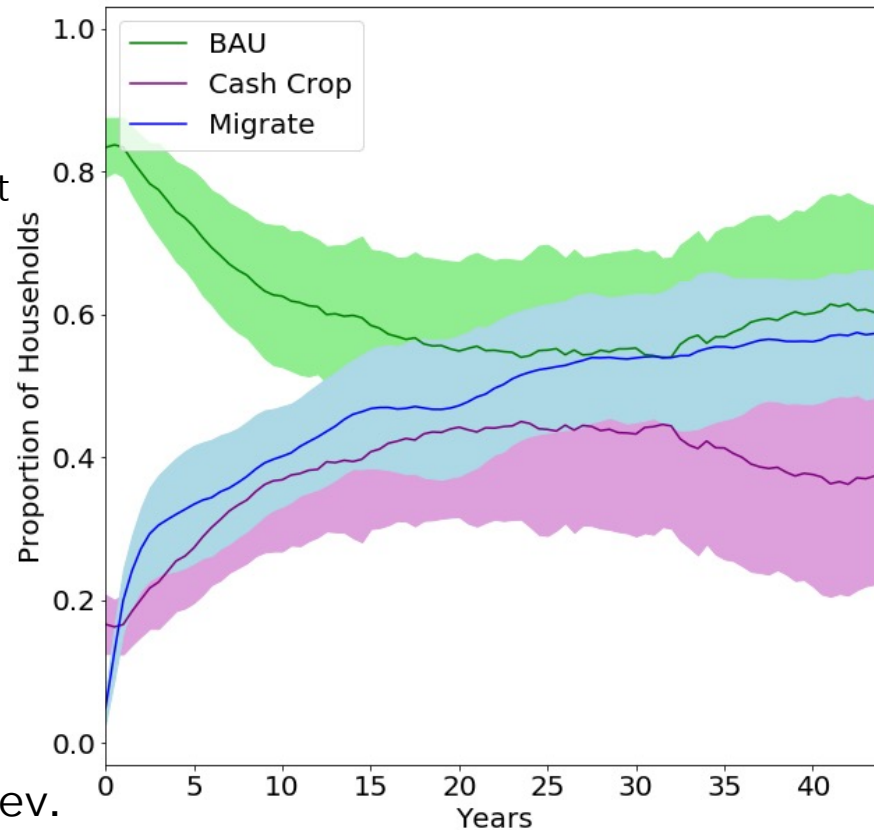
Methods: Nepali Agriculture System Actors



Results: Effect of National Crop Insurance Policy

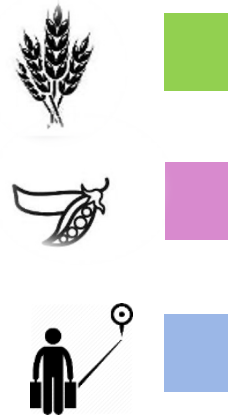
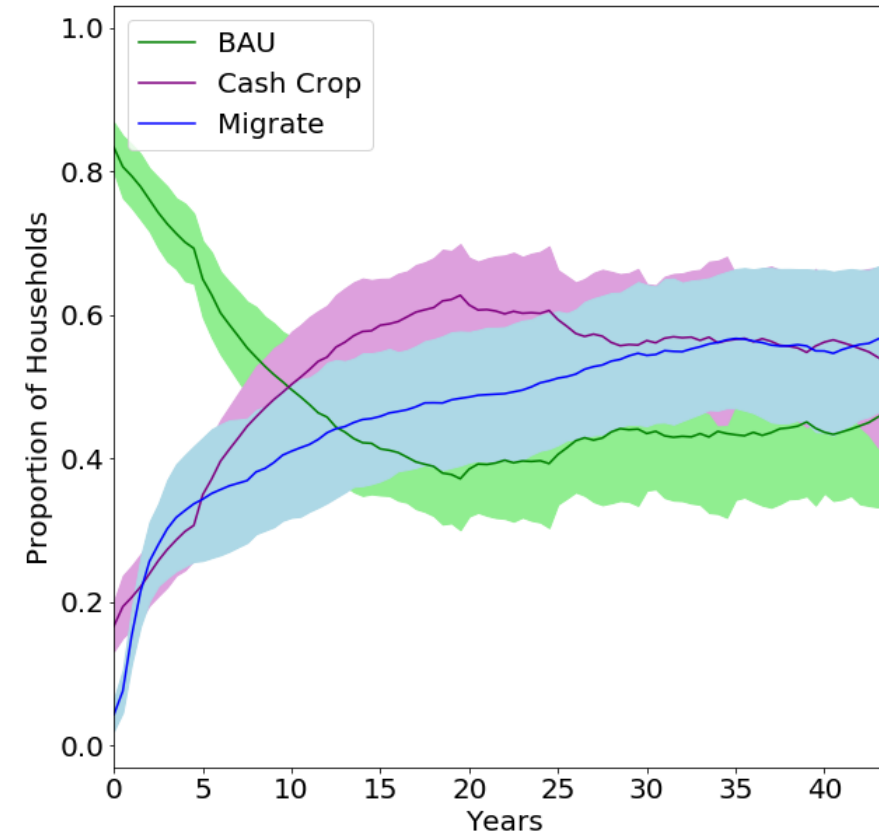
Objective:
Accelerate
commercial
agriculture
development

No Policy Interventions



Shaded
Areas:
+/- 1 Std. Dev.

With Crop Insurance



- In Base Case, households gradually diversify livelihoods to include migration and/or cash crops as they accumulate resources/information.
- Crop Insurance leads more households to rely on cash crops, slightly less on migration.

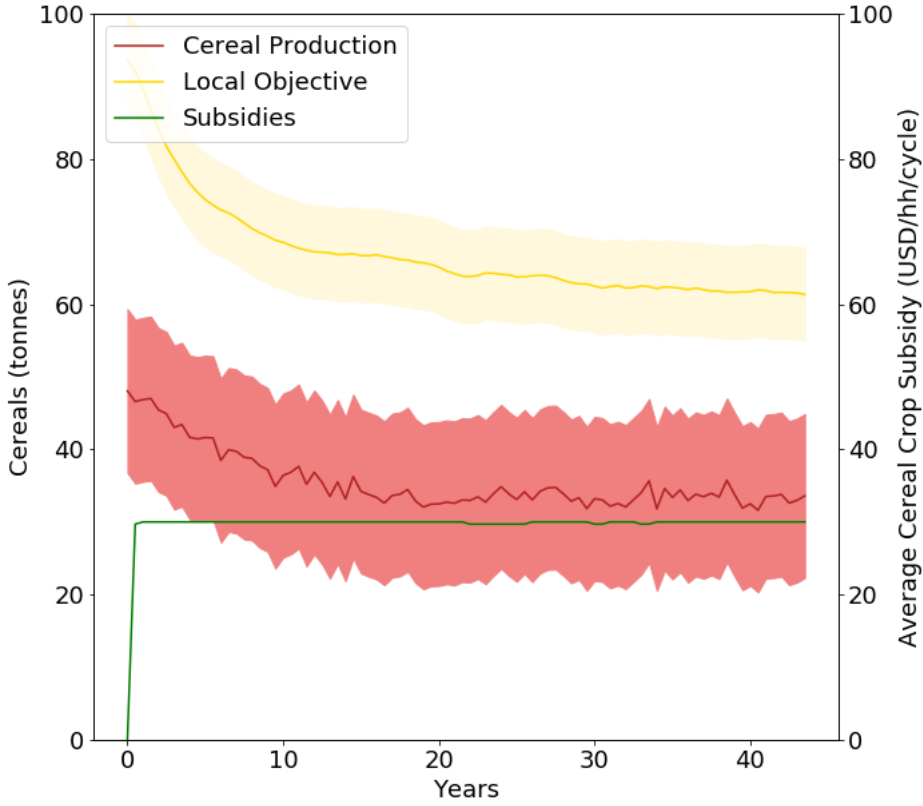
Results: "Interventionist" Local Policymaker

Objective: 50% of cereal needs met locally

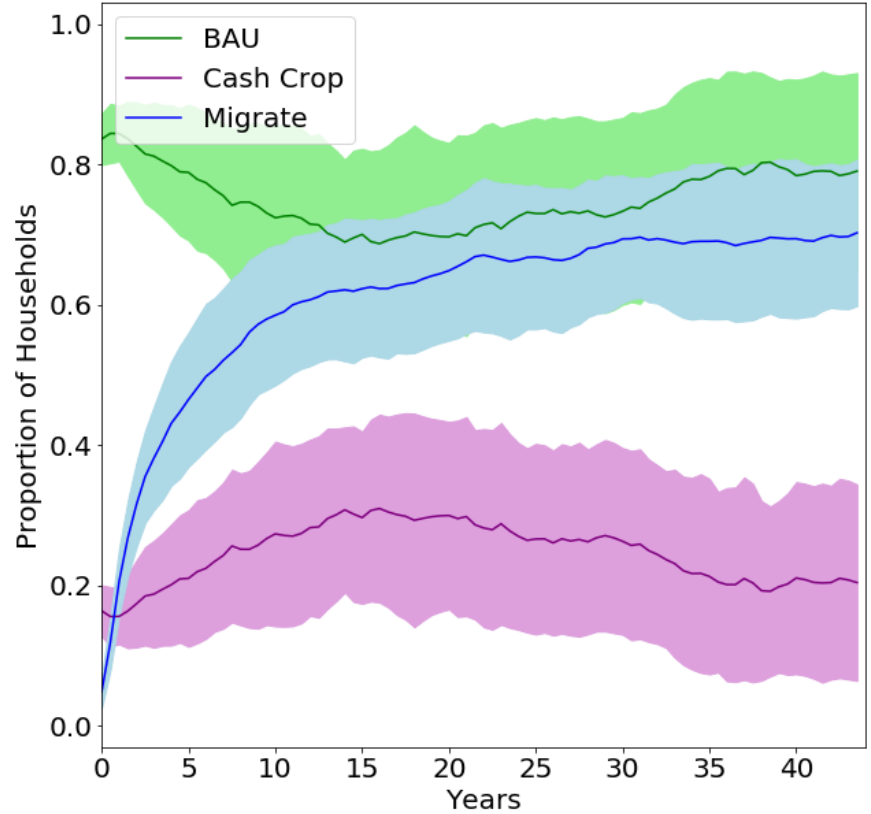
Policy tool: \$30/hh/cycle subsidy for cereal crops

Shaded Areas: +/- 1 Std. Dev.

Food Security Metrics



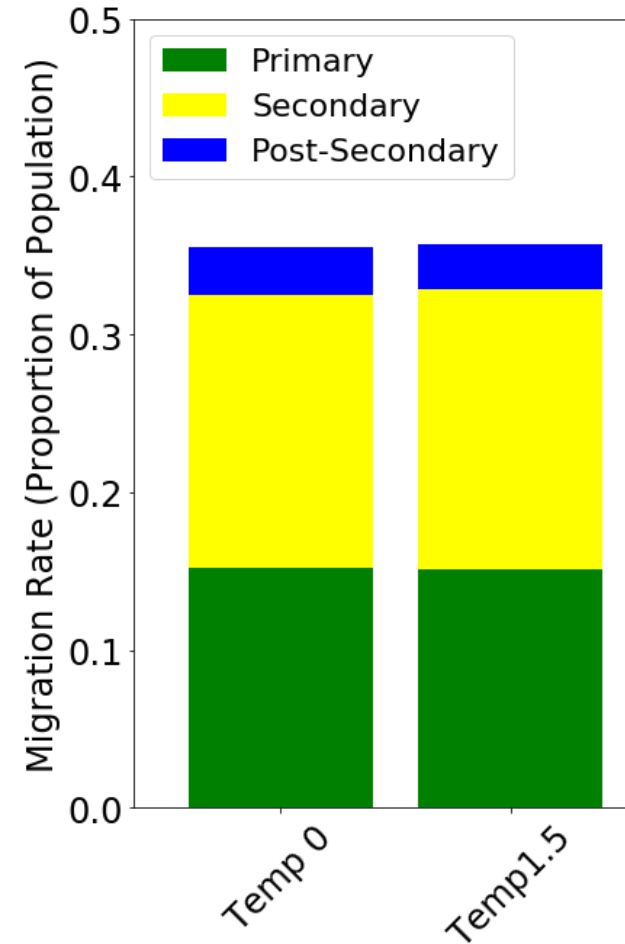
Local Policy (No Insurance)



However, for a local policymaker, food security objectives are perpetually not met, leading to subsidies of cereal crops and much higher dependence on migration

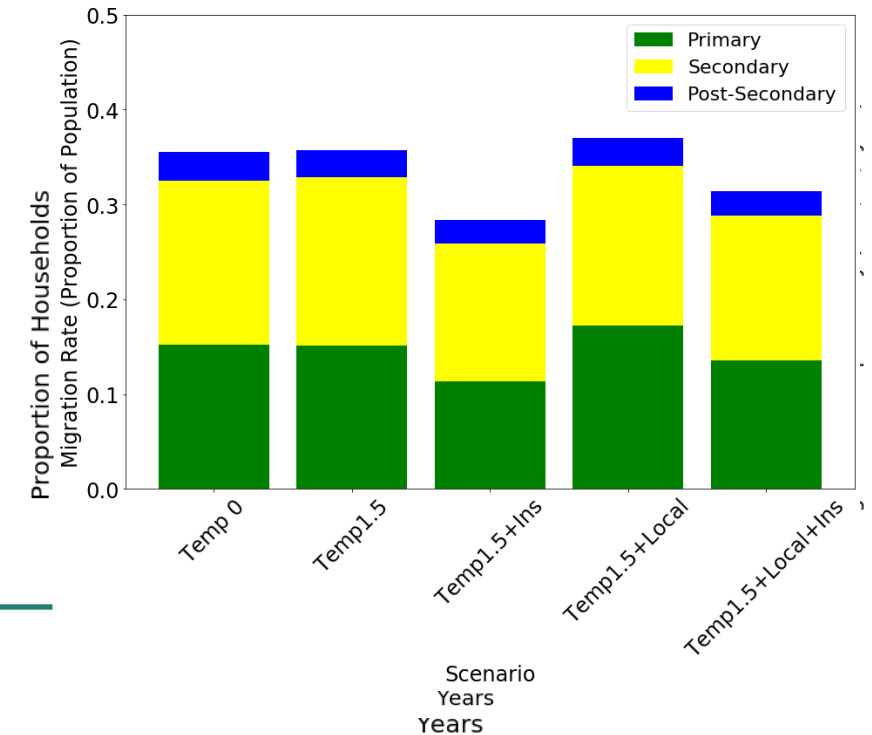
Results: Migration Rates by Policy and Climate Scenarios

- On its own, temperature change seems to have negligible effect on out-migration
- National policy response to climate risks may decrease out-migration
- But local policy response may counter or even increase net migration rate
- **More vulnerable households** particularly susceptible to policy effects



Discussion: Preliminary Conclusions and Next Steps

- Different endogenized policy responses may lead to qualitatively different adaptation pathways
- Migration rate may differ substantially based on assumed adaptation policy responses
- Top-down policies may lead to unintended consequences from local interventions, highlighting need for cross-scale coordination



Next Steps

- Expand set of policy interventions
- Endogenize national policymaker response
- Test policy robustness against exogenous uncertainty (climate, macroeconomic factors)

Vielen Dank!

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