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Affordability of nutritious diets
in Malawi, Tanzania, Ethiopia and worldwide

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Feed the Future Innovation Lab for Nutrition
Partners meeting on supporting program design through research on agriculture to nutrition linkages

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Why measure the cost of nutritious diets?

- Rural and urban food markets are changing rapidly
  - from own-production to use of markets
  - from generic commodities to branded, packaged foods
  - lower cost of starchy staples relative to milk, eggs, meat, fruit & veg
  - higher earnings, allowing more choice among affordable foods
- To monitor change, we need new kinds of price indexes
  - existing indexes focus on trade, producer prices, or the cost of living
  - we add nutritional data, to measure the cost of a healthy diet
  - comparison to earnings reveals affordability at each time and place
- Measuring access to nutritious diets can guide intervention
  - where do diet costs exceed earnings, so transfers are needed?
  - which foods & nutrients drive costs up, so access can be improved?
  - are some foods already accessible at low cost, but under-consumed?

Photo by Anna Herforth
at Nsawam market, Ghana

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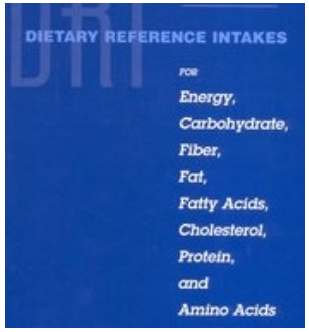
How do we define affordability of nutritious diets?

- For *affordability*, we seek the least expensive foods needed to meet each nutritional standard
  - Data are retail prices for all items available at each place and time
    - typically a list of 50-200 foods and beverages
    - typically at many market locations, visited once per month
  - Matched to food attributes associated with health outcomes
- For *nutritious*, we use three different kinds of diet quality metrics
  - *Nutrient adequacy*, based on requirements for essential nutrients
  - *Recommended diets*, based on guidelines for food groups
  - *Nutritional profile scores*, ranking items with stars, categories or points
- The cost of each standard answers a different policy question
  - Cost of Nutrient Adequacy (CoNA) & Cost of Recommended Diets (CoRD) are amounts per day for an individual or family, to compare with income
  - A Nutritional Consumer Price Index (nCPI) measures change over time, to compare with inflation in what people actually eat (CPI)
  - Here will focus only on CoNA results, for cost of nutrients

Photo by Anna Herforth at Nsawam market, Ghana

We offer three different nutritional price indexes

- Cost of Nutrient Adequacy (CoNA)
  - From Dietary Reference Intakes for 21 macro- and micro-nutrients
  - Use a total of 35 upper and lower limits for intake (e.g. mcg/day)
  - Typically for an adult woman, also consider variation among people
  - Select least-cost foods to provide nutrients in required proportions
  - Results use 6-8 items, with large quantities of starchy staples
  - Compare to Cost of Caloric Adequacy (CoCA), just starchy staples



- Cost of Recommended Diets (CoRD)
  - From Dietary Guidelines for quantity consumed from each food group
  - Use target quantities of foods in each group (e.g. servings/day)
  - Designed for the general population, not age/sex specific
  - Select least-cost foods from each group in required proportions
  - Results use 6-8 items, with more expensive foods than CoNA

- Nutritionally-weighted Consumer Price Index (nCPI)
  - Use Nutrient Profile scores for each food's contribution to health
  - Count all foods in the CPI basket, but weighted differently

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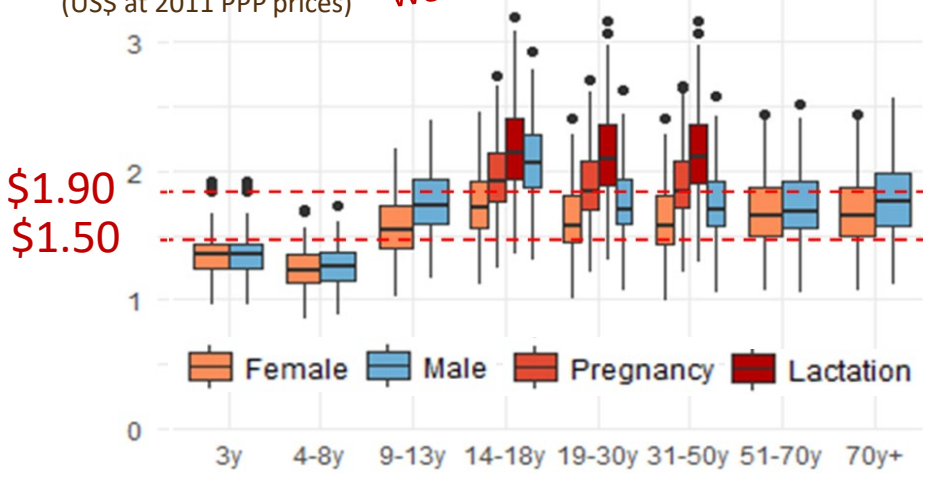
The cost of nutrient adequacy varies by life stage

Using prices for 55 items at 29 markets in all regions of Malawi, monthly from Jan. 2007 to July 2017, and their nutrient contents from the new Food Composition Table (FCT) for Malawi plus all Dietary Reference Intake (DRI) constraints

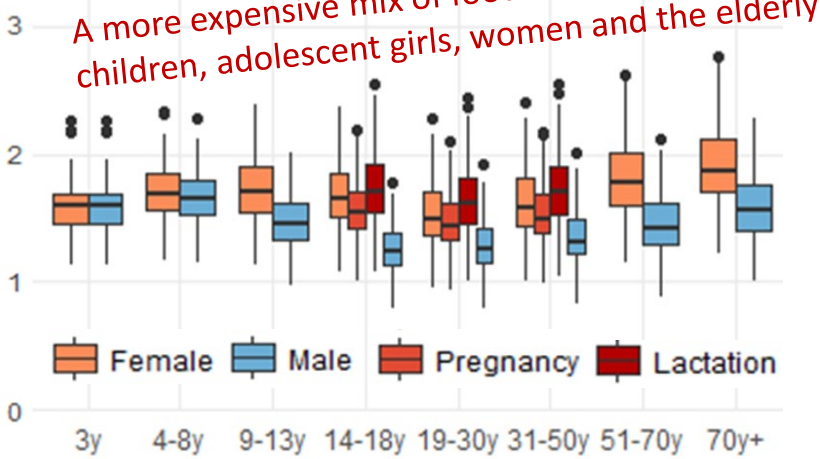
Expense is highest in pregnancy and lactation;
Well above local and global poverty lines

Cost per day
(US$ at 2011 PPP prices)



Cost per 1,000 kcal
(US$ at 2011 PPP prices)

A more expensive mix of foods is needed for children, adolescent girls, women and the elderly



Source: Y. Bai et al. (2019)

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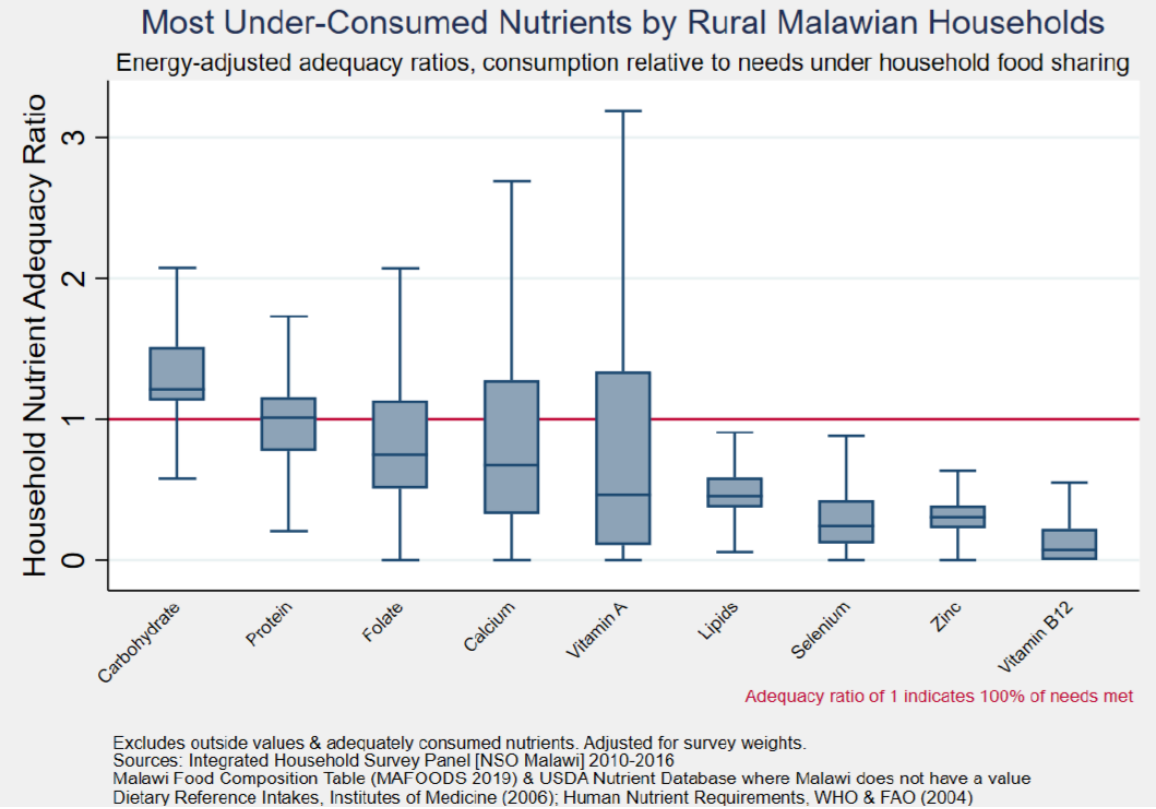
Adding up individual needs reveals nutrient gaps

Using survey data for household consumption, and uniform sharing within the household



Source: K. Schneider et al. (2019)

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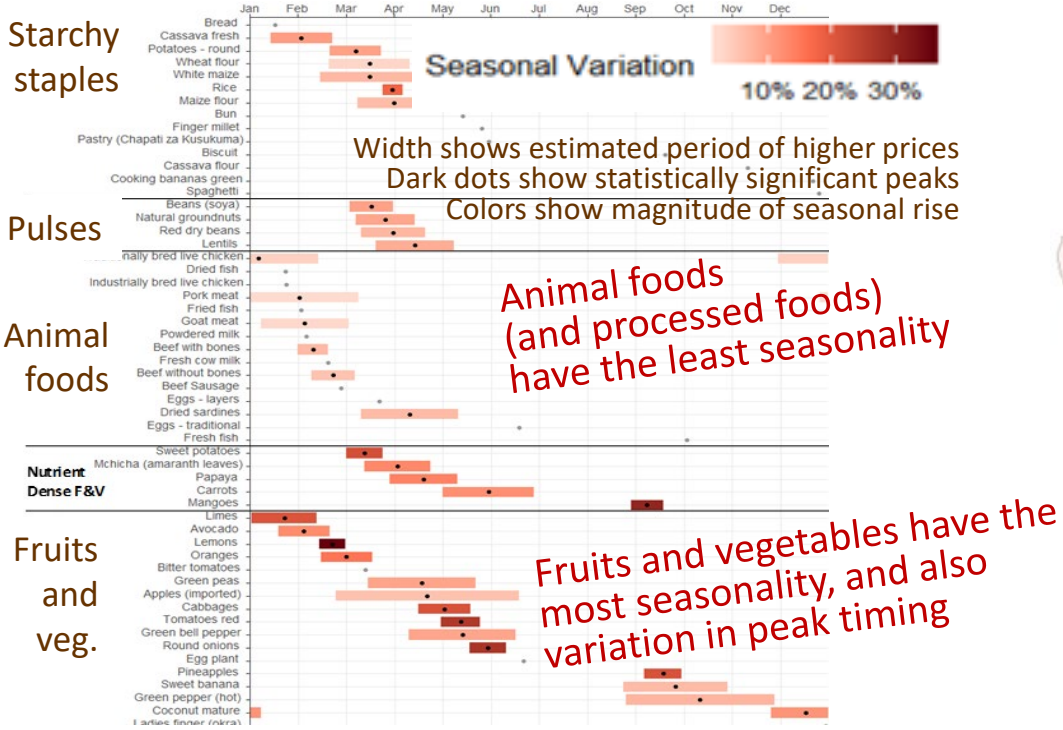
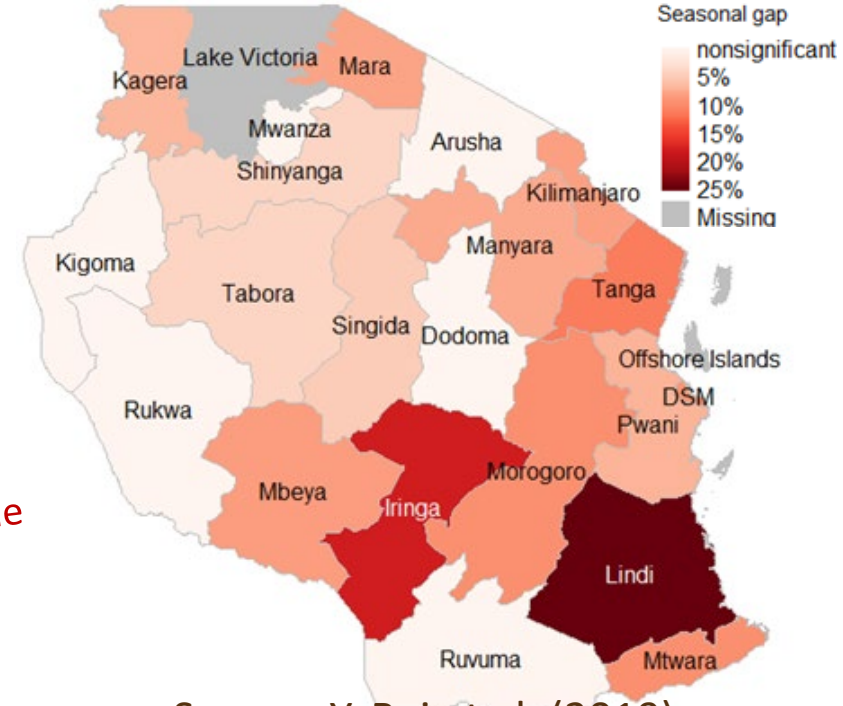
Seasonality often drives variance in diet costs

Using prices for 64 items at 21 markets in all regions of Tanzania, monthly from 2011 to 2015, with nutrient composition and all Dietary Reference Intake (DRI) constraints for a representative adult woman

Seasonality varies by type of food



Seasonality in diet cost varies by region



Source: Y. Bai et al. (2019)

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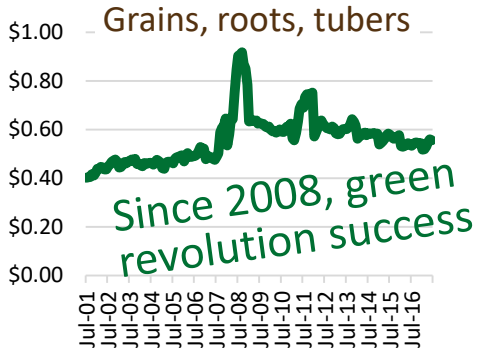
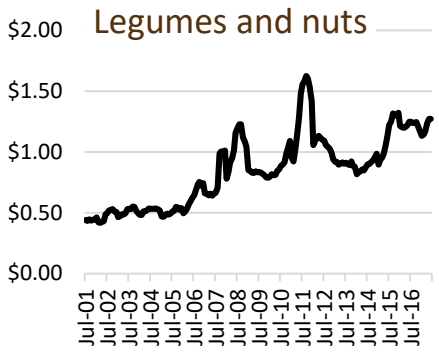
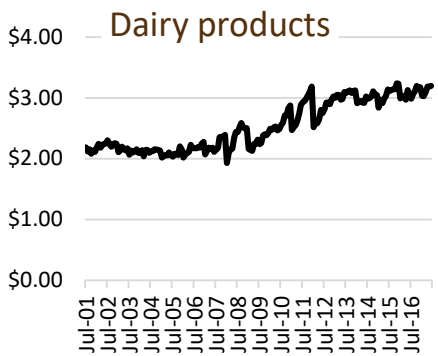
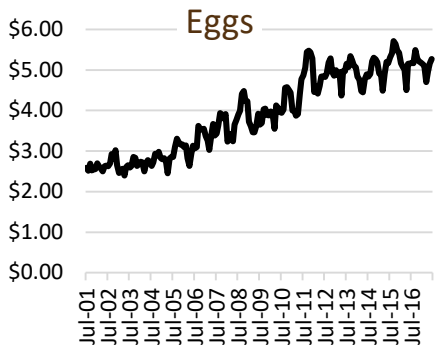
Ethiopia reveals differences among food groups

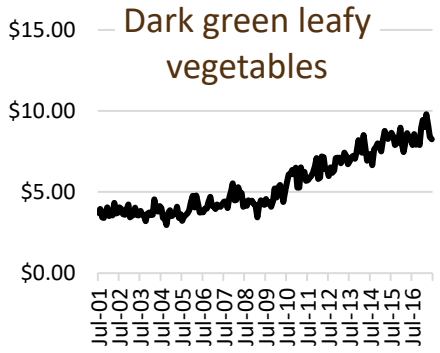
Using prices for 92 items at 120 markets in all regions of Ethiopia, monthly from 2001 to 2017

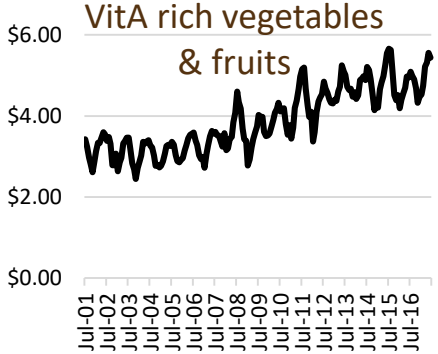


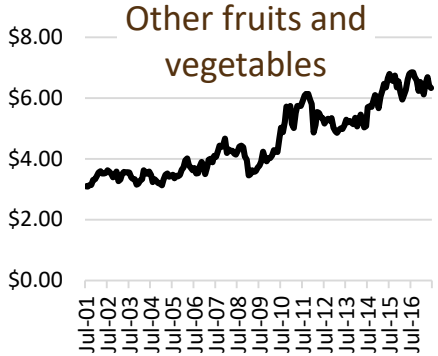


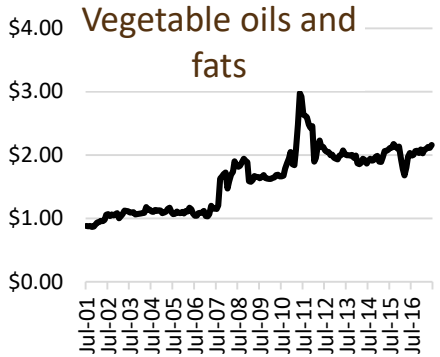












Source: F. Bachewe et al. (2019)

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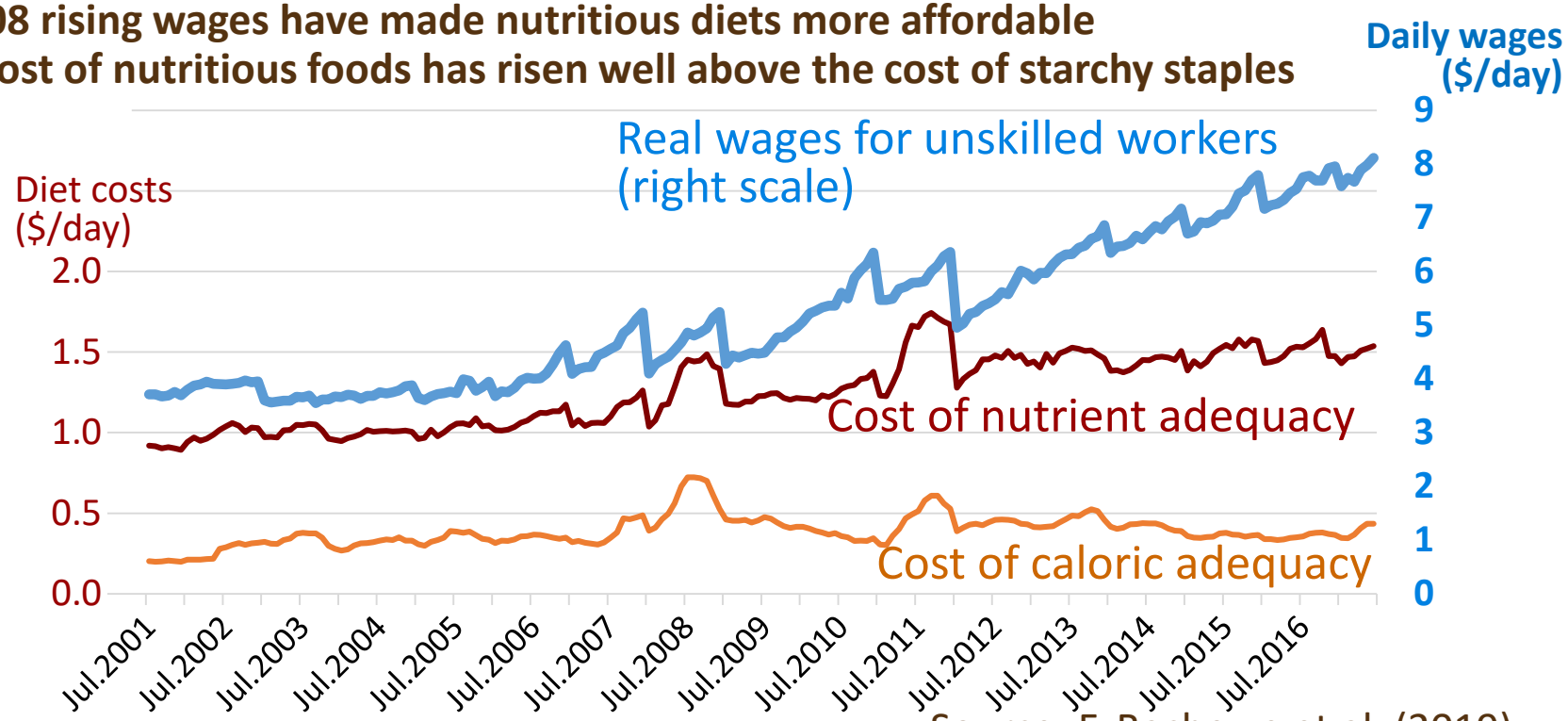
In Ethiopia, nutrients are costly but wages are up

Using prices for 92 items at 120 markets in all regions of Ethiopia, monthly from 2001 to 2017, with nutrient composition and all Dietary Reference Intake (DRI) constraints for a representative adult woman

Since 2008 rising wages have made nutritious diets more affordable but the cost of nutritious foods has risen well above the cost of starchy staples



Source: F. Bachewe et al. (2019)

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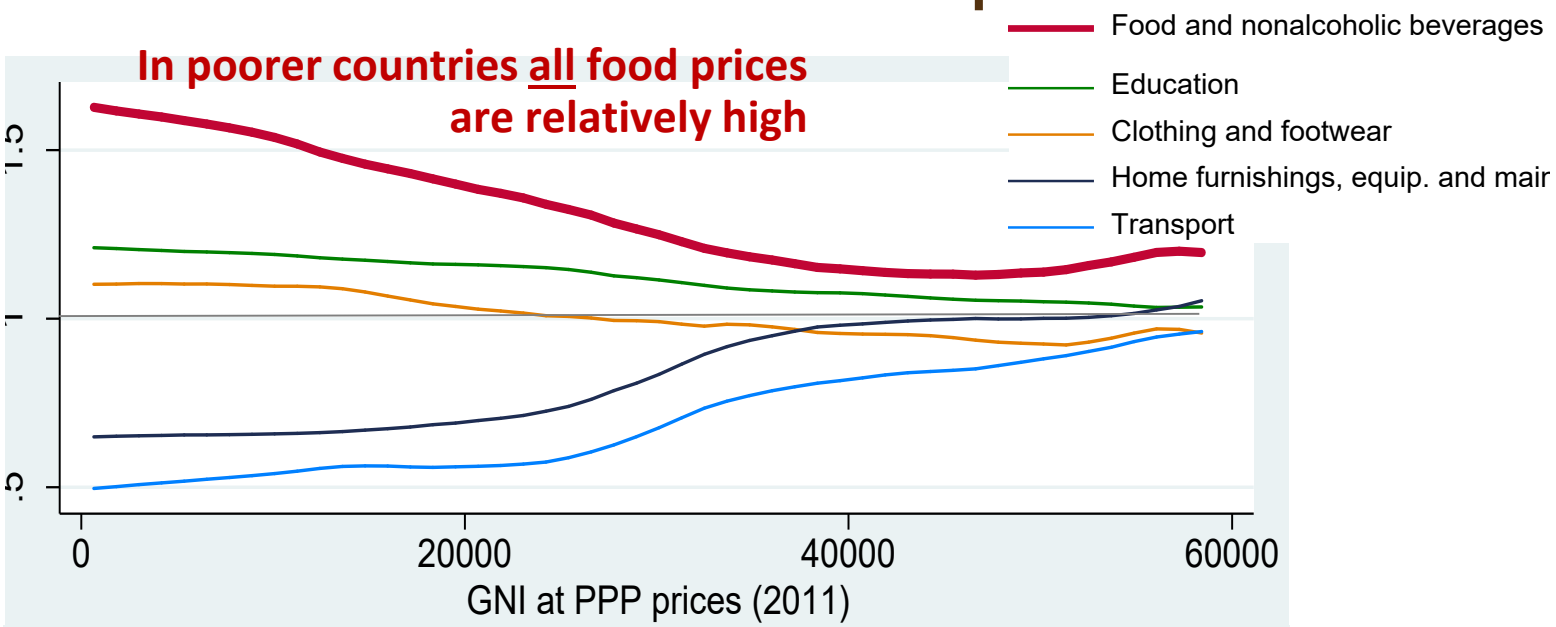
Using global data, we can trace structural change

Using nationally-representative average annual prices for 744 items in 158 countries in 2011, with nutrient composition and all Dietary Reference Intake (DRI) constraints for a representative adult woman

Price levels relative to all household expenditure



Note: Data shown are each sector's price level, relative to prices for all household expenditure at each level of GNI (US price levels = 1), for 159 countries with GNI<60,000, estimated by local polynomial regression.

Source: R. Alemu et al. (2019)

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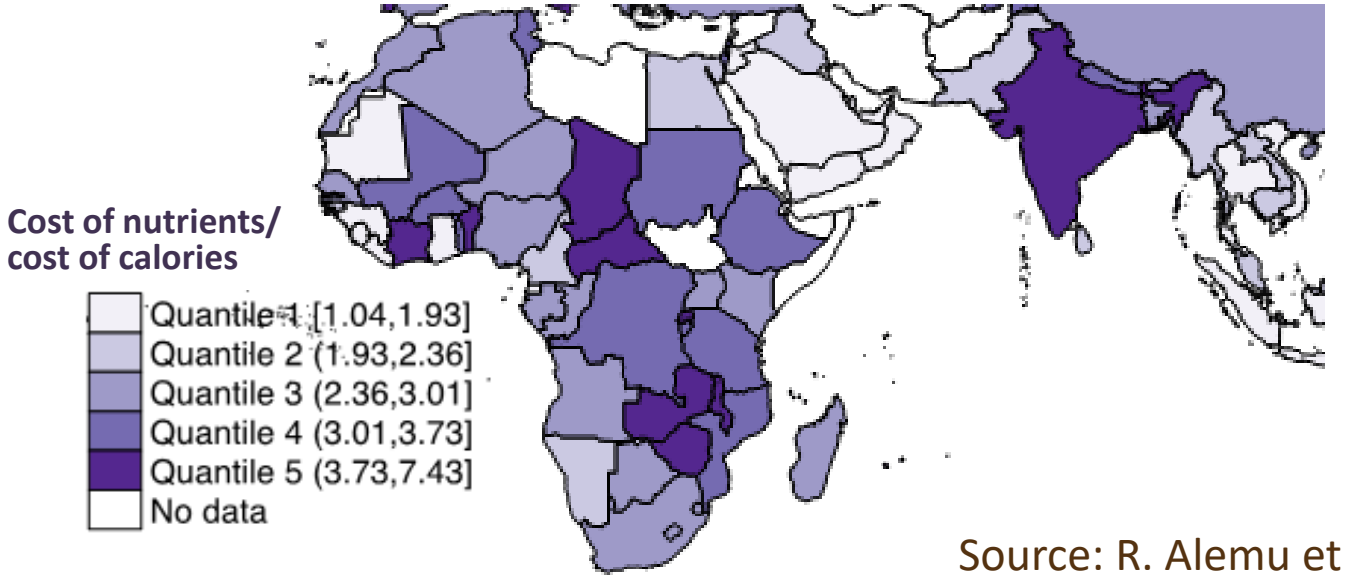
Least-cost diets reveal differences in food systems

Using nationally-representative average annual prices for 744 items in 158 countries in 2011, with nutrient composition and all Dietary Reference Intake (DRI) constraints for a representative adult woman

Cost of nutrient adequacy relative to cost of caloric subsistence

In 40% of countries, nutritious diets cost >3x the cheapest starchy staple



Source: R. Alemu et al. (2019)

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Conclusions

- The retail cost of nutritious diets varies widely and reveals systemic differences over space and time, foods and nutrients
- Initial studies in Malawi, Tanzania, Ethiopia and worldwide provide useful insights to guide policies and programs
- Here we focused on cost of nutrient adequacy which reveals:
  - Unaffordability in Malawi, especially for maternal & child needs
  - Seasonality in Tanzania, especially for fruits & vegetables
  - Divergence in Ethiopia, with success for calories but not nutrients
  - Large variance in country averages, even in Africa & S. Asia
- To advance the frontier on food systems, we have focused on:
  - Costing the whole diet with retail prices, for all foods
  - Using new food composition data, and variation in requirements
  - Drawing on all nutritional standards, including dietary guidelines and food profile scores (not discussed here)
- We have just begun to study the market cost of nutritious diets!

Photo by S. Kaiyatsa at Mitundu market, Malawi

Funding

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- Global results are due to collaboration between CANDASA and a project led by IFPRI on Advancing Research in Nutrition and Agriculture (ARENA) funded by the Bill & Melinda Gates Foundation as OPP1177007

- Details available online, at https://sites.tufts.edu/candasa

Thank you!

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