

Food Balance Sheets (FBS) - Module8

1. Module 8

1.1 Welcome



Notes:

Welcome to the Food Balance Sheet (FBS) course. This course will help you to understand basic concepts and main uses related to FBS, as well as the process of compiling FBS. This course consists of 11 lesson equipped with exercise and assessment test that will take place at the end of the course.

1.2 Lesson objective

Suggested data sources and imputation: Food availability and loss

Lesson objective

In this lesson we will learn about the Food Balance Sheet (FBS) with respect to:

1. Different data sources for food availability and loss;
2. Recommended approach for imputation and estimation of food availability and loss.



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Notes:

1.3 Outline

Suggested data sources and imputation: Food availability and loss

Outline

- Official data sources for food availability
- Alternative data sources for food availability
- Imputation and estimation for food availability
- Official data sources for loss
- Alternative data sources for loss
- Imputation and estimation for loss.



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Notes:

1.4 Official data sources

Suggested data sources and imputation: Food availability and loss

Official data sources

[Food availability](#)

Two primary types of official data sources may provide information useful to the estimation of a country's food availability:

Industrial output survey	Household survey
The first potential source of data is industrial output surveys from food processors, including flour mills, oilseed crushers, dairy processors, or breweries. These data are useful for food estimates because they represent so-called "bottleneck" industries, through which all quantities of the primary commodity that will be used as food must first pass before they become edible.	Household surveys provide a detailed portrait of consumption at the household level. However, food consumed outside the home may not be fully captured. As such, household surveys can, in most cases, be considered to provide a conceptual "lower bound" for food availability.

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Notes:

1.5 Official data sources

Suggested data sources and imputation: Food availability and loss

Official data sources

[Food availability](#)

Industrial survey

Things that need to be considered:

- These data sources will only be available to facilitate estimation of foods that are processed.
- These sources are only useful in countries where most processed food production occurs at the industrial level and not at the farm or artisanal level.
- Estimates of industrial output for food manufacturers may in some cases only be available in value terms.
- In order to use this data to arrive at an estimate of food availability at the SUA level, other uses (exports, stock changes, tourist food) must first be netted out.

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Notes:

1.6 Official data sources

Suggested data sources and imputation: Food availability and loss


Official data sources

[Food availability](#)

Household survey

While household surveys do provide a detailed portrait of consumption at the household level, food consumed outside the home may not be fully captured. As such, household surveys can, in most cases, be considered to provide a conceptual “lower bound” for food availability.

Using consumption figures derived solely from household surveys will likely underestimate total food availability within a country, and do so by potentially large margins in countries where a large portion of calories are consumed away from home, and are therefore not accounted for in the survey.



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Notes:

1.7 Official data sources

Suggested data sources and imputation: Food availability and loss

Official data sources

[Food availability](#)

Household survey

Limitations of household surveys:

- Data are typically collected only for a brief period of time, but strictly annualizing the data may be problematic for countries where consumption varies between seasons.
- Data may be collected only infrequently every four or five years, such that quantities may need to be adjusted for subsequent years
- Surveys may miss some underrepresented subgroups, thus biasing consumption estimates when extrapolated to the total population.
- Household surveys will entirely miss consumption occurring in schools, prisons, hospitals, and military installations.
- Although it is increasingly less common, household surveys sometimes collect data only on 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.

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Notes:

1.8 Alternative data sources

Suggested data sources and imputation: Food availability and loss


Alternative data sources

Food availability

For food processor statistics, FBS compilers may wish to either consult industry groups, processor associations, or even a handful of firms (provided that they collectively account for a large share of the total market) to assess the availability of data at the first-line processor level.

For example, if a wheat flour millers' association represents approximately 80 percent of the total market, then data on output from the association could be used to derive a total production of flour used for food simply by dividing by 0.8.

In each of these cases, compilers should note the representativeness of the data, and make adjustments as necessary.



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Notes:

1.9 Imputation and estimation

Suggested data sources and imputation: Food availability and loss

Imputation and estimation

Food availability

Suggested approach

The basic approach to imputing food use relies on this assumption, modeling food availability in the current year based on availability levels in the previous year, but by making adjustments for changes in income and the overall trend in consumption.

Imputation of food availability should also account for changes in population

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

where food availability in the current period t ($Food_t$) is estimated as a function of the change in population (expressed here as the ratio of population in the current period to population in the previous period) multiplied by food availability in the previous period ($Food_{t-1}$), multiplied by 1 plus the historical trend (e.g., the growth rate) in food consumption (ϕ)

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Notes:

1.10 Imputation and estimation

Suggested data sources and imputation: Food availability and loss

Imputation and estimation

[Food availability](#)

Suggested approach

Country-level compilers can consider introducing both income (in the absence of data on income, this may be proxied by either expenditure data sourced from national accounts, or GDP, depending upon data availability and the preferences of the country) and product-specific income elasticities of demand into the equation.

$$Food_t = \frac{Population_t}{Population_{t-1}} \times Food_{t-1} \times \left[1 + \epsilon \log \left(\frac{Household\ consumption\ expenditure_t}{Household\ consumption\ expenditure_{t-1}} \right) + \phi \right]$$

Where ϵ = income elasticity for the commodity in question

$\left(\frac{Household\ consumption\ expenditure_t}{Household\ consumption\ expenditure_{t-1}} \right) \rightarrow$ Proxi to the change in income

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Notes:

Income elasticities of demand measure the responsiveness of demand for a certain good to a change in income. Mathematically, this can be expressed as

income elasticity of demand = % Δ in demand / % Δ in income.

For example, an income elasticity of demand of 0.1 for a given good indicates that for every 10 percent increase in income, demand for the product rises by 1 percent. Nearly all food products are normal goods-that is, an increase in income is associated with an increase in demand for the good.

1.11 Imputation and estimation


Suggested data sources and imputation: Food availability and loss

Imputation and estimation

[Food availability](#)

Alternative approach

For products where food use is the sole or the overwhelming utilization, countries can employ a balancer approach (similar to that described above for wheat flour), where food availability is calculated as the balance of production minus net trade (and any other small utilization elements).



Because this approach will result in food use accumulating all of the error from the other utilization elements, this approach is most appropriate for products that have no or few other utilization, principally items that cannot be stocked for extended periods of time and are not used for feed, like meat, eggs, and certain fruits and vegetables or dairy products.

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Notes:

1.12 Official data sources


Suggested data sources and imputation: Food availability and loss

Official data sources

[Loss](#)

Concept of "Loss" in FBS

Food losses are all the crop and livestock human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/slaughter production/supply chain by being discarded, incinerated or otherwise, and do not re-enter in any other utilization (such as animal feed, industrial use, etc.), up to, and excluding, the retail level. Losses that occur during storage, transportation and processing, also of imported quantities, are therefore all included.



Agriculture Production/Supply Chain

Pre-harvest/Pre-slaughter → Agriculture Production → Post-harvest/Post-slaughter Handling and Storage → Processing and Packing → Distribution to retail → Retail → Public and household consumption

LOSS & Waste **Waste & Loss**

Loss is the result of unintended actions, decisions or situations.
Waste results from some elements of a discretionary process.

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Notes:

1.13 Official data sources


Suggested data sources and imputation: Food availability and loss

Official data sources

Loss

It is recommended that countries use targeted surveys to measure **loss**. This may include surveying loss in on-farm operations and storage, loss in warehouses or collection points, loss in transportation, and loss in public storage.

While surveying for information on loss can be expensive, there are recommendations that countries can follow to reduce these costs, such as including a module on loss in annual production surveys at the farm level.



For countries holding large public food stocks—particularly of cereals—access to data on the loss both in public storage facilities and loss occurring during the transportation of these publicly-held stocks is essential to accurate estimation of overall loss. Without such data, loss is likely to be severely underestimated.

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Notes:

1.14 Alternative data sources

Suggested data sources and imputation: Food availability and loss

Alternative data sources

Loss

For most countries, at least some data on loss in specific segments of the supply chain will likely be available outside of official sources, as loss incur real-world economic costs on supply chain actors.

At a minimum, country-level FBS compilers are encouraged to consult warehouse managers and transportation firms or associations for a basic understanding of the scale of loss for the most important commodities.

In addition, country-level FBS compilers are advised to seek out case study investigations of that may contain loss estimates for particular sectors.

Compilers are, however, encouraged to consider the statistical validity of the data, particularly its representativeness of the target population, before adopting an estimate published in a sector case study.

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Notes:

1.15 Imputation and estimation

Suggested data sources and imputation: Food availability and loss

Imputation and estimation

Loss

Suggested Approach

In cases where some historic data exist

It may be optimal to estimate loss through a regression approach, such that loss is modeled as a function of certain other variables (potentially including covariates like maximum temperature in the harvest areas, average moisture level of grain, miles of paved roads per square kilometer, refrigerated storage capacity, or distance of main producing areas from the main terminal markets).

In cases where no historical data exists

Country-level FBS compilers are advised to scour any relevant available information that might inform an estimate of loss: scaling up estimates from case studies, convening focus groups of supply chain experts, consulting industry organizations, or conducting controlled experiments or pilot studies to form some idea of the share of production or supply that ends up as loss. Then this percentage can be applied to production (or supply) in subsequent years to impute a value for loss, as in equation:

$$\text{Loss} = \text{Production} \times \text{Estimated \% Loss}$$

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Notes:

1.16 Imputation and estimation

Suggested data sources and imputation: Food availability and loss

Imputation and estimation

Loss

Alternative Approach

If no local information available, FBS compilers may consider imputing loss by relying on the available global loss information.

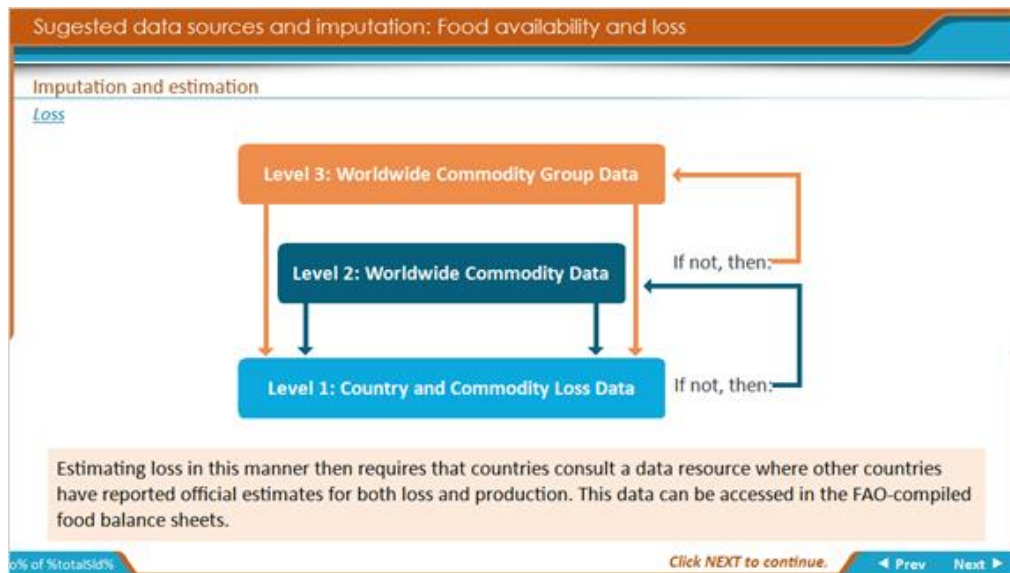
Conceptually, the approach is as follows:

1. If data on loss for a particular commodity in a particular country is reported, then no imputation is necessary, if not:
2. Loss of that commodity in that country is imputed by estimating the relationship between production and all other independent variables and loss of that commodity in all other countries of the world that reported official data on loss, and then using that relationship to calculate likely loss in the country in question. If no official data are reported for that commodity for any country in the world, then:
3. Loss of that commodity in that country are imputed by estimating the relationship between production and all other independent variables and loss of all commodities from the same commodity group as the commodity in question for all other countries of the world that reported official data on loss, and then using that relationship to calculate likely loss in the country in question.

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Notes:

1.17 Imputation and estimation



Notes:

1.18 Quiz 1

(Multiple Choice, 10 points, 1 attempt permitted)

Suggested data sources and imputation: Food availability and loss

Quiz

Q 01 Household surveys provide a detailed portrait of consumption at the household level. However, food consumed outside the home may not be fully captured.

Select one that apply.

☒ True

☐ False

SUBMIT

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Feedback when correct:

1.19 Quiz 2

(Multiple Choice, 10 points, 1 attempt permitted)

Suggested data sources and imputation: Food availability and loss

Quiz

Q 02 In order to use industrial survey data to arrive at an estimate of food availability at the SUA level, other uses (exports, stock changes, tourist food) must first be netted out.

Select one that apply.

☒ True

☐ False

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1.20 Quiz 3

(Multiple Choice, 10 points, 1 attempt permitted)

Suggested data sources and imputation: Food availability and loss

Quiz

Q 03 It is recommended that countries use targeted surveys to measure **loss**. This may include surveying loss in on-farm operations and storage, loss in warehouses or collection points, loss in transportation, and loss in public storage.

Select one that apply.

☒ True

☐ False

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Feedback when correct:

1.21 Quiz 4

(Multiple Response, 10 points, 2 attempts permitted)

Suggested data sources and imputation: Food availability and loss

Quiz

Q 04 Limitation of household survey data for FBS compilation are:

Select all that apply.

- ☐ Household surveys also cover consumption occurring in schools, prisons, hospitals, and military installations.
- ☒ Although it is increasingly less common, household surveys sometimes collect data only on expenditures and not quantities.
- ☒ Data may be collected only infrequently every four or five years, such that quantities may need to be adjusted for subsequent years

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1.22 Conclusion

Suggested data sources and imputation: Food availability and loss

Conclusion

You have finished lesson 8.

In this lesson, we have discussed:

1. Different data sources for food availability and loss component;
2. Recommended approach for imputation and estimation of food availability and loss component.




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Notes:

1.23 Thank You

Suggested data sources and imputation: Food availability and loss



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Food Balance Sheets (FBS)

Thank You!

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Notes: