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A Consistent Food Demand Framework for International Food Security Assessment

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What Is the Issue?

The International Food Security Assessment (IFSA) model—used by USDA’s Economic Research Service to project food gaps and the number of food-insecure people in 76 low- and middle-income countries—will be improved to take advantage of food price data that have become available since the model was first specified in the mid-1990s. In doing so, the model will be placed on firm microeconomic foundations. Furthermore, after dividing the population into 10 groups based on income, the calculation of food demand per decile will be changed to allow aggregation to a market demand that is consistent with average consumption data. Also, food quality is allowed to vary depending on the income level of consumers. The new demand framework will be the basis of ERS International Food Security Assessments starting in 2016. A prototype has been developed for Tanzania, which serves here to illustrate the new model features.

What Are the New Model Features?

The new modeling approach captures economic behavior by making food demand systematically responsive to income and price changes. The difference in food quantity consumed between a country’s lowest and highest income groups is diminished by introducing the “quality” scaling factor that allows lower income consumers to purchase lower value food items within a food group at a lower price compared with higher income consumers. By setting the average scaling factor to 1, aggregated demand across income deciles remains unchanged. Finally, a country’s projected change in food consumption can be apportioned to its main drivers: population growth, income growth, and changes in food prices and real exchange rates. The new approach will allow a closer examination of key drivers of food insecurity.

The modeling framework has several new features:

- Demand can be aggregated across income deciles to arrive at a consistent measure of average market demand;
- Food quality is modeled to increase with income;
- Price and income responses become less sensitive as income increases; and
- Greater income inequality reduces average per capita food consumption.

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How Does the New Model Work?

The improved modeling approach is based on a simple price-independent generalized logarithmic (PIGLOG) demand approach for four food categories (major grain, other grains, roots and tubers, and “all other” foods), a general specification well-grounded in microeconomic foundations. Grains and roots/tubers make up between 50 and 80 percent of the diet in most low- and middle-income, food-insecure countries. The new approach allows for an explicit aggregation of demand over 10 income deciles for each food category to an aggregate market demand and relies on data currently available for the International Food Security Assessment model, complemented by own-price and income elasticities, and additionally available price data.

The new approach is illustrated for Tanzania, which was chosen because the country is part of the U.S. Federal Government’s Feed the Future program and because consumption data are robust due to several recent household surveys.