

Do household food baskets meet all individual needs?

Using Household Surveys to Estimate Nutrient Adequacy in Malawi

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Motivation

- Nutrition needs differ by age, gender, life stage and activity level, but families eat together from a shared basket of foods.
- Individual dietary data are rare in developing country settings and expensive to collect.
- Household consumption and expenditure surveys are lower cost, regularly collected, and are often nationally representative.
- Existing efforts to use household survey data to estimate individual adequacy rely on adult equivalencies, standardizing all household members as a proportion of an adult man on the basis of energy needs.

Methods: Aggregation

We develop two scenarios of household food sharing to estimate individual adequacy that:

- Are flexible to household composition;
- Include multiple nutrients which different types of individuals need in varying densities relative to their energy needs.

- 1) **Food sharing:** all members eat the same diet in proportion to individual energy needs. The nutrient density of the household diet is defined by whichever member has the highest need per calorie per nutrient.

Food sharing key assumption:

As long as each household member gets enough food to satisfy his or her energy needs, all other nutrient requirements will be met.

- 2) **Targeted diets:** individuals eat a diet perfectly tailored to individual needs. The household diet is the sum of individual diets.

Targeted diets key assumption:

Family members each receive a share of household food that meets all individual needs.

Data

- **Household panel survey** data from 2010, 2013 and 2016/17 (National Statistics Office, Malawi) provides household members' ages and genders and household food consumption of all members over a 7-day period;
- **Nutrient composition** of reported foods identified using Malawi's new food composition tables (LUANAR, Malawi), supplemented by USDA standard reference database;
- **Nutrient requirements** specified by the Dietary Reference Intakes (Institutes of Medicine, 2006 & 2011) for energy, all macronutrients, and 18 micronutrients* (EAR) using reference weights per age and gender group.

*Micronutrients included: A, C, E, thiamin, niacin, riboflavin, B6, B12, folate, calcium, copper, iron, magnesium, phosphorus, selenium, zinc

Methods: Adequacy Ratios

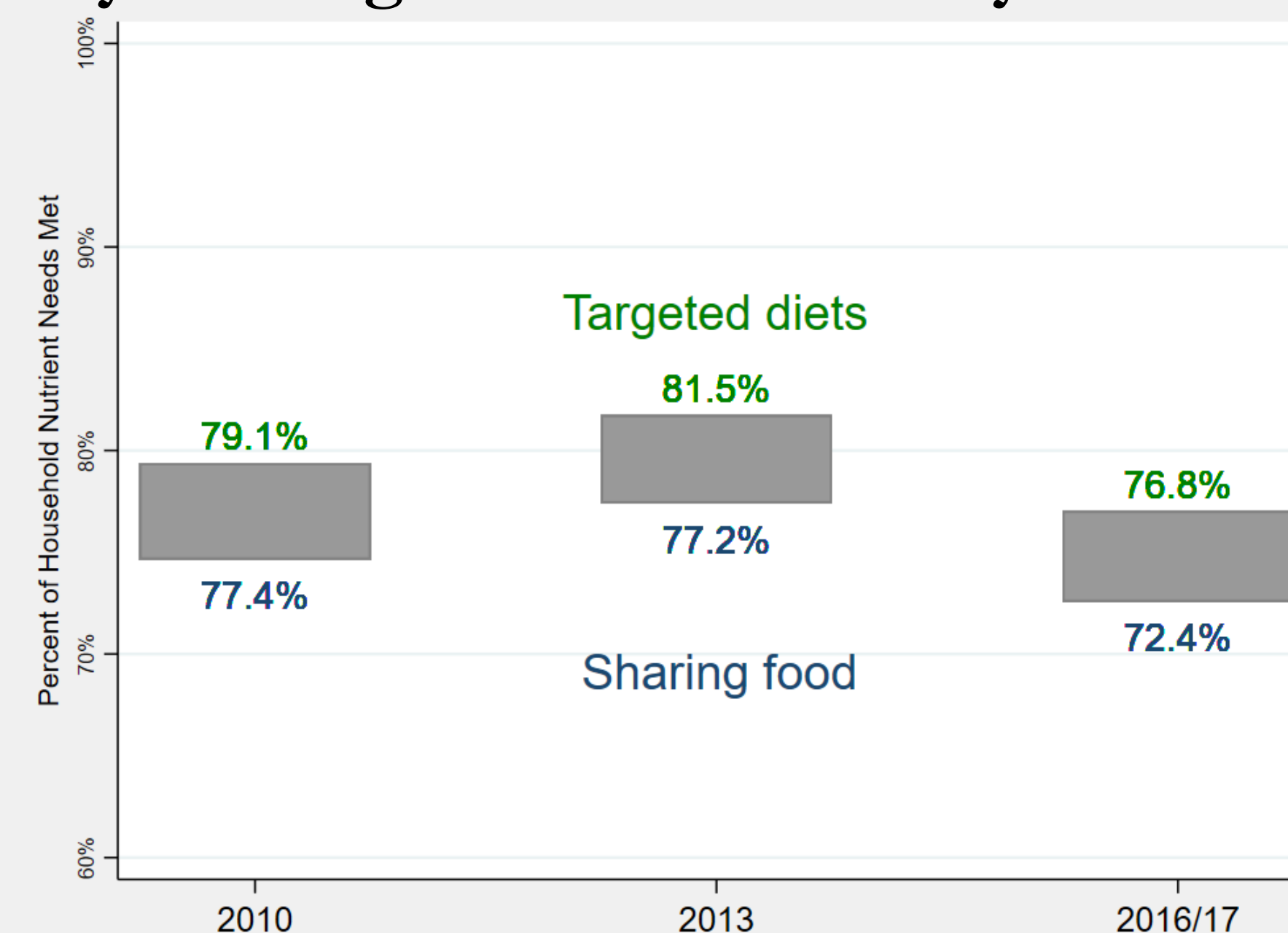
We compare reported consumption of 129 food items, matched to their nutrient composition, to household nutrient needs.

We then compute household level adequacy ratios:

- Household nutrient adequacy ratios are per nutrient
- Household mean adequacy ratio is over all nutrients

Results: Mean Adequacy

Adequacy of Household Diets over all Nutrients, by Sharing Scenario & Survey Round



Notes: Energy-adjusted Household Mean Adequacy Ratios (HMAR). Mean adequacy is the average of all Household Nutrient Adequacy Ratios (HNARs), which equal consumption relative to needs per nutrient. Nutrient adequacy ratios are truncated at 100% per standard methodology; mean adequacy by definition has a maximum value of 1. Food consumption was measured by 7-day recall of all foods consumed by any household member, reported by the member with primary responsibility for household food preparation in most cases. Sources: Integrated Household Survey Panel [NSO Malawi] 2010-2017; Malawi Food Composition Table (draft) & USDA where Malawi does not have a value; Dietary Reference Intakes, Institutes of Medicine (2006).

Results: Nutrient Adequacy

Nutrient Adequacy of Household Diets, by Sharing Scenario & Survey Round
Percent of household nutrient needs met by reported food consumption



Notes: Energy-adjusted Household Nutrient Adequacy Ratios (HNAR). Selected nutrients shown. Food consumption was measured by 7-day recall of all foods consumed by any household member, reported by the member with primary responsibility for household food preparation in most cases. Sources: Integrated Household Survey Panel [NSO Malawi] 2010-2017; Malawi Food Composition Table (draft) & USDA where Malawi does not have a value; Dietary Reference Intakes, Institutes of Medicine (2006).

Conclusions

- Our method advances the potential to use household survey data to estimate individual nutrient adequacy and assess diet quality.
- We incorporate multiple nutrient needs, in varying proportions, over different types of individuals, offering an alternative to existing equivalence methods.
- The sharing scenario accounts for the reality that households share food, often from a common pot as in Malawi.
- At best, reported food consumed by Malawian households meets around 80% of nutrient needs, on average.
- Nutrients found in animal source foods, such as B12 and calcium, are particularly lacking in household diets.
- One limitation is that food consumption may overestimate adequacy of zinc and other minerals, due to low bioavailability, when they are provided primarily by plant-based sources.

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