Long-run subnational projections of income and poverty for Ethiopia: A CGE-spatial microsimulation approach

Presentation prepared for the 9th World Congress of the International Microsimulation Association

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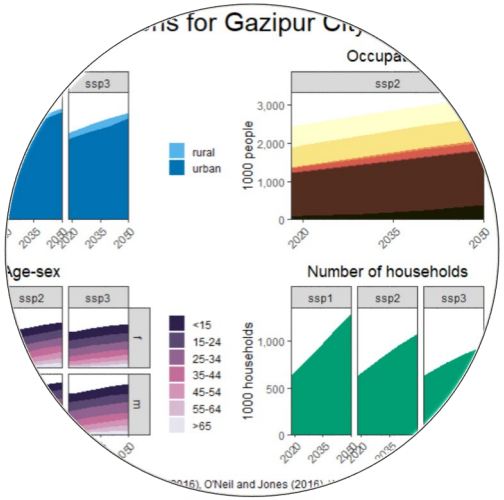

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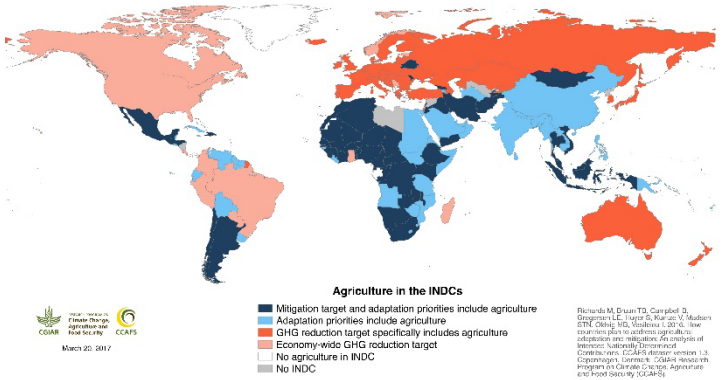
Introduction

- Many countries are developing national food security (UNFSS), SDG and climate (NDCs) action plans and strategies
- Gold standard for ex-ante policy assessments are simulation models combined with scenario analysis
- Conventional (macro-level) simulation models are not able to take into account household heterogeneity and spatial detail, which is demanded for national-level analysis

PRESS RELEASE

More than 100 countries sign up to develop national strategies for transforming food systems

Ahead of September's Food Systems Summit, more than half of the UN's Member States have pledged to host Dialogue events to begin conversations about improving food systems.



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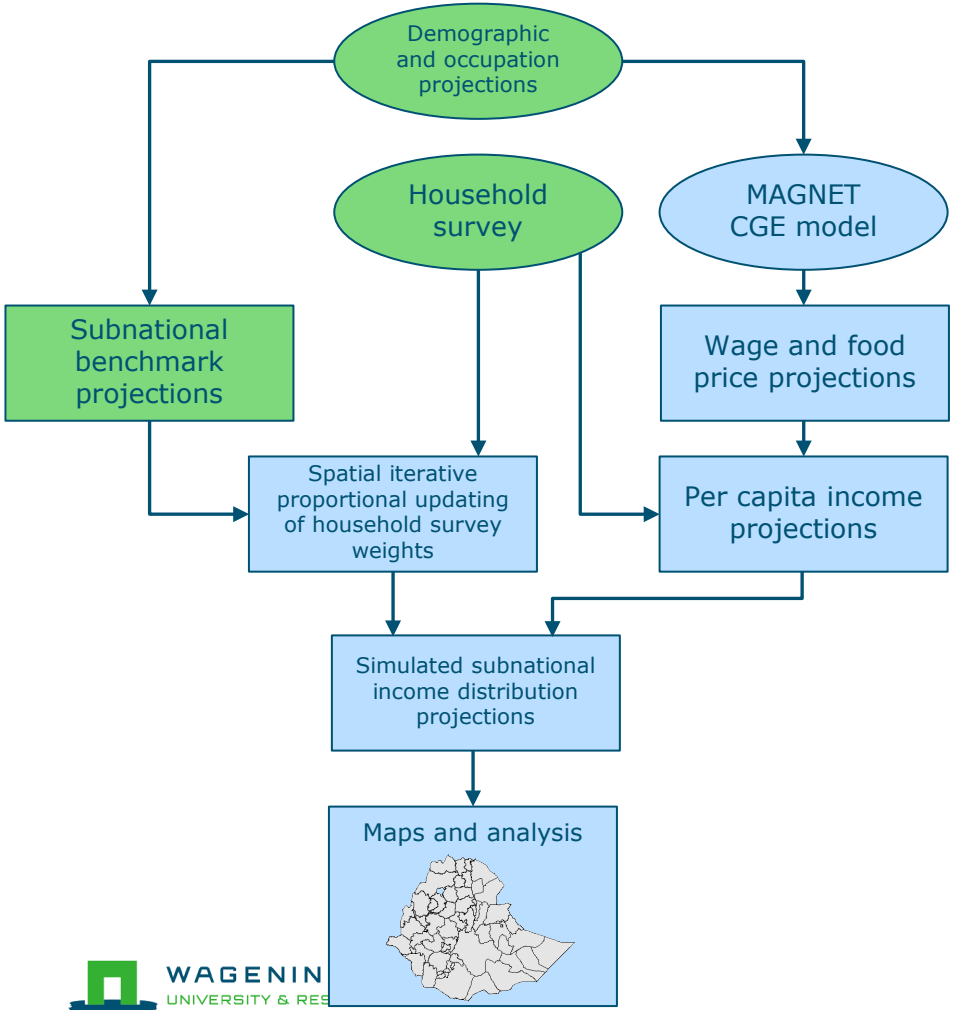
Aim

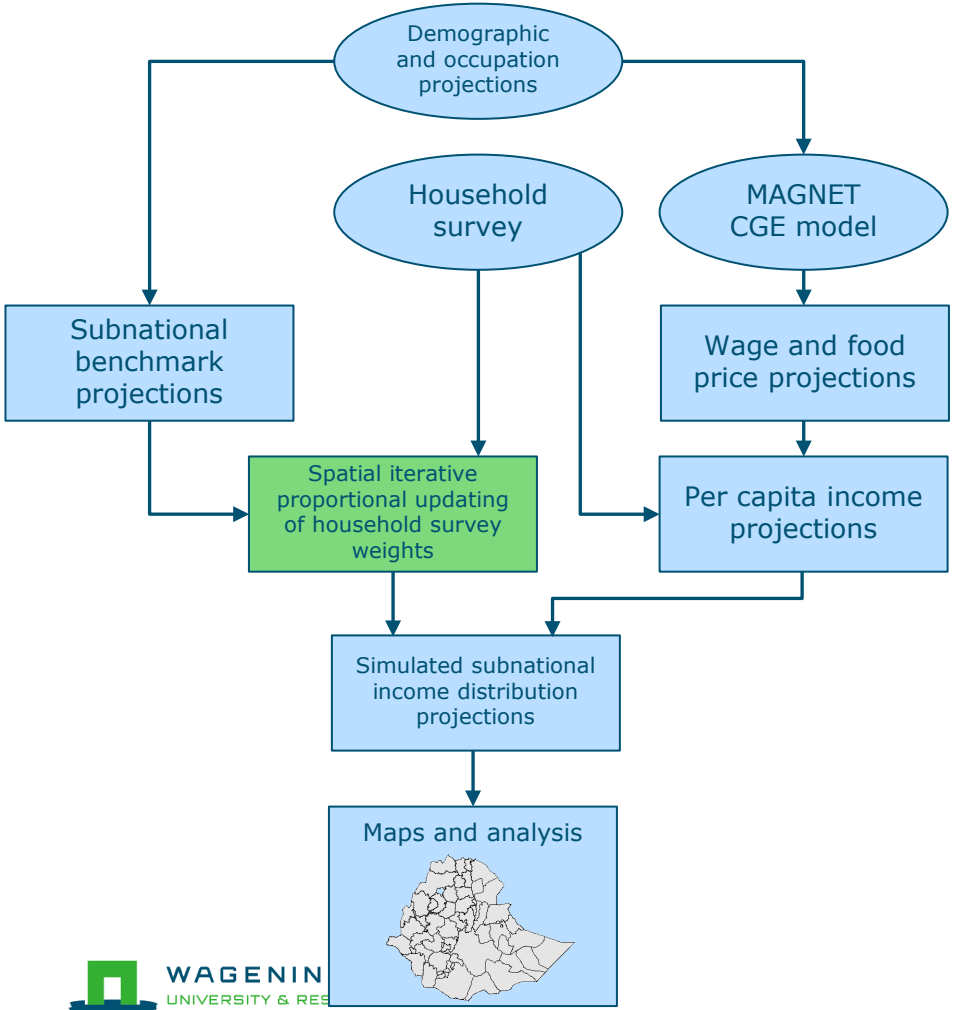
To develop a **modelling approach** that takes into account global, national and local drivers of income **to simulate income distribution and poverty at subnational scale**, answering questions such as:

- Which districts are most likely to achieve SDG1 and SDG10?
- What is the impact of economic policies (e.g. carbon, trade policy and consumer taxes) on the long-run spatial distribution of poverty?
- Are there overlaps between climate and poverty hotspots?



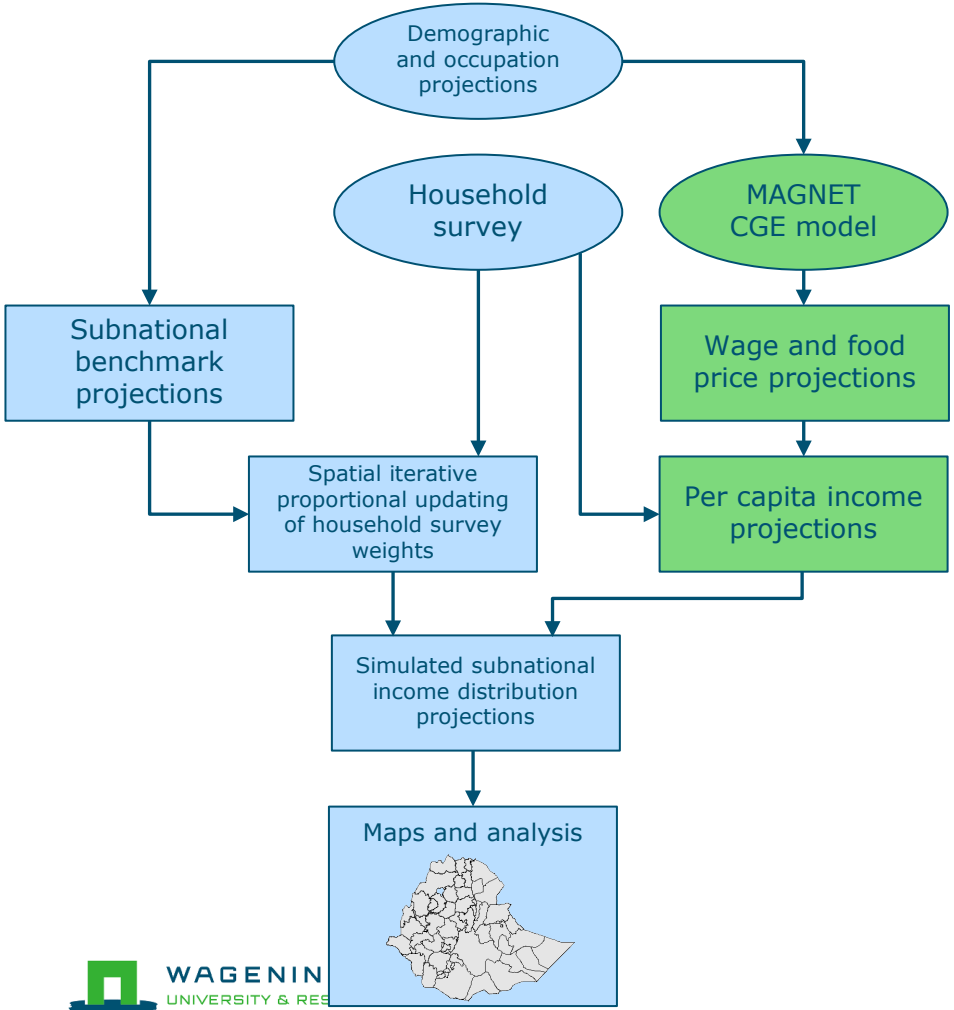
Input data

- Three scenarios based on Shared Socio-economic Pathways (SSPs).
- Subnational benchmarks prepared for 60 districts and three SSPs from 2018-2050.
- Combined with Ethiopian national household survey (7,527 households).



Spatial simulation model

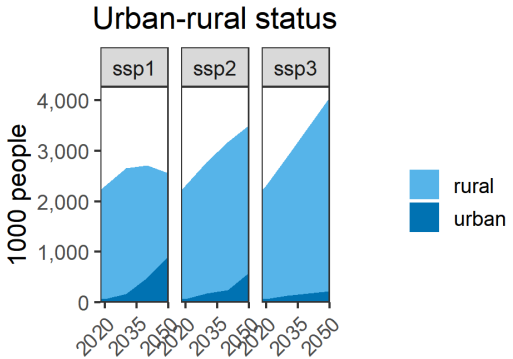
- Static aging/pseudo dynamic spatial simulation model (Harding 2011, Tanton 2014).
- Spatial Iterative Proportional Updating (IPU) (Ye et al. 2009) algorithm to reweight household survey data using both household and person constraints.
- Implemented by means of R ipfr package.

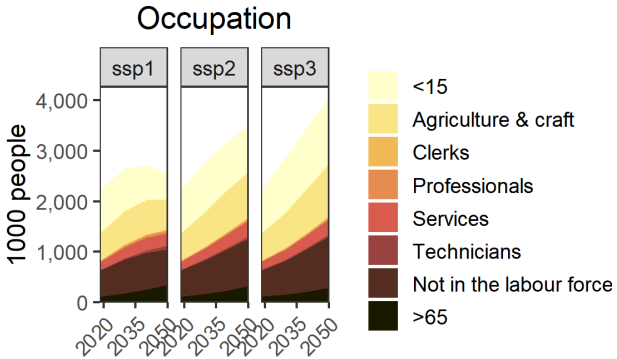


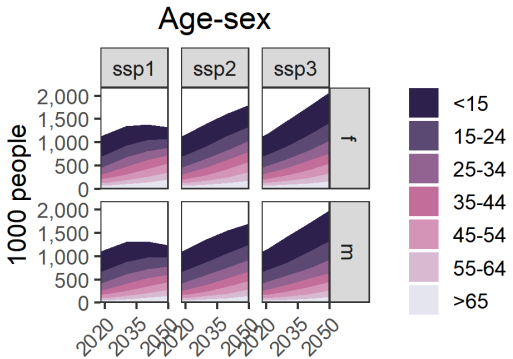
Link with CGE model

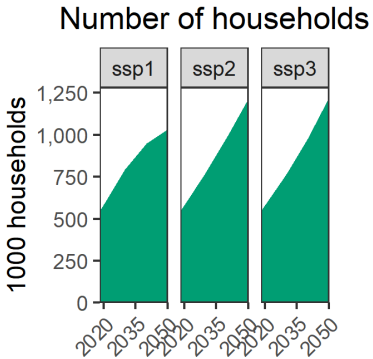
- Income/wages also change over time because of structural transformation, technical change and labour market dynamics.
- Wage projections from a global CGE-model (MAGNET) to update household member wage income.

North Shewa: Benchmark





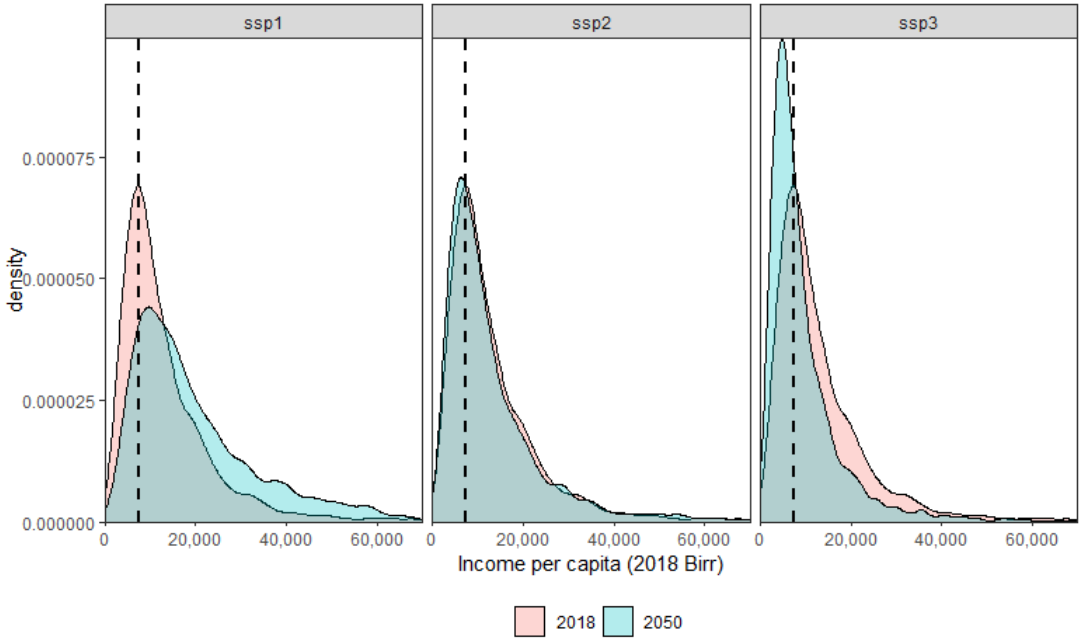




North Shewa:
Income distribution by SSP scenario: 2018-2050

Regional distributional patterns determined by the combined effect of:

- Demographic change
- Urbanization
- Structural economic change
- Change in wages per occupation



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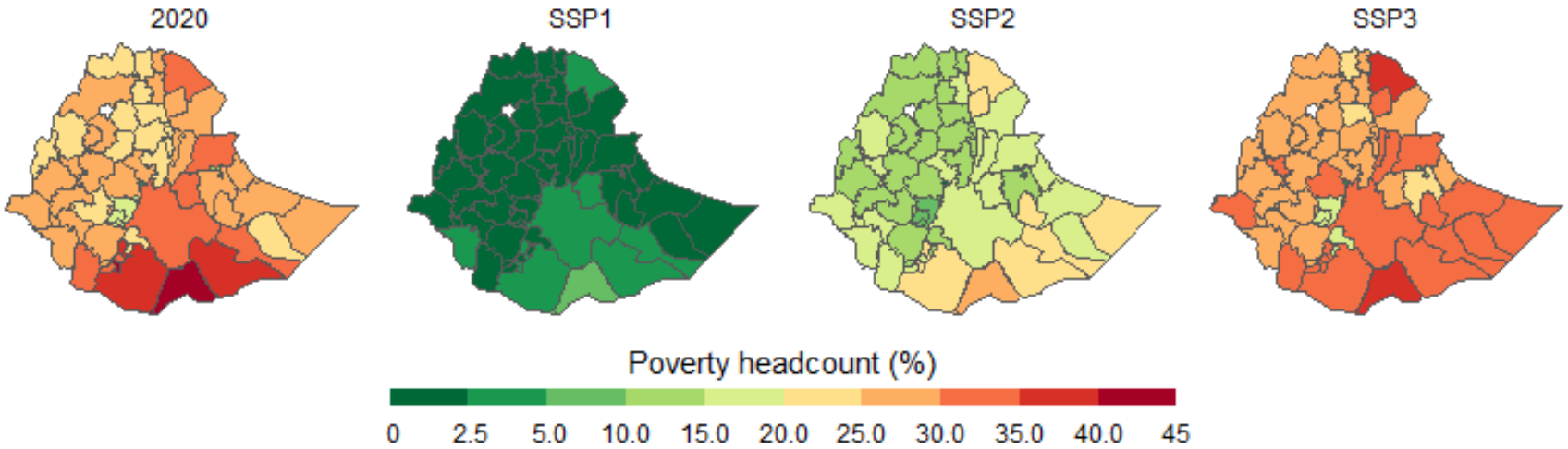
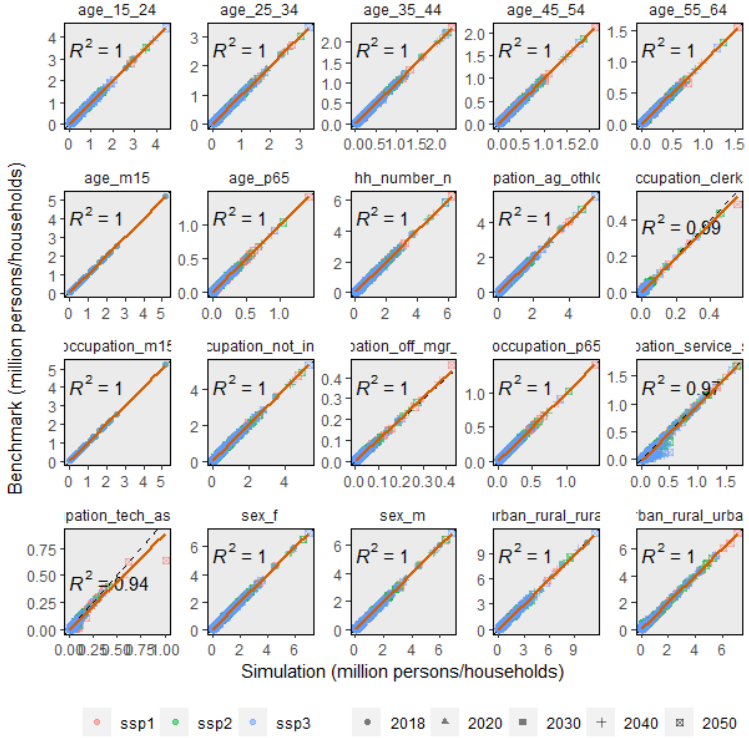
Spatial distribution of poverty headcount over time and space by SSP scenario: 2020-2050

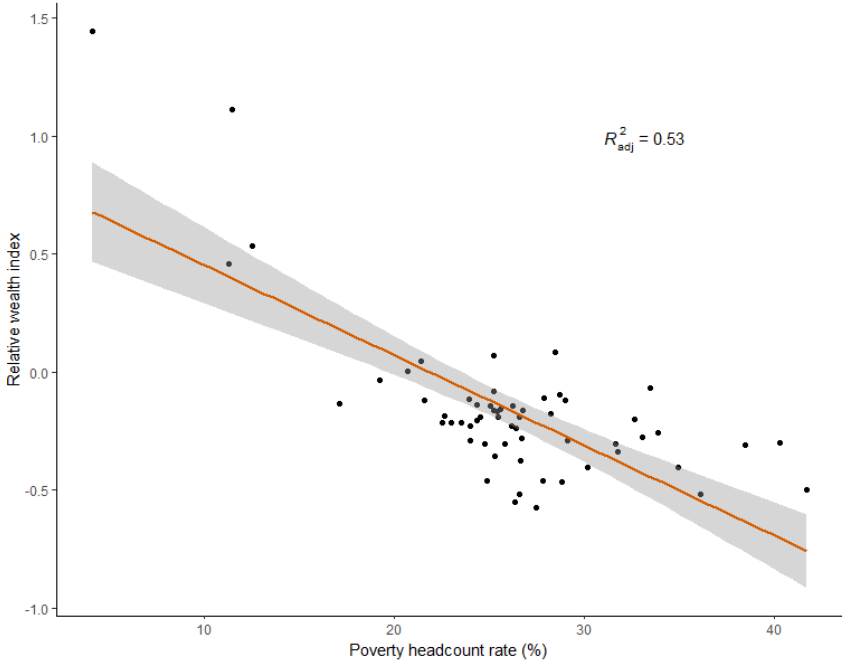


Validation

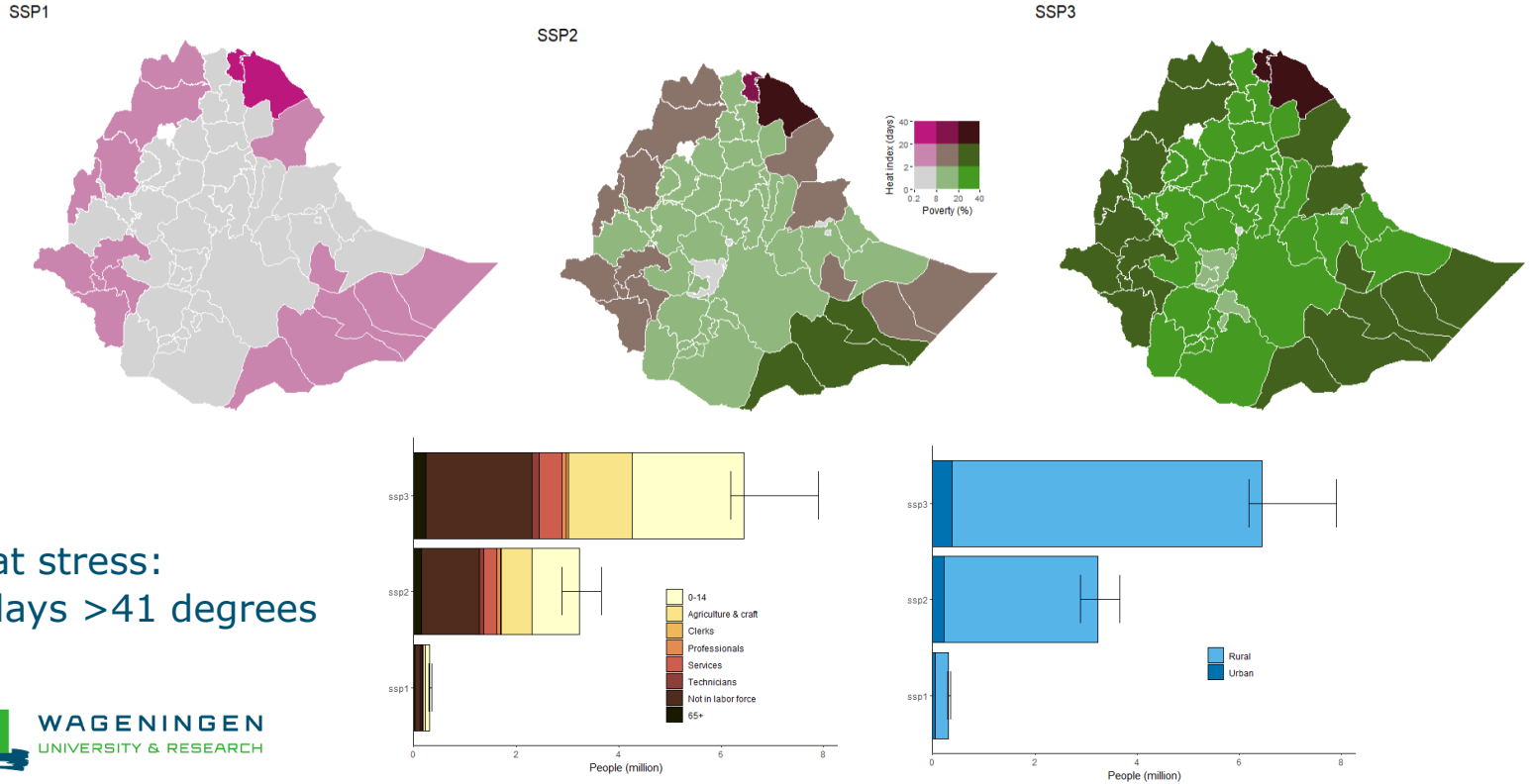
Internal validation: Correlation between benchmark and simulation



External validation: Correlation with global gridded wealth index map (2020)



Application
Combining poverty and heat stress maps



Heat stress:
days >41 degrees

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Conclusions

- Limitations
  - CGE model wage projections are not spatially explicit.
  - Top-down approach – no feedback loops from micro to macro.
  - Household income change is driven by wage change only. No information on capital income of households.
- Next steps:
  - Simulate impact of redistributive policies (taxes and subsidies) on future income distribution.
  - Combine income projections with food consumption data to produce food demand and food security projections.
  - Application to other countries.

Thank you! Questions?

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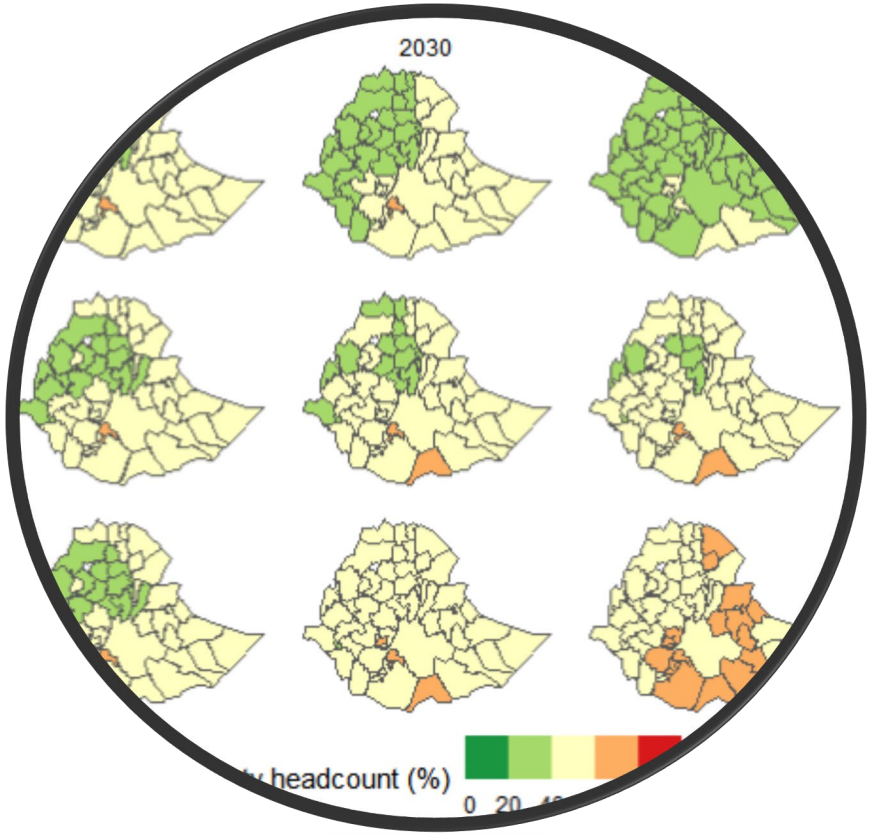

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