



Global Trade Analysis Project

# Incorporating Nutritional Accounts to the GTAP Data Base

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# Outline

- 1. Motivation**
- 2. Overall approach**
- 3. Overview of the constructed database**
- 4. Illustrative application**
- 5. Discussion**

# Motivation

- **Importance of representing nutritional accounts in a CGE/IAM framework:**

- Post-farmgate value chains make up most of the food expenditures (>80% in many countries).
- Variety of policy applications: hunger, obesity, food availability, nutritional composition of food supply, dietary shifts, nutritional implications of trade and climate policies...

- **Limitations of the earlier studies:**

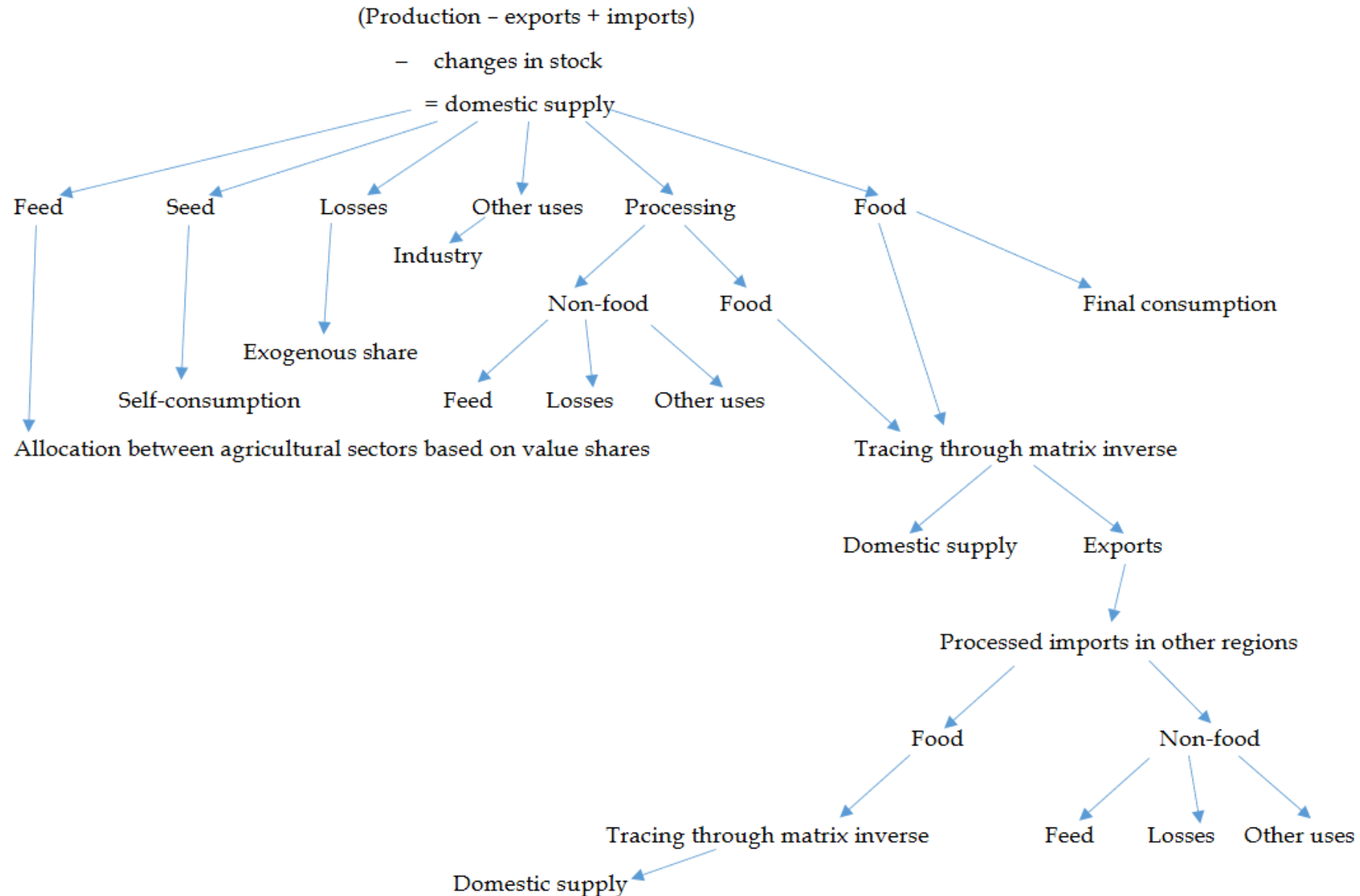
- Tracing of out-of-home food consumption.
- Explicit tracking of transformation from primary to processed commodities.
- Representation of non-food categories (feed, seed, losses, other uses).
- Not publicly available.

**We attempt to address some of the above limitations and develop GTAP-consistent nutritional database.**

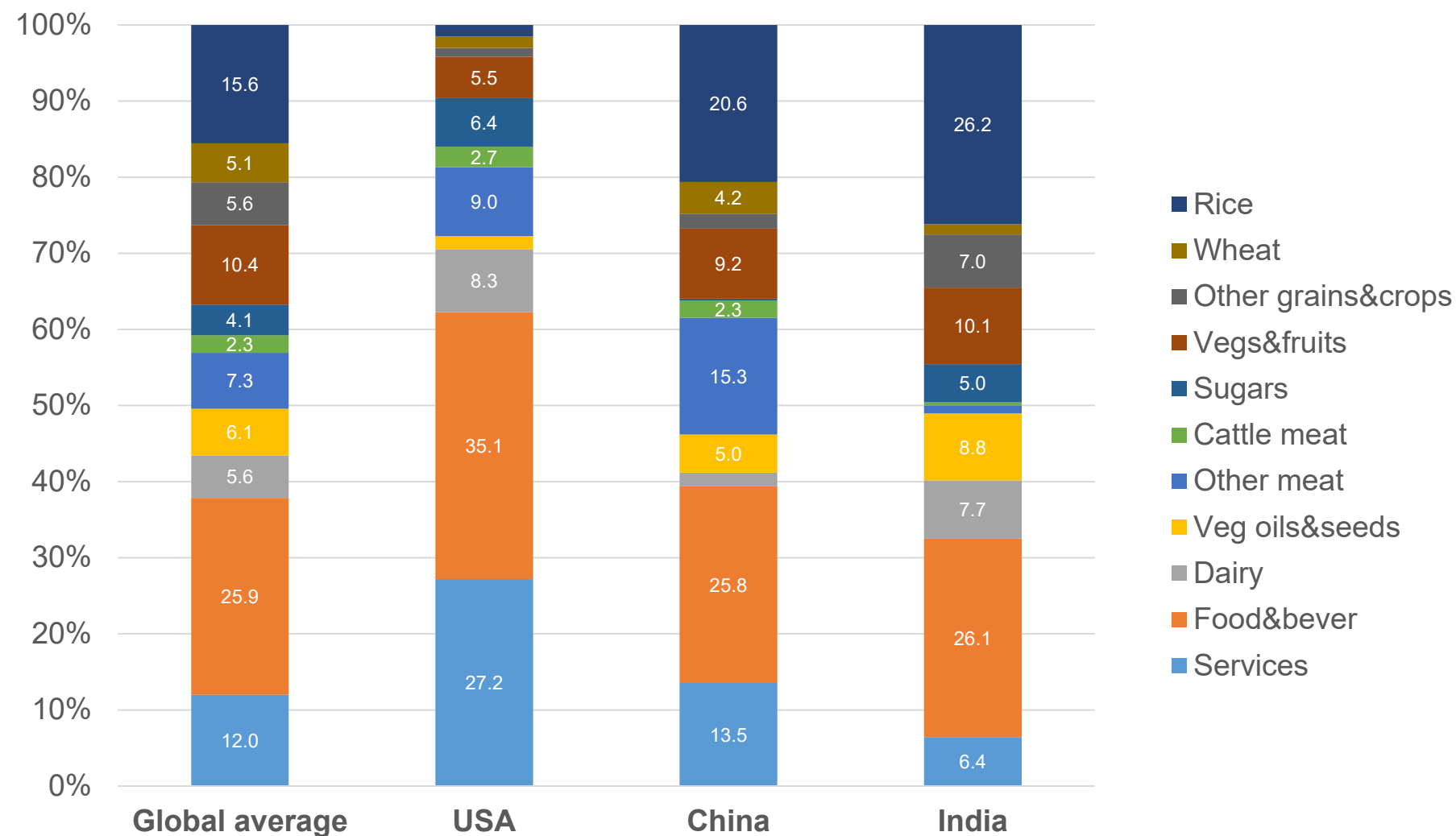
# Constructed database is calibrated to FAO's FBS

(1) Estimation of the Leontief inverses	<ul style="list-style-type: none"><li>• <b>Data:</b> GTAP 10 Data Base, four reference years (2004, 2007, 2011 and 2014).</li><li>• Identify food, feed, seed and other supplies. Estimate Leontief inverses for the tracing of primary and processed commodities.</li></ul>
(2) Construction of the bilateral trade data	<ul style="list-style-type: none"><li>• <b>Data:</b> FAOSTAT, FishstatJ trade data for 446 primary and processed commodities.</li><li>• Data gap-filling and mapping, construction of the bilateral trade in fish and aquaculture.</li></ul>
(3) Estimation of the primary domestic supply	<ul style="list-style-type: none"><li>• <b>Data:</b> FAOSTAT primary commodity production; data on non-food categories (feed, seed, loss, etc.) from FBS; bilateral trade data; commodity balances for non-food supply (e.g. oil cake); nutritive factors.</li><li>• Estimation of the primary food supply, processing-related food supply (e.g. oils) and non-food supply by primary commodity equivalents.</li></ul>
(4) Tracing of the nutritional supply by GTAP sectors	<ul style="list-style-type: none"><li>• <b>Data:</b> Primary domestic supply estimates; Leontief inverses.</li><li>• Domestic nutritional supply by GTAP sectors in primary commodity equivalents.</li></ul>
(5) Tracing of the trade-related nutritional supply	<ul style="list-style-type: none"><li>• <b>Data:</b> Bilateral trade data; nutrition factors; technical conversion factors.</li><li>• Trade-related nutritional supply by GTAP sectors in primary commodity equivalents.</li></ul>
(6) Construction of the final database	<ul style="list-style-type: none"><li>• <b>Data:</b> Domestic and trade-related nutritional supply; FBS data.</li><li>• Tracing of food supply between domestic and imported flows.</li></ul>

# Primary supply is traced along value chains

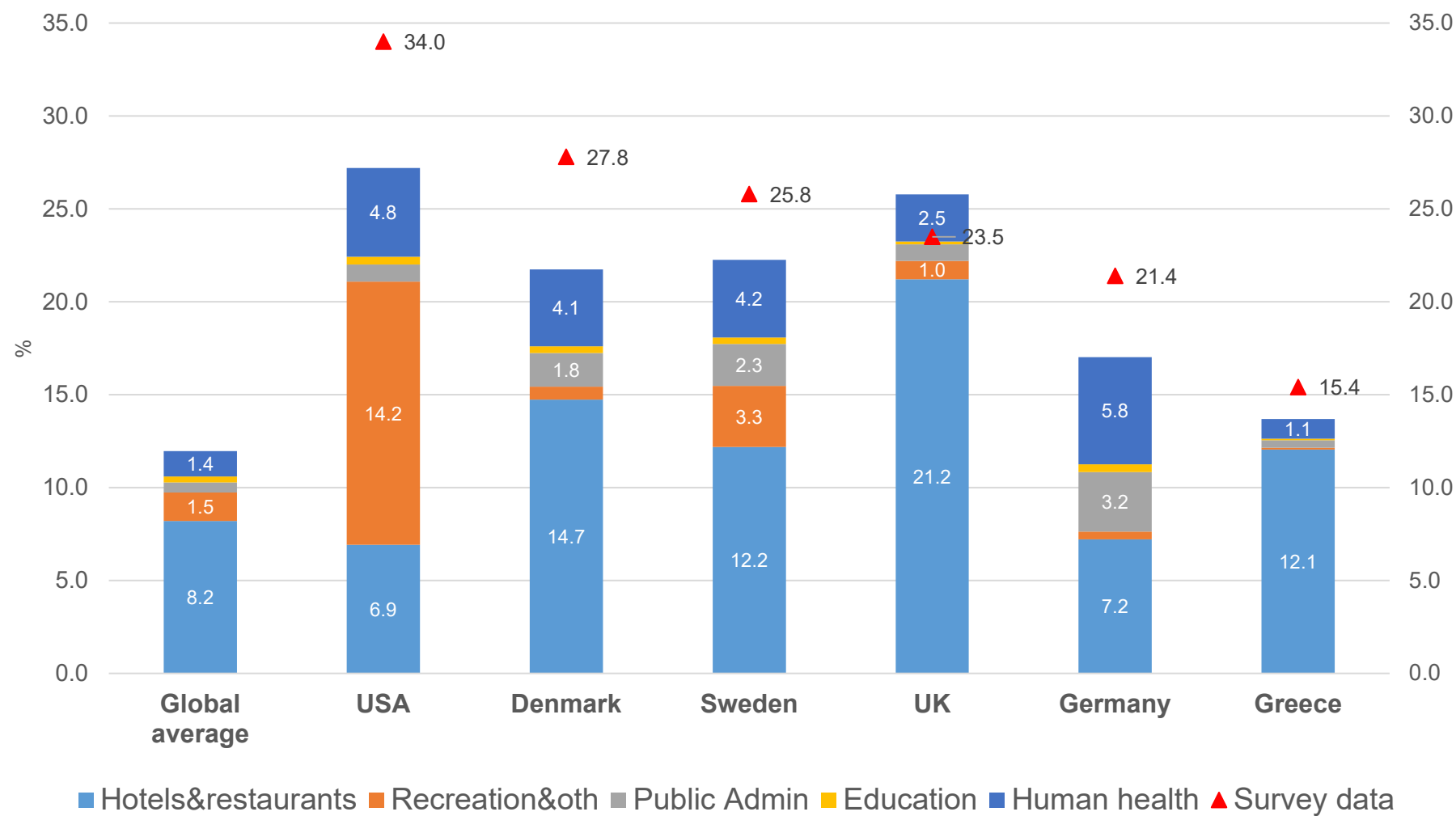


# Composition of food supplied substantially varies across countries



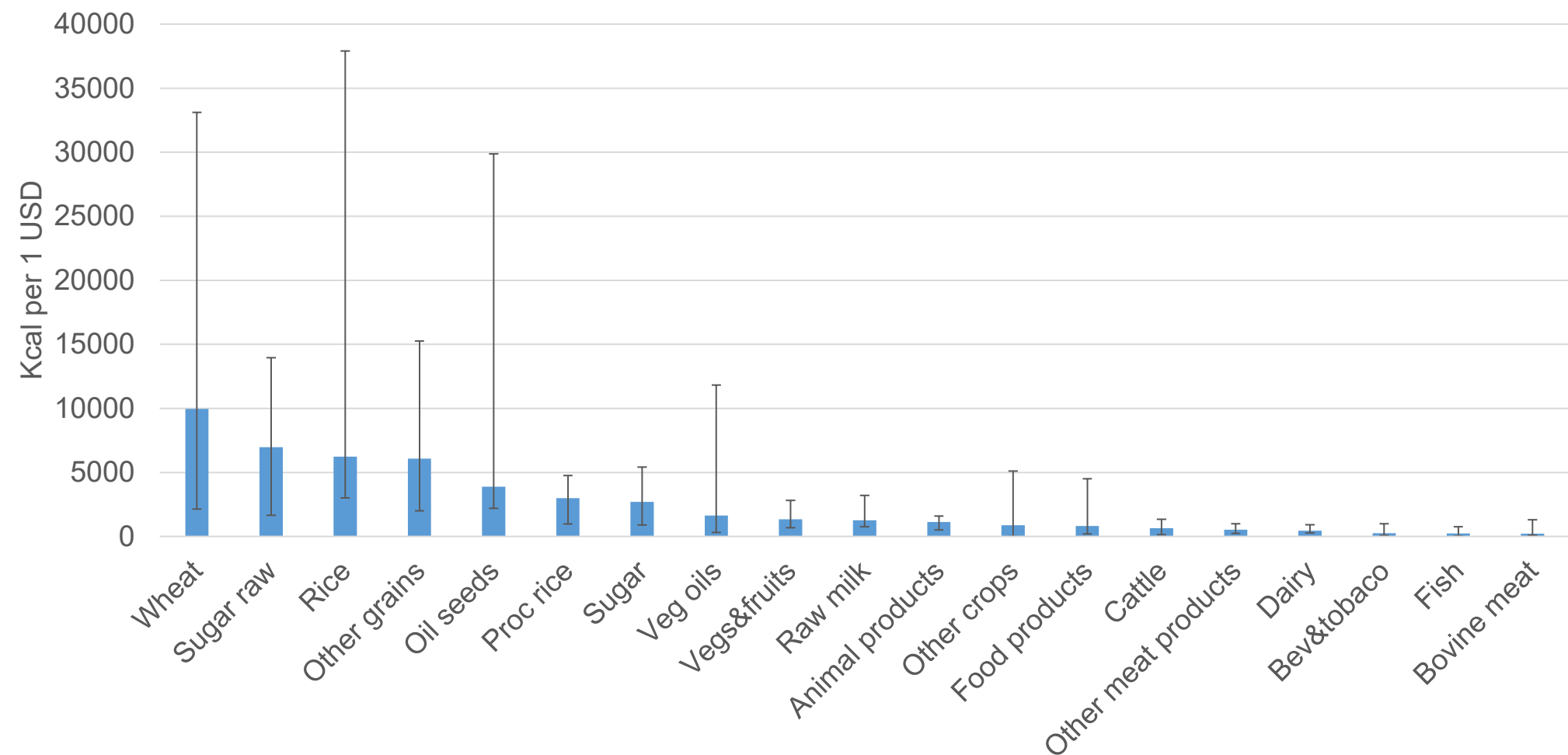
Distribution of calories supplied by GTAP sectors in 2014, % (selected countries)

# Estimated out-of-home food supply is consistent with survey data



Comparison between GTAP account and survey data, % (share of total calories supply)

# High regional variation in calories supplied per unit of value

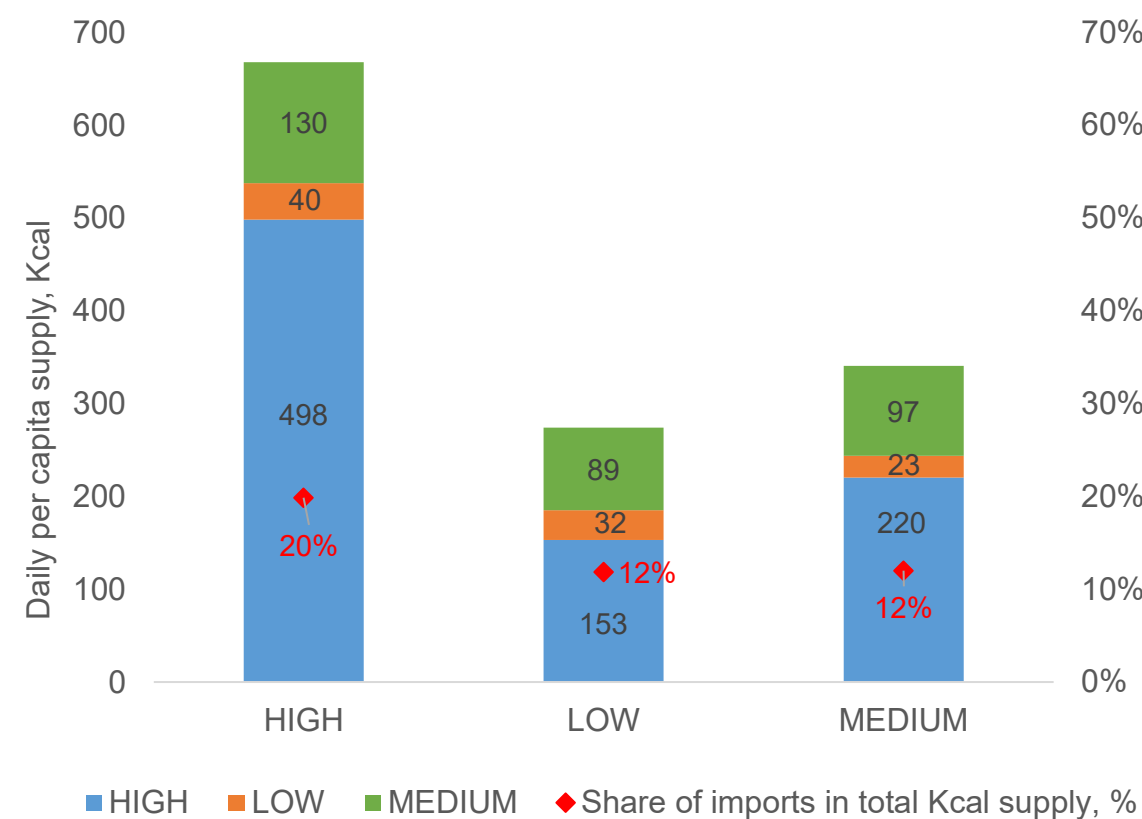


*Notes:* Error bars indicate minimum and maximum value across ten aggregate regions: Oceania, East Asia, South East Asia, South Asia, North America, Latin America, EU-27, Middle East and North Africa, Sub Saharan Africa and Rest of the World.

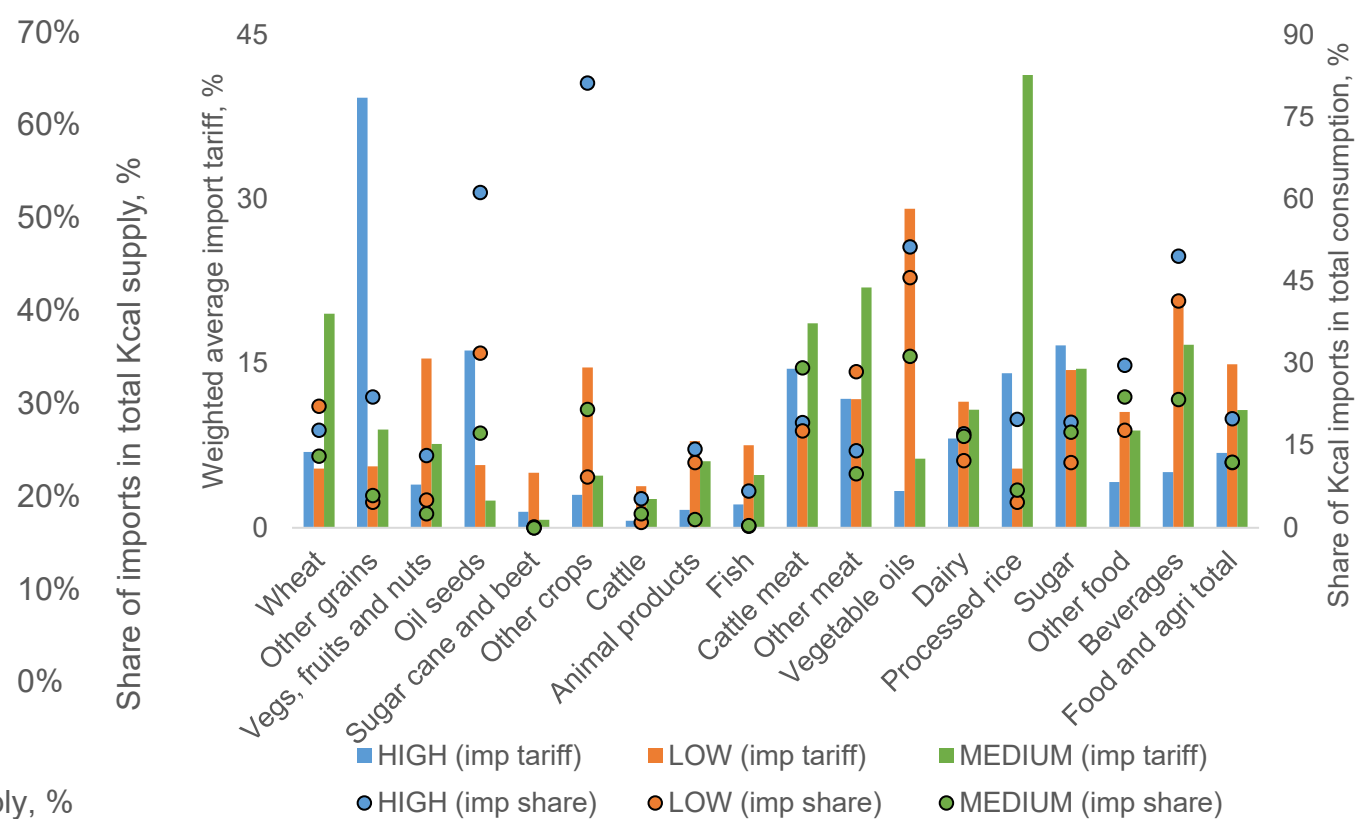


# Impact of changing import tariffs on food supply and trade

- **Regional aggregation:** <2500 (“LOW”), 2500-3000 kcal (“MED”) and >3000 (“HIGH”).
- **Experiment:** elimination of import tariffs and subsidies on agricultural and food commodities by all regions.
- Changes in the nutritional data flows are linked to the quantity flows from GTAP model -> RunGTAP application.

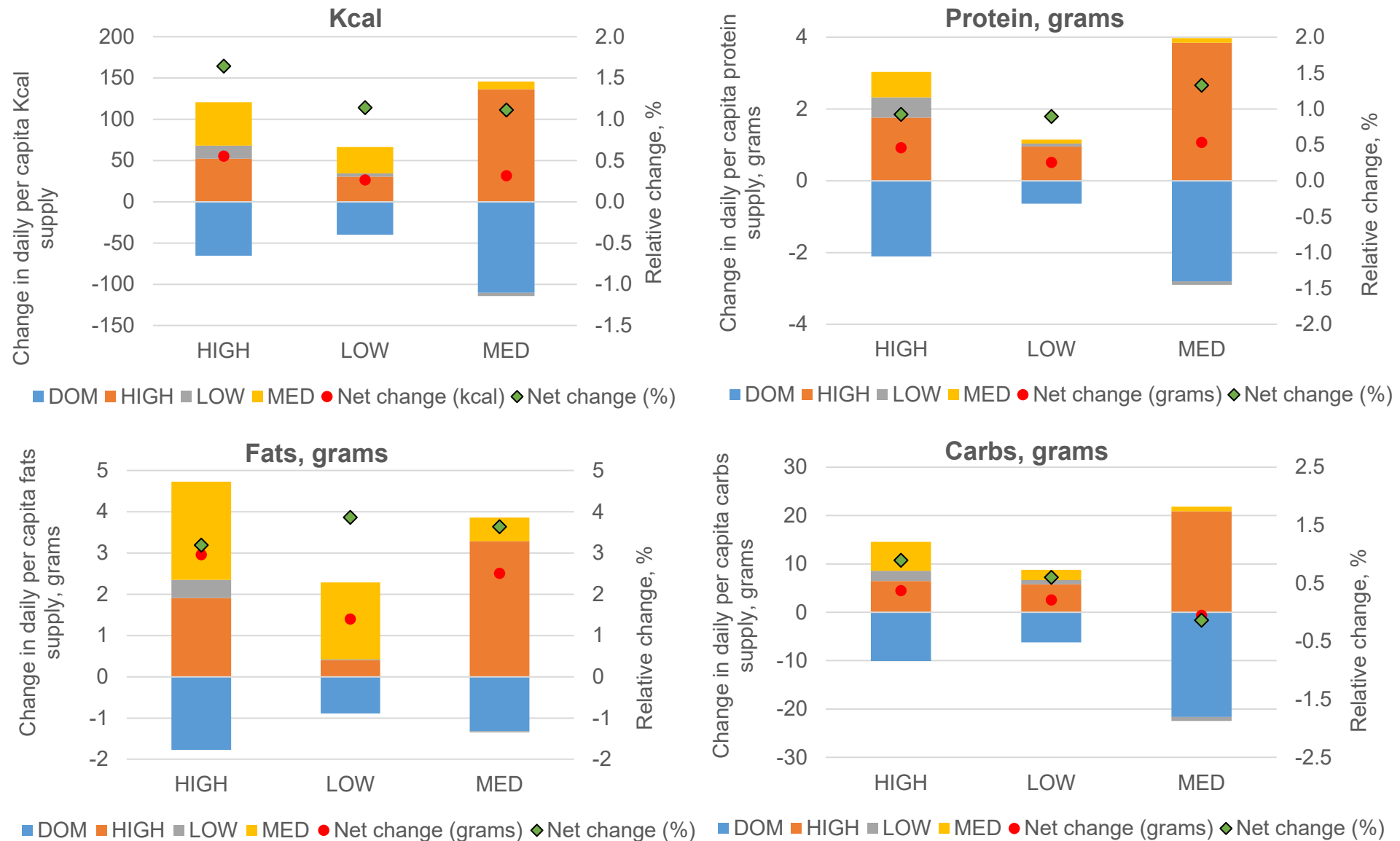


Distribution of Kcal per capita per day embodied into imports by aggregate regions in 2007



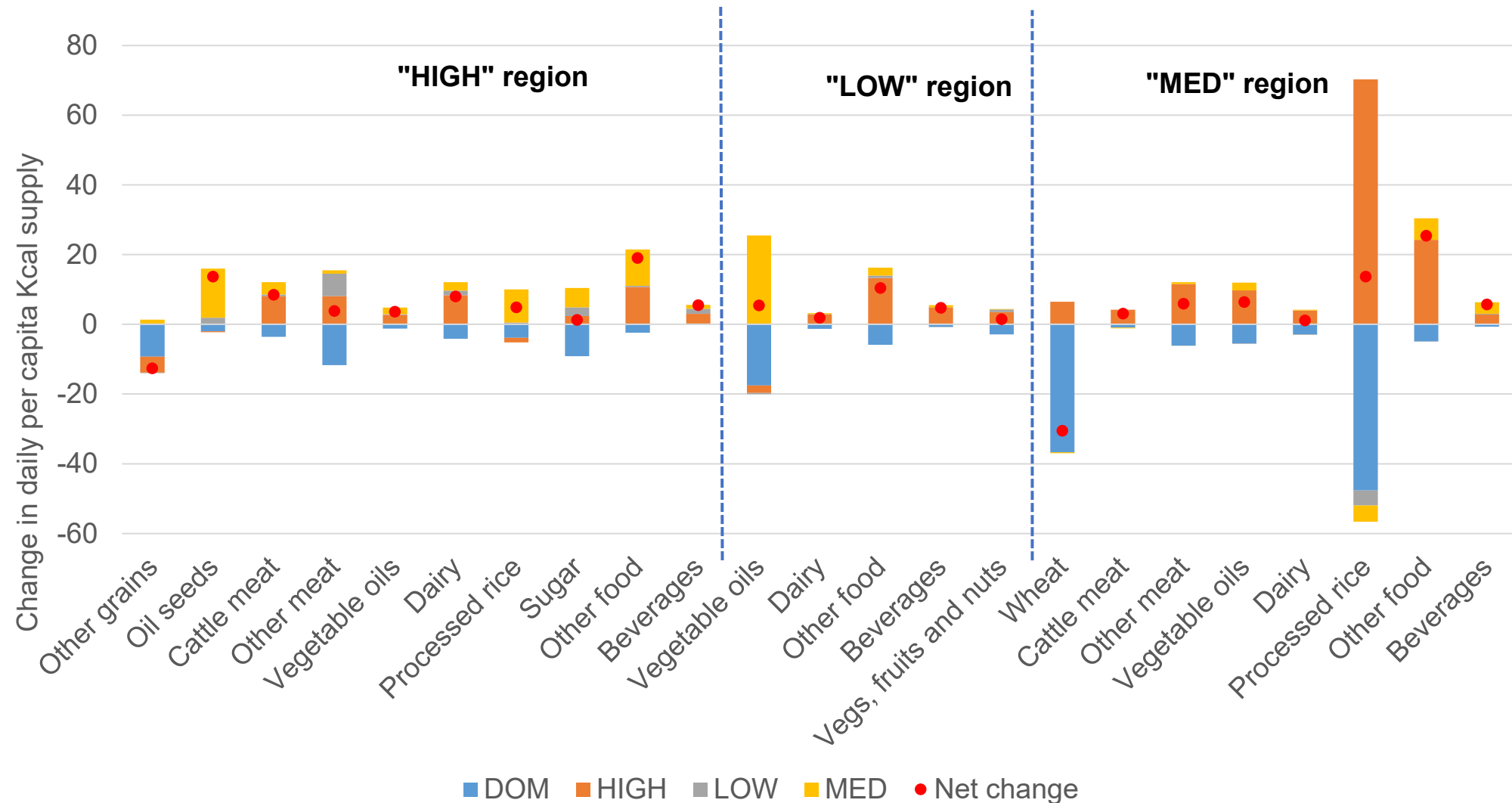
Import tariffs and import shares for selected agricultural and food sectors in 2007

# Food supply increases in all regions



Change in daily per capita nutritional supply following import tariffs elimination

# Supply of other food products is impacted the most



Change in the daily per capita kcal supply by sources for selected commodities

# Discussion

- **Current effort incorporates nutritional accounts to the GTAP Data Base and provides a link to the static GTAP model (RunGTAP archive is provided).**
- **Limitations and next steps:**
  - Data improvements: fish trade, representation of small countries with unavailable FBS.
  - Representation of micronutrients in the database.
  - Detailing of selected use accounts, such as food loss and waste (Alessandro's presentation).
  - Incorporation of additional biomass flows and environmental extensions (e.g. land, water).
  - Application within the dynamic modelling framework (Marijke's presentation).



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# Thank you!

## Questions/Comments?

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