IMPROVING AGRICULTURAL & RURAL STATISTICS
Global Strategy

Food Balance Sheets

FBS component: Food availability

Learning objectives

The participants will know:

a) What Food availability data are and their role in the FBS setting
b) What are the Food availability data sources (official and non-official)
c) How to estimate Food availability data

Outline

1. Concept of “Food Availability” in the FBS setting
2. Data sources:
   a. Official data sources
   b. Alternative data sources
3. Imputation and Estimation
   a. Recommended Approach
   b. Alternative Approach

1. Concept of "Food Availability"

Food availability (in the FBS setting) *refers to quantities of any substance, whether raw, processed or semi-processed (including drinks) available for human consumption during a given reference period at the retail level by the country's resident population.*

IN	OUT
Any waste (or loss) at the retail or consumer level	Food available for tourists (Tourist Food component of the FBS)
Food available for refugees and guest workers	

1. Concept of "Food Availability" (Cont.)

Food availability, not food consumption!

- Apparent food consumption ≠ Effective food consumption
- Food availability from FBS > Food Consumption from NHS

  (especially in the developed countries)

Dietary Energy Supply (DES) estimates are based on food availability estimates at SUA level!

1. Data Measurement Issue

- Directly measured data are difficult to obtain.
- Estimates can be derived by making certain adjustments to other existing datasets measuring **food production** or **consumption**.

Key issue:

- understanding exactly how the measured quantities differ from the FBS food availability definition
- ensuring that each one of these differences is accounted for in the adjustment process (**recommended action**)

2. Food availability Data Sources

Official data sources:

- **Industrial output surveys**
- **Household consumption or expenditure surveys**

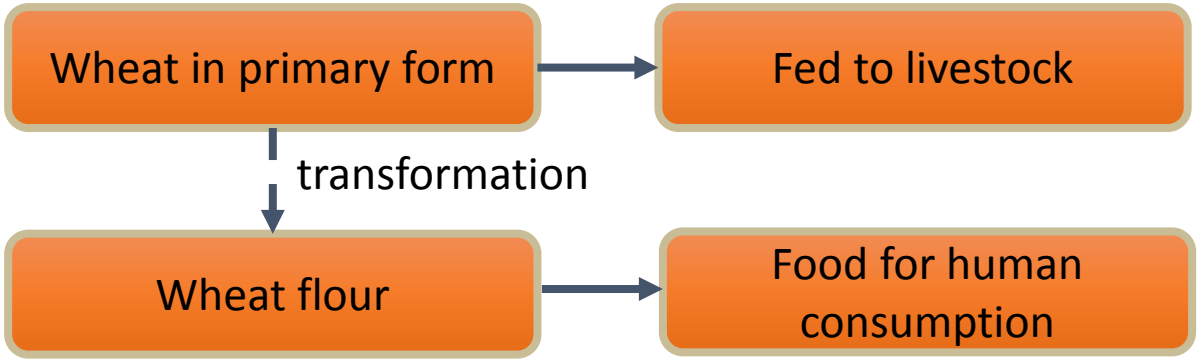
Alternative data sources:

- Non official channels (e.g. industry groups, processor associations or a handful of firms)
  - Check the **representativeness** of the data and make **adjustments** as necessary (e.g. if a wheat flour millers' association represents approximately 80% of the total market, it is possible to derive a total production of flour used for food simply by dividing by 0.8)

2. Industrial Output Surveys

Official data on **food availability** from food processors (including flour mills, oilseed crushers, dairy processors, or breweries)

- Data are useful for food estimates because they represent so-called “bottleneck” industries
  - e.g. wheat industry (not in all countries)



2. Industrial Output Surveys (Cont.)

Cons:

- Data needs to **represent** a large proportion of total production (these sources are useful)
- Data sources will **only** be available to facilitate estimation of foods that are **processed** (e.g. fresh fruits and vegetables are excluded)
- Estimates of industrial output for food manufacturers may in some cases only be available in **value terms**
- Output data for food processors are technically **production quantities** and **not food availability values** for those SUA-level items (e.g. other uses must be netted out)

Pro:

- Data will **cover processing use for all consumption** occurring within a country (including schools, hospitals, jails, or military installations)

2. Household Surveys (HS)

Official data on **food consumption** at the household level:

- **Do not cover all consumption** occurring within a country in a given period (e.g. exclude food consumed outside of the home)
  → HS data represent conceptually a "**lower bound**" for food availability.

- Even if **calorie estimates** can vary widely between HS and FBS, **shares** of individual food groups in overall consumption (HS data) or availability (FBS data) tend to remain consistent (**Grünberger, 2014**)

  → HS data may prove very useful in **estimating** or **imputing food availability**, provided that FBS compilers take note of, and adjust for, the other limitations of household surveys.

2. Household Surveys (Continued)

Limitations:

- Data collected for a **brief period of time**
- **Infrequent** data collection (e.g. every 4 or 5 years)
- HS may miss some **under-represented** subgroups (biased consumption estimates)
- HS will entirely **miss consumption** occurring in restaurants/public places, schools, prisons, hospitals, and military installations
- HS often collect data **only in expenditures** and not quantities
- Surveys will **not include** any accounting for **food waste** at the retail level, and may not include food waste at the household level either, potentially underestimating total food availability

3. Imputation and Estimation

Recommended Approach: modelling food availability in the current year based on availability levels in the previous year, but by making adjustments for changes in **income**, **population** and the overall trend in **food availability**.

Linear equation for food availability (using only population, trend, and food use in the previous period):

$$Food_t = \frac{Population_t}{Population_{t-1}} * Food_{t-1} * (1 + \phi)$$

ϕ is the historical trend in food availability (e.g. growth rate). It should be estimated from a regression on the historical data series.

3. Imputation and Estimation (Cont.)

Recommended Approach:

Semi-log equation for food availability (using additional information):

$$Food_t = \frac{Population_t}{Population_{t-1}} * Food_{t-1} * \left[1 + \epsilon + \log\left(\frac{Income\ per\ capita_t}{Income\ per\ capita_{t-1}}\right) + \phi\right]$$

- **ϵ = % Δdemand / % Δincome**, is the product-specific elasticity of demand (e.g. ϵ = 0.1 for a given good indicates that for every 10% increase in income, demand for the product rises by 1%)
  - Data on ϵ for food categories are produced by USDA (2010)
- If **Income** is not available please use a proxy as **GDP** (ϵ formula is still valid)

There is some suggestion to substitute GDP with consumption from the National Accounts. This option will be evaluated in a short time.

3. Imputation and Estimation (Cont.)

Alternative approach: food availability is calculated as the **balance of production minus net trade** (and any other small utilization elements)

Cons:

- in food use will **accumulate all of the error from the other utilization** elements. It is most appropriate for products that have no or few other utilizations.

Note:

- in the final **validation and balancing process**, **food availability estimated** using either approach may be **adjusted**.

References

- Global Strategy to improve agricultural and rural statistics, 2017. *Handbook of Food Balance Sheet*, Rome, Italy, chapter 3.5, section 3.5.4

- Grünberger, K. 2014. *Estimating Food Consumption Patterns by Reconciling Food Balance Sheets and Household Budget Surveys*. FAO Statistics Division Working Paper Series No. ESS/14-08. Available at: http://www.fao.org/3/a-i4315e.pdf. Accessed on 19 January 2017.

- USDA (2005). This database is publicly available, at: http://www.ers.usda.gov/data-products/international-food-consumption-patterns.aspx.

Thank You