Outline

- A brief historical account
  (to put the debate in perspective)

- Current status

- Scope for advancements
  - in the short-medium term
  - perspectives for the longer term future

History of food security assessment

- In the early 1960's, P.V. Sukhatme (head of FAO's statistical division from 1952 to 1970) developed the basis of a probabilistic approach to estimate the likely proportion of people having insufficient caloric intake
  - Still the basis for the FAO Prevalence of Undernourishment indicator
    - the interpretation of some of its statistical underpinning has been revised over the years (see Naiken, 2007)
  - Clarifies the probabilistic nature of any statement about the prevalence of food deprivation in a population
  - Allows for the combination of macro and micro level data in a theoretically consistent framework

History of food security assessment

1. **Early stages: food supply**
   - An aggregate measure
   - Food security seen a scarcity problem
2. **Prevalence of undernourishment**
   - Measured at the aggregate level (global, national)
   - Recognition of constraints to food access
3. **Anthropometric measures**
   - Measured at the individual level
   - Focus on the biological consequences of food inadequacy
4. **What next? …**
   - Subjective assessments of food insecurity status, aiming at capturing a broader concept of food security

History of food security assessment

- Early stage: food supply assessment
  - Set the stage for FAO statistics work, still one of the founding objectives of the institution (and rightly so!)
  - Emphasis on increasing food production
  - As evidences of local/temporary food surpluses became recurrent, it lost momentum, only to come back with a vengeance when episodic price crises occurred (1974, 2008)
  - Are we sure there is no food scarcity problem? (water, biofuels...)

History of food security assessment

- The FAO indicator was selected as the 1996 World Food Summit target indicator (to reduce the number of people suffering from hunger) and later as the MDG hunger indicator

- As it gained recognition and visibility through publication of the State of Food Insecurity (SOFI) periodic report, critics have become more vocal

- Criticisms could be raised at three different levels
  - On the statistical concept (and the corresponding operational definition of food insecurity being measured)
  - To the way in which the concept is measured through available data
  - On the quality of the available data

History of food security assessment

- The debate has been conditioned by failure to distinguish among the three levels
  - Svedberg (1996) -> critical of the concept of an input based indicator, promotes use of outcome-based indicators of nutritional status, such as indexes of anthropometric failure, levels a (mistaken) criticisms of the statistical methodology
  - Smith (1999) -> critical of the use of FBS data and of the statistical procedure followed by FAO, proposes a conceptually simpler analysis of household surveys data, reminiscent of head-count methods for poverty assessments
- The FAO 2002 Symposium was conveyed to clarify the scope and validity of the criticisms
  - A lost decade since? Not really…

History of food security assessment

- Where do we stand now
  (CFS 2011 RT on Measuring Hunger)
  - We understand that food insecurity comprises conceptually different dimensions (availability, access, utilization, stability) that can be defined at different levels (chronic vs. short-term; population, subpopulation groups, household)
  - Different indicators capture different dimensions of food insecurity at different levels, and therefore they should not be seen as substitutes
  - Rather than dismissing the usefulness of some approaches, we should explore the complementarities between different measures -> a suite of indicators to assess the state of food insecurity
  - Input based approaches, such as the analysis of food supply and distribution are still of paramount importance. Efforts needs to be made to apply them also at more disaggregated level.

The FAO method

- The method is based on the following principle: an individual's average consumption of a certain nutrient over a given time reference (i.e., a measure of his or her habitual food consumption) could be compared to a normative value for that individual's requirement of the same nutrient, to establish adequacy of intake over that reference period of time
  - What is the relevant reference period? The quality of the data is conditional on the answer
- However, observation of both habitual nutrient consumption and individual nutrient requirements is costly
- We need to estimate both consumption and requirements from possibly incomplete and imprecise information, thus the need for a statistical model

The FAO method

- Key inputs into the FAO methodology are
  - the data on average food supply available in a country, obtained from country's food balances
  - the data on household food consumption (obtained from nationally representative household surveys) used to estimate the dispersion of food consumption in the population

The FAO method

- The surveys initially used by FAO were mostly household budget or expenditure surveys, recording households' expenditure on food
    - Even when surveys collect data on food quantities, these quantities refer to acquisition (not necessarily consumption) over a (usually short) reference period
    - Expenditures and acquisitions need to be converted into quantities of nutrients using specific conversion tables, the resulting data can be used to estimate the distribution of the corresponding nutrient consumption in the population

The FAO method

- Reliance on household survey data must consider that:
  - part of food consumption may not be captured by the household survey data (for example, F(C)AFH)
  - observations referring to short time reference contain excess variability due to both idiosyncratic (illnesses, presence of guests, etc.) and systemic factors (seasonality, food price level, etc.)
  - the **empirical distribution of per capita caloric consumption** that can be obtained from the surveys **cannot be considered a distribution of habitual calories intakes**, even after significant data checking and cleaning (too many values are too low or to high to be credible levels of caloric intake)

Improvements in estimates: Details of the revisions in data

- New assessments of national level food supplies
  - **Food Balance Sheet** series updated for all countries up to 2009. Preliminary estimates for 2010, 2011 and 2012 based on the trends observed through FAO commodity balances for the major food commodities (covering about 80% of the caloric supply, on average)
- New population data
  - UN Population Division revision 2010 of the World population data introduce **major changes in population data** for some large countries (i.e., China, Bangladesh, Myanmar, Indonesia, Pakistan and Afghanistan)
    - Two impacts on estimated figures: effect on per capita DES, different number of undernourished

10/30/2012

Details of the revision: data

- New data on the distribution of habitual (i.e., annual average) food consumption
  - **58 national household surveys** been analyzed to derive parameters of the distribution of households' access to calories (CV and Skewness)
  - Revision included parameters for 45 countries, representing **almost 70% of the undernourished** population in the world in 2009
- New assessment of **Minimum Dietary Energy Requirement**
  - Estimates of MDER revised based on **improved data on people's stature** (Demographic and Health Surveys and other household surveys data with anthropometric modules)
    - From a minimum of **1651** Kcal/day for Timor Leste, to a maximum of **1991** for the Netherlands

Details of the revision: methods

- Projections of the estimates up to 2012, based on projecting the various parameters of the distributions, according to the latest available information
  - No scenarios
- Revision of the household level caloric availability, by taking into account losses occurring during distribution at retail level due to wastage, based on the finding of the FAO study on Global food losses and food waste. Extent, causes and prevention.
  - Caloric losses are estimated at an average of about 3% of DES, with difference by year and by country due to the different composition of the aggregate food supply.

Details of the revision: methods

- New **statistical model for the distribution** of food consumption in the population
  - The Skew-Normal distribution instead of the Log-Normal, to give **more flexibility** to capture changes in the symmetry of the distribution

- Improved **estimation of the distribution's parameters**
  - Correction for excess variability due to presence of outliers and to recording food acquisition rather than food consumption data

Improvements: What to do?

- Improving Food balance Sheets
- More and better data from Household Surveys
- Complementing the PoU with other indicators, capturing different dimensions of food insecurity
  - Outcomes of malnutrition (broadly meant)
  - Economic cost of accessing food

1. Assessing Food Supply

- Two tier approach,
  - improving on the elementary data
  - refining procedures for "filling the data gap"
- Areas of improvement
  - Post Harvest Losses (PHL) and waste factors
  - Feed estimates, livestock parameters
  - Stocks
  - …
- Some examples
  - Use of independent observations (i.e., from HH surveys) to check consistency of various contributors to food availability (by food item, in each country)
  - Use of robust statistical procedures for imputation

2. Assessing Food Access

- Better surveys' design, to increase the ability to capture food consumption data that are better suited for food security analysis
  - By integrating food consumption modules within larger surveys
  - Improving methods to assess habitual dietary intakes
  - By defining minimum criteria and procedural guidelines for data collection and treatment in the field
- Use of external information (including FBS) to calibrate the distribution of food consumption used to draw inference

3. Exploring new perspectives

- Reaching households to collect information is a precious opportunity to collect more than food consumption data
  - Subjective assessments of household food insecurity can be obtained by interviews, thus providing insights into the broader welfare impact of food insecurity
  - Easy to measure relevant anthropometric characteristics of household members can be obtained, by allowing to better assess requirements and nutritional status
  - Specialized polls for a rapid assessment of the changing perception of food insecurity at the household level

Concluding remarks

- Involving countries
  - Will bring a feasibility dimension to all discussions
  - Imperative to ensure the highest possible data quality *in practice*
- The role of the research community
  - While debate is a healthy element, there is the need to better coordinate to avoid sending confusing signals
  - The need for proper treatment of incomplete data will never disappear, so that the role of statistical analysis is crucial. There is ample scope for cross-fertilization of methods used by economists and methods used by nutritionists

Thanks

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