# Use of Household Consumption and Expenditure Survey Data to Predict Quality of the Diet and Potential Strategies to Fill Micronutrient Gaps

**Monica Woldt,** Senior Technical Advisor, USAID Advancing Nutrition; **Erin Milner,** Senior Nutrition Monitoring, Evaluation, and Learning Advisor, U.S. Agency for International Development (USAID) Bureau for Global Health; **Omar Dary,** Health Science Specialist, Nutrition, USAID, Bureau for Global Health; **María Teresa Menchú,** Nutrition Advisor, Specialist in Food Intake Studies, Institute of Nutrition of Central America and Panama; **Humberto Méndez,** Food Security and Nutrition Monitoring and Evaluation Specialist, Institute of Nutrition of Central America and Panama

## BACKGROUND

Lack of national/sub-national dietary intake data is a barrier when designing programs to fill population-level nutrient gaps. Simple methods for determining food-intake patterns can help decision makers—

- identify gaps in micronutrient intake
- identify commonly consumed staple foods that might serve as vehicles for fortification
- design, predict impact of, and implement programs to improve micronutrient intake through fortification or other means (e.g., supplementation)

To help decision makers in their planning, this study explored the use of secondary analysis of routinely collected (every 3–5 years) household consumption and expenditure survey (HCES) data to identify risk of micronutrient gaps, main food sources for micronutrients, and potential vehicles for food fortification.

## RESEARCH METHODS

Analyzing data from **Guatemala, Honduras, and Nicaragua,** the study team relied on the expenditure or acquisition of food recorded in the HCES surveys to estimate apparent micronutrient inadequacy for households at different strata per geographic area or wealth quintiles. We determined micronutrient adequacy by comparing nutrient density of the diet (apparent consumption of micronutrient per 1,000 kilocalories) with the estimated average requirement (per 1,000 kilocalories) for non-pregnant and non-lactating adult women and children 2–4 years of age. We estimated the percentage contribution of different foods to the total availability of micronutrients to identify the main food sources of each micronutrient. We also determined household consumption of commercially processed staple foods that decision makers could fortify, considering coverage and apparent consumption.

## FINDINGS

### Risk of Inadequate Micronutrient Intake and Main Food Sources

- We found risk of inadequate **calcium, iron, and zinc** intake across all socio-economic groups for all three countries, except of zinc among non-poor children 2–4 years of age in Honduras.
- Among the extreme poor, women and young children had a risk of inadequate **vitamin B12** intake across all three countries.
- Potential for inadequate intake of the greatest number of micronutrients was found among impoverished women in **Guatemala** (8), followed by impoverished women in **Nicaragua** (7), and **Honduras** (5). We found similar results for poor children.
- Corn tortillas and beans were the primary sources for several micronutrients among impoverished households in all three countries.
- Current sugar fortification is preventing nutrient inadequacy of vitamin A for all three countries.
- Wheat flour fortification is correcting for or reducing nutrient inadequacy of iron, folic acid, thiamine, riboflavin, and niacin among the non-poor in Guatemala and Nicaragua, and among all groups in Honduras.

**Table 1. Risk of Inadequate Micronutrient Intake for Non-Pregnant, Non-Lactating Women 15–49 Years of Age and Children 2–4 Years of Age in Guatemala, Honduras, and Nicaragua, via Analysis of HCES Data in Each Respective Country (Risk Indicated by Red Shading)[a]**

| | Guatemala | | | | Honduras | | | | Nicaragua | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Non-poor | | Extreme Poor | | Non-poor | | Extreme Poor | | Non-poor | | Extreme Poor | |
| **Nutrient** | Women | Children 2–4 yrs | Women | Children 2–4 yrs | Women | Children 2–4 yrs | Women | Children 2–4 yrs | Women | Children 2–4 yrs | Women | Children 2–4 yrs |
| Calcium | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Iron | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Zinc | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | ■ |
| Vitamin A (with fortified sugar) | | | | | | | | | | | | |
| Thiamine | | | | | | | | | | | | |
| Riboflavin | | | ■ | ■ | | | | | | | ■ | |
| Niacin | | | | | | | | | | | | |
| Folate (with fortified wheat flour) | | | | | | | | | | | | |
| Vitamin B12 | | | ■ | ■ | | | ■ | ■ | | | ■ | ■ |
| Vitamin C | | | ■ | | | | | | | | ■ | ■ |

**a.** Risk of inadequate intake defined as greater than 50 percent of the population with an intake below the EAR/1,000 kilocalories for each group (non-pregnant, non-lactating women 15–49 years and children 2–4 years of age).

# Household consumption and expenditure surveys may be used to predict diet quality and identify foods for fortification.

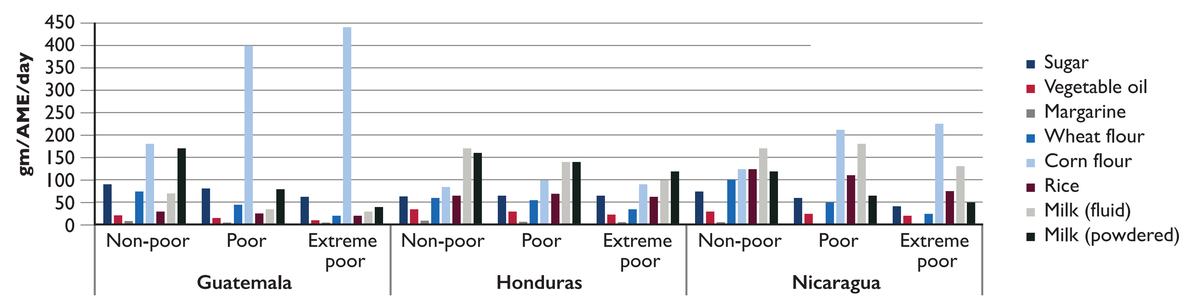
**Table 2. Main Food Sources of Micronutrients for Poor and Extreme Poor Households in Guatemala, Honduras, and Nicaragua, via Analysis of HCES Data in Each Respective Country[a]**

| | Main Food Sources of Micronutrients | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nutrient** | Corn Tortillas | | | Beans | | | Meat/Poultry | | Milk | Eggs | | | Tomato | Citrus Fruits | Banana/Plantain | |
| Calcium | ■ | ■ | ■ | | | | | | | | | | | | | |
| Iron | | | | ■ | ■ | ■ | | | | | | | | | | |
| Zinc | | | | ■ | ■ | ■ | | | | | | | | | | |
| Thiamine | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | |
| Riboflavin | ■ | ■ | ■ | | | ■ | | | | | | | | | | |
| Niacin | ■ | ■ | ■ | | | | | | | | | | | | | |
| Folate | | | | ■ | ■ | ■ | | | | | | | | | | |
| Vitamin B12 | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | | | | |
| Vitamin C | | | | | | | | | | | | | ■ | ■ | ■ | ■ |

**Key:** ■ Guatemala ■ Honduras ■ Nicaragua

**a.** Main food source defined as providing more than approximately 20 percent (range 20–76 percent) of the total micronutrient per day for poor or extreme poor households.

**Figure 1. Median Grams of Potential Fortification Vehicle Available per Household per AME per Day, by Country and Income Group**




## POTENTIAL FORTIFICATION VEHICLES

- **Sugar, rice, and milk** for the poor and extreme poor in all three countries and improving access to milk among impoverished households
- **Wheat flour** among urban populations and those with a higher socio-economic status in Guatemala and Nicaragua and among all groups in Honduras

## ADDITIONAL RECOMMENDATIONS

- Consider adding **zinc and vitamin B12** to identified fortification vehicles.
- Study possible deficiency in **riboflavin and vitamin C** among the poor and extreme poor.
- Review vitamin A fortification content in sugar to minimize risk of excessive intake.
- Consider conducting dietary and biochemical analysis of **iron status**.

## CONCLUSION

Our findings suggest that the use of HCES data has a **high potential to**—

- easily and quickly predict micronutrients for which populations may be at risk
- identify main micronutrient sources
- explore potential fortification vehicles and the need for other strategies to fill nutrient gaps.

Further work should validate the study findings in various settings and target groups.

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