

# Exploring demand-side mitigation: historical dietary changes and future projections

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## Dietary changes and climate change mitigation

- The food system has significant impacts on climate change, land use change, ecosystems degradation and biodiversity loss.
- **21% to 37%** of global anthropogenic **emissions** attributed to the **food system** – one third of global emissions according to most recent estimates (Crippa et al., 2021).
- Animal protein production is responsible for **56-58%** of emissions from food but produces only 18% of the world's calories (Poore & Nemecek, 2018)
- **Dietary changes** – in particular substituting meat with plant-based alternatives can significantly contribute to climate mitigation

## Dietary changes in climate mitigation scenarios

- Climate mitigation **scenarios produced by Integrated Assessment Models (IAMs)** are central in IPCC Reports & global climate policy
- So far **dietary changes as a mitigation lever** are explored to a limited degree
- Our objective: develop **more grounded projections of livestock demand** in climate mitigation scenarios, based on empirical data
  - Employ **empirical data** to understand predictors of livestock demand
    - Including not only economic but also social and cultural predictors
    - Macro level - employing variables present in models
  - Develop **projections** of food demand based on empirically-tested model
  - Compare these projections with trends of livestock demand in climate mitigation **scenarios**

## Economic, social, and cultural drivers of dietary choices

- Historical relationship between **economic development** and meat demand (Marques et al., 2018; Sans & Combris, 2015)
- In scenarios, livestock demand is mostly modeled as a function of **GDP, population and prices** (based on price elasticity assumptions)
- However, **demographic, social, and cultural factors** are very important drivers
- **Education, religion, social norms** (Vranken et al., 2014, Milford et al. 2019, Eker et al. 2019, Falchetta et al. 2021, Biondi et al 2021)

## Method

- We analyze drivers of livestock demand employing empirical data
  - Theoretically selected economic, social, and cultural predictors
- We build **projections of livestock** demand based on empirically-tested models
  - Employing economic, social, and cultural predictors
  - Country-specific and product-specific projections
  - Aggregated for all livestock products and at IAM region level
- We compare our livestock projections with trends in IAM scenarios

## Conclusion and Outlook

- Adding **social and cultural predictors to the projections** of dietary trends can enhance existing narratives
- Overall, this can broaden the existing scenario space and increase the **political relevance of scenarios**

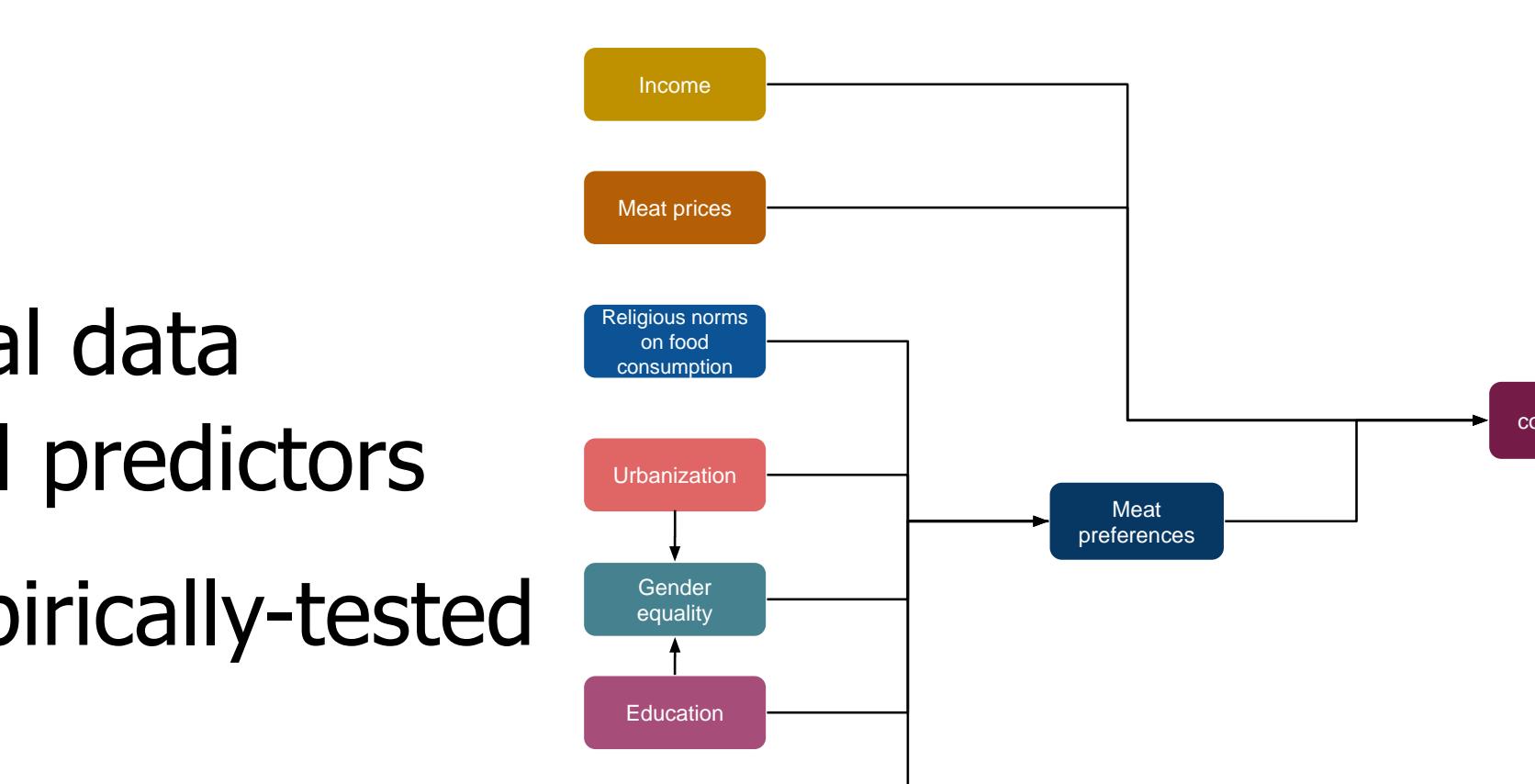


Fig 1: Theoretical Framework for the empirical model

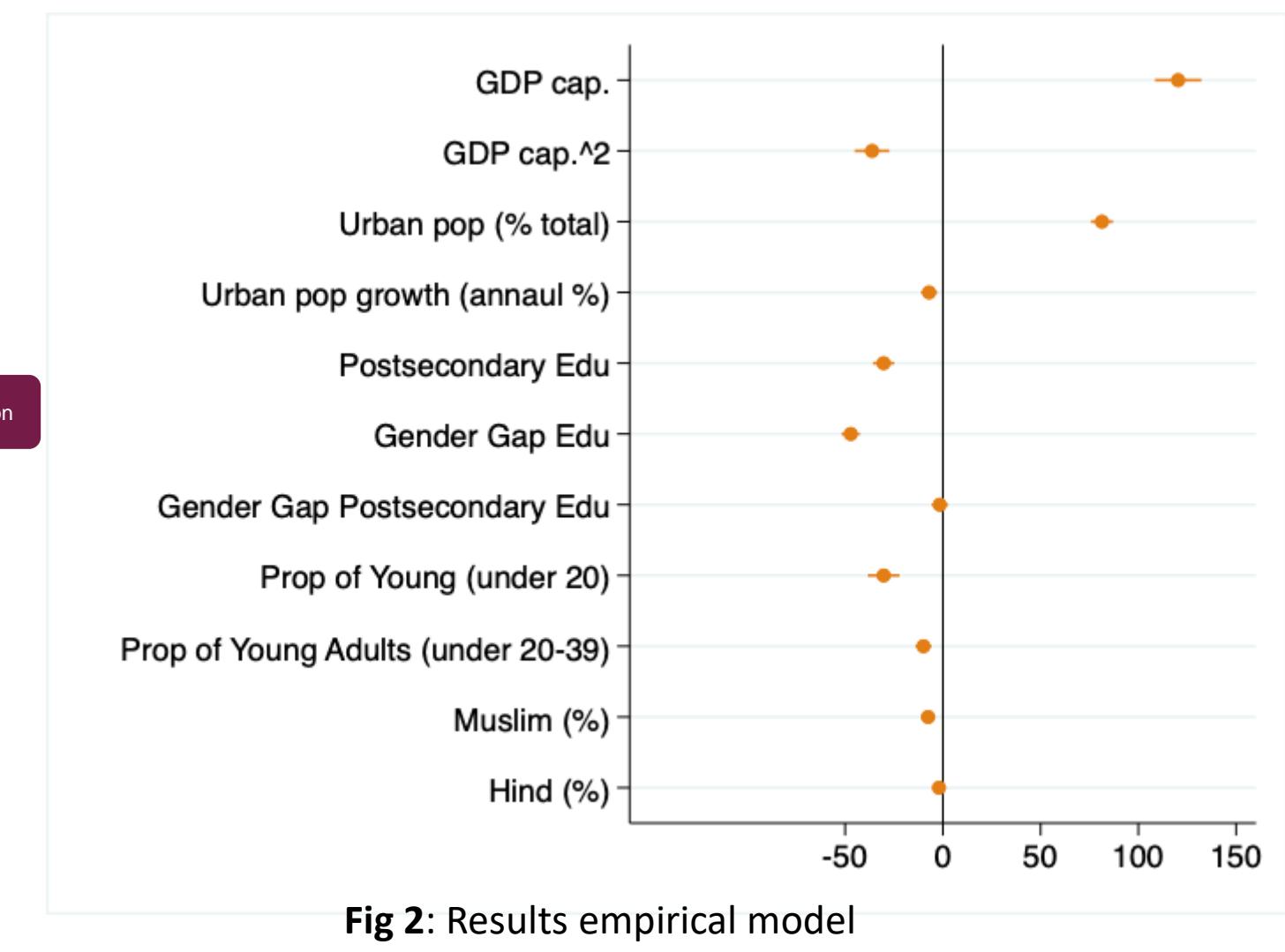


Fig 2: Results empirical model

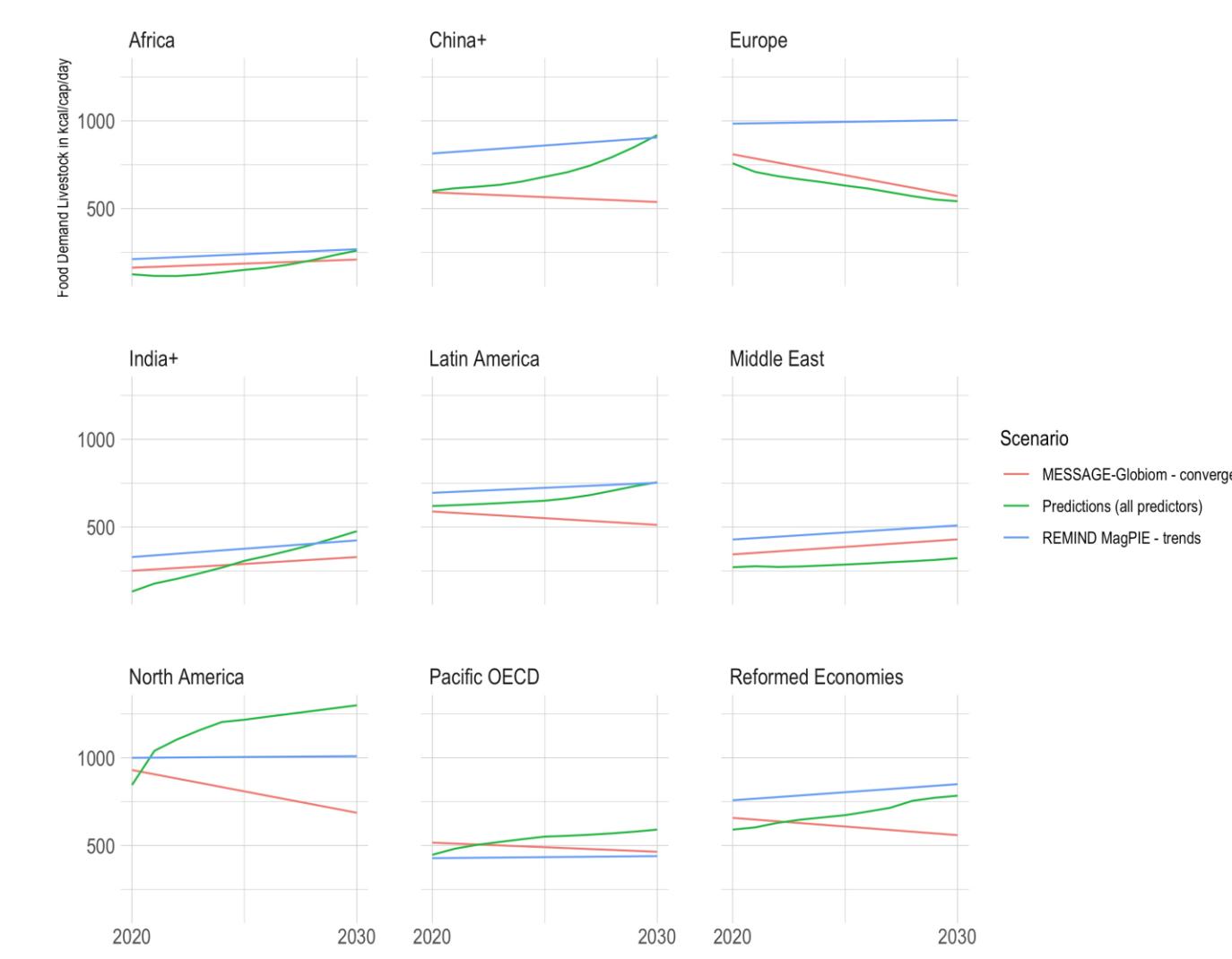


Fig 3: Projections compared to an output from a MESSAGE-Globiom scenario (assuming convergence across regions) a and REMIND-MagPIE scenario assuming continuation of trends.