


# Food Balance Sheets (FBS) - Module4

## 1. Module 4

### 1.1 Welcome

Data assessment and other preliminary consideration



**Food Balance Sheets (FBS)**

Lesson 4  
Data assessment and other preliminary consideration

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Notes:


## 1.2 Lesson objective

Data assessment and other preliminary consideration

Lesson objective

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

1. Different data sources and how to prioritize them;
2. Rules and guidelines to ensure data comparability;
3. System for data search and assessment.



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## 1.3 Outline

Data assessment and other preliminary consideration

Outline

- Data comparability
- Data quality, measurement error and flags
- Data search and assessment



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Notes:

## 1.4 Data comparability

Data assessment and other preliminary consideration

Data comparability

Throughout the process of gathering data, users must keep in mind that in order for an “apples-to-apples” comparison in the context of the balanced supply and utilization equation, data need to be fully comparable. This comparability includes various levels, including: item, unit of measurement, and reference period.

```
graph LR; A[Data comparability] --> B[Item]; A --> C[Unit of measurement]; A --> D[Reference period];
```

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Notes:

## 1.5 Data comparability

Data assessment and other preliminary consideration

Data comparability

**Item comparability**

Production quantities for rice, as an example, can be reported on either a paddy (unmilled) or milled basis. If production were to be recorded on a paddy basis in the supply and utilization balance, but another variable such as tourist food were to be recorded on a milled basis, an unintentional error would be introduced in to the balancing process that could easily have been avoided if an analyst had checked to ensure that the products were strictly comparable.

To avoid these kinds of situations, it is advised that countries express quantities of products using some sort of international statistical classification structure. Not only will utilizing such a structure ensure the comparability of products within a balance sheet framework, but will also facilitate the comparability of data between countries that utilize the same structures.

Countries are of course free to develop their own statistical classification schemes, but numerous international statistical classifications already exist for agricultural statistics that can, in most cases, be adapted to fit the needs of any given country. The UN Central Product Classification (CPC) and the Harmonized Commodity Description and Coding System (HS) are some classification structure that can be used.

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Notes:

## 1.6 Data comparability

Data assessment and other preliminary consideration

Data comparability

Unit measurement

In some countries, agricultural production is measured and reported in other units specific to those countries. As two examples, El Salvador reports production of most crops in terms of quintals, and the United States reports production for most grain crops in terms of bushels. At the same time, most trade data is reported in MT, and most calorie conversion tables are elaborated in terms of calories per kilogram.

For this reason, it is recommended that countries elaborate balance sheets in MT. Aside from ease of converting quantities into calories equivalents, compiling balance sheets in MT has other advantages—primarily that country balance sheets compiled in MT are directly comparable to those compiled by FAO, and are more likely to be comparable to balance sheets compiled by other countries as well.

At the same time, it is possible that balance sheets compiled in other units may be more easily understood by stakeholders within the country. Whichever unit is chosen, compilers should be careful to convert all data expressed in different units of measure using internationally-accepted conversion rates.

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### Notes:

For some liquid products, certain variables in the balance sheets may be reported in litres (L), while other variables may be reported in MT. For these conversions, it should be noted that compilers must use conversion factors specific to the product in question.

## 1.7 Data comparability

Data assessment and other preliminary consideration

Data comparability

Reference period

Common reference periods for the balance sheet include the **marketing year** (also sometimes referred to as the agricultural year, harvest year, or crop year), **the calendar year**, and the **fiscal year** (also sometimes referred to as the financial year or budget year).

The marketing year begins in the month when the bulk of the crop in question is harvested, the calendar year begins in the first month of the calendar (January-December for countries observing the Gregorian calendar), and the fiscal year begins whenever defined by the country in question.

For reasons of data comparability, it is recommended that countries compile their balance sheets on a calendar year basis. However, depending upon agricultural data collection programs, compiling sheets on a marketing year or fiscal year may be more feasible.

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### Notes:



## 1.8 Hierarchy of data source

Data assessment and other preliminary consideration

Hierarchy of data source



```
graph TD; A[Official data] --> B[Semi-official data]; B --> C[Imputation]; C --> D[Expert estimation]
```

Food balance sheets are analytical datasets, comprised of data extracted from a variety of different sources.

Compilers should recognize that data taken from different sources will likely be of varying degrees of quality.

For this reason, there is a preferred hierarchy of data sources.

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Notes:

## 1.9 Hierarchy of data source

Data assessment and other preliminary consideration

Hierarchy of data source

Official data

Semi-official data

Imputation

Expert estimation



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Notes:

Tab 1 (Slide Layer)

Data assessment and other preliminary consideration

Hierarchy of data source

Official data

Semi-official data

Imputation

Expert estimation

Official data sources are always preferred for expected values, as it is assumed that such data are most likely to have been compiled according to sound statistical methodologies. However, for many countries, there is not a single “official” estimate, as multiple agencies publish data relating to agricultural output.

It is suggested that the process of compiling food balance sheets be preceded by the reconciliation of estimates between different official sources. Optimally, only one agency would be tasked with producing an “official” estimate. In cases where this may not be possible for whatever reason, it is recommended that different sources explore the methodological reasons for the divergence in the estimates and come to some agreement about which number is most appropriate for the purposes of compiling food balance sheets.

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Tab 2 (Slide Layer)

Data assessment and other preliminary consideration

Hierarchy of data source

Official data

Semi-official data

Imputation

Expert estimation

In instances where official data are not available (particularly for utilization variables), it may become necessary to consult and consider alternative sources. These sources—deemed “semi-official”—may include industry groups, trade publications, or investigations conducted by product supply chain experts.

In ideal circumstances, the expertise uncovered in a search for alternative sources could help to inform/reform processes for collection of official data for the variable in question, as semi-official sources may not collect data with the same regularity as an official source.

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**Tab 3 (Slide Layer)**

Data assessment and other preliminary consideration

Hierarchy of data source

Official data	Semi-official data	Imputation	Expert estimation
<p>When no official or semi-official sources can be found for the data in question, the next alternative is the model-based imputation of missing data. It should be noted that in most cases, data imputation relies on a historical data series, such that the quality of imputed data will highly depend upon the quality of the source data—often referred to as the “garbage-in, garbage-out” phenomenon.</p> <p>Separate imputation approaches are suggested for different variables in the balance sheet. An effort has been made in these Guidelines to be as comprehensive as possible in the listing of various approaches, but users should keep in mind that other methodologies may be more appropriate for certain products in their home countries.</p>			

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**Tab 4 (Slide Layer)**

Data assessment and other preliminary consideration

Hierarchy of data source

Official data	Semi-official data	Imputation	Expert estimation
<p>The lowest quality level of source data is that derived through expert estimation.</p> <p>Expert estimation is different from imputation in that it relies not on a model, but instead on expert judgment. Because this approach is not based on statistical methodology and is not replicable, the error on values estimated by experts is assumed to be high.</p>			

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## 1.10 Application of flags

Data assessment and other preliminary consideration

### Application of flags

it is recommended that countries not only keep track of the data sources used, but also publish a flag denoting the data source alongside the final estimates. This allows users to see, at a glance, the source of the data, and to understand that some data points may be more reliable than others. Additionally, the flags can be used to assist compilers in the process of assigning *a priori* tolerance intervals for the purposes of the balancing process

Source	Flag
Official	
Semi-official	T
Imputed	I
Expert estimation	E

Country-level compilers can expand on the list of flags suggested here if they feel that more detail is necessary to properly communicate necessary information to users. In fact, a list of additional suggested flags, as well as international guidelines on observation dissemination flags, are available from the Statistical Data and Metadata eXchange (SDMX).

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### Notes:

See SDMX-produced documents, “Guidelines for the Creation and Management of SDMX Cross-Domain Code Lists,” and “Code List for Observation Status,” available at [http://sdmx.org/wp-content/uploads/SDMX\\_Guidelines\\_for\\_CDCL.doc](http://sdmx.org/wp-content/uploads/SDMX_Guidelines_for_CDCL.doc), and [https://sdmx.org/wp-content/uploads/CL\\_OBS\\_STATUS\\_v2\\_1.docx](https://sdmx.org/wp-content/uploads/CL_OBS_STATUS_v2_1.docx).

## 1.11 Confidence and tolerance intervals

Data assessment and other preliminary consideration

### Confidence and tolerance intervals

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

It is crucial to the balancing process that each point estimate also be accompanied by an estimate of confidence, as signified by the tolerance interval.

Estimates that come from surveys will likely be published with their measurement errors, which country-level FBS compilers should note and use in the balancing phase as the tolerance interval.

For estimates that are not published with a measurement error, it is necessary for the balancing phase to assign some sort of an *a priori* assigned tolerance interval that denotes the perceived quality of the estimate—the highest quality data can be assumed to have the highest confidence and the lowest tolerance interval, while data of lower quality can be assumed to have a lower confidence and higher tolerance interval.

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## Notes:

### Tab 1 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

For at least the main commodities, most countries will be measuring production through agricultural surveys. For this reason, there should be high confidence in the production estimate. Whether or not this confidence is 100 percent or something slightly lower is up to the judgement of the FBS compilers, based on an assessment of the data collection processes under which the production estimate was derived.

For example, if the compilers wish for the “official” estimate to appear in the final balance, they should assign a tolerance interval of 0%. If estimates come directly from surveys published with their own confidence intervals, compilers should feel free to use that data in this process.

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### Tab 2 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

As with production, most countries should have official data on imports and exports published by the relevant agency (Customs, Ministry of Trade, etc.). However, it may be the case that sizeable quantities of cross-border flows, for whatever reason, are not included in official trade data (more information on this possibility will be provided in section 3.5.2), so compilers may not have 100 percent confidence in the trade estimates, and may instead assign trade a lower degree of confidence.

can be assumed to have a lower confidence and higher tolerance interval.

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### Tab 3 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

**Stocks**

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

Stocks are kept to smooth consumption levels between harvests, so by their very nature they may fluctuate wildly from year to year. At the same time, most countries are not measuring stock levels, such that most estimates on stocks are already based on some sort of expert judgement. Given these factors, the confidence in most stock level and stock change estimates is likely to be lower.

...can be assumed to have a lower confidence and higher tolerance interval.

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### Tab 4 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

Stocks

**Food availability**

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

Particularly for staple foods, consumption levels are not likely to fluctuate greatly from just one year to the next, as even in the face of higher prices, households are more likely to cut spending on other goods rather than change their food consumption patterns substantially. For this reason, although food availability is not typically measured by countries, it is also likely to be fairly stable over time. Thus, although some flexibility may be needed in food availability for the purposes of balancing the supply = utilization identity, the confidence in the food estimate should be quite high—perhaps not at the levels estimated for production and trade, but higher than the confidence in the other variables of the balance sheet.

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Tab 5 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production	<p>Food processing will in most cases be dropped from the balance before the balancing process in order to avoid double-counting. As such, in most cases it will not need to be assigned a tolerance interval for the balancing process. In cases where it is not dropped, its tolerance interval should mirror that assigned to production (since food processing quantities are directly linked to the production of derived commodities through extraction rates).</p>
Imports and Exports	
Stocks	
Food availability	
<b>Food processing</b>	
Feed	
Seed	
Tourist food	
Industrial use	
Loss	

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Tab 6 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production	<p>Depending upon how the feed estimate is derived, it may have a larger or smaller implied tolerance interval. This is for two reasons. First of all, most countries do not measure feed use, implying that confidence in the point estimate is low to begin with. Second, although the total feed demand for a country in terms of nutrient value should be a hard number (if an accurate livestock count is available), the substitutability of feedstuffs ensures that for each individual commodity, the amount of feed might vary greatly from year to year depending upon relative pricing. For this reason, the tolerance interval of the feed estimate may be quite high for certain countries. For other countries where good data is available from feed industries and there is high confidence in data on estimated numbers of livestock, it is possible that there could be high confidence in livestock data, implying a lower tolerance interval.</p>
Imports and Exports	
Stocks	
Food availability	
Food processing	
<b>Feed</b>	
Seed	
Tourist food	
Industrial use	
Loss	

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Tab 7 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

**Seed**

Tourist food

Industrial use

Loss

Quantities of seed needed for the following year are solely a function of planted area and seeding rates. Although planted area may fluctuate depending upon crop prices, the seeding rate should remain stable. For this reason, even if estimates of seed use are imputed, if there is a solid estimate of planted area in the following year, seed use estimates should be fairly rigid so as to maintain a plausible seeding rate. However, if no estimate of area is available, then seed use may have a lower confidence.

It should be noted here that seeding rates may vary according to production system even within a country. In those cases, an average seeding rate should be used, taking into account the prevalence of the various production systems.

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Tab 8 (Slide Layer)

Data assessment and other preliminary consideration

Confidence and tolerance intervals

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

**Tourist food**

Industrial use

Loss

Estimates of tourist food are somewhat flexible. This is because the proposed imputation methodology assumes a level of food consumption by tourists that is a rough approximation—it is not based on any measurements. As such, the confidence in this variable should likely be lower.

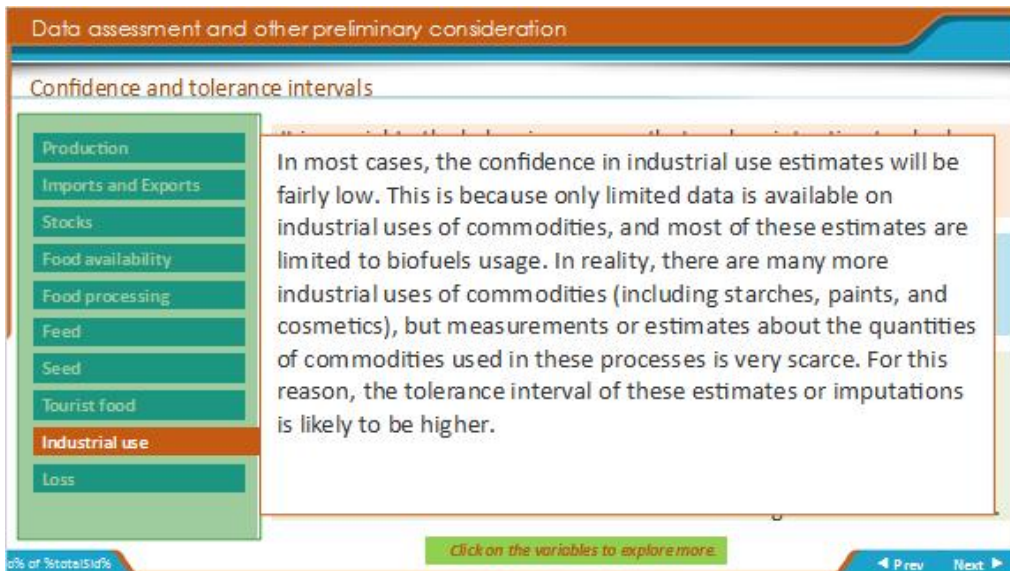
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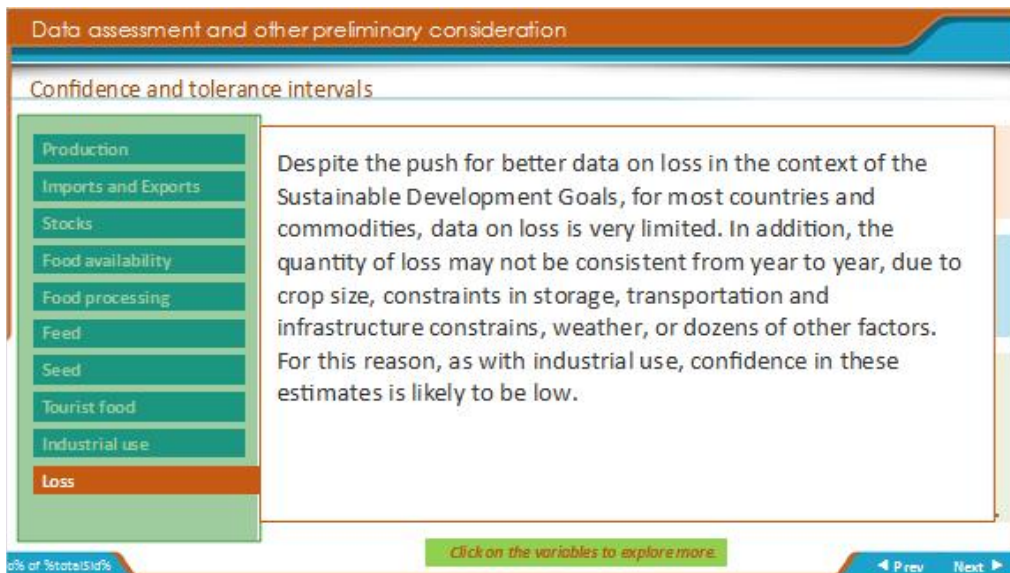
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Tab 9 (Slide Layer)



Tab 10 (Slide Layer)



## 1.12 Confidence and tolerance intervals

Data assessment and other preliminary consideration

### Confidence and tolerance intervals

Based on the previous considerations, an a priori assignment of example confidence and tolerance intervals by variable may produce a table such as table shown beside.

Users should keep in mind that the values in Table beside should be based on a discussion of the quality of data inside the country compiling the balance sheets—they should not feel bound to use the values suggested here. However, it is advised that compilers fix at least one element in the supply = utilization identity (likely production and/or trade).

Sample confidence and tolerance intervals given a priori knowledge of variables

Variable	Confidence	Tolerance interval
Production	1.0	± 0%
Trade	1.0	± 0%
Stocks	0.75	± 25%
Food	0.90	± 10%
Food processing	1.0	± 0%
Feed	0.75	± 25%
Seed	0.90	± 10%
Tourist Food	0.75	± 25%
Industrial Use	0.75	± 25%
Loss	0.75	± 25%

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Notes:

## 1.13 Quiz 1

(Multiple Choice, 10 points, 1 attempt permitted)

Data assessment and other preliminary consideration

### Quiz

**Q 01** Common reference periods for the food balance sheet are *marketing year, calendar year, and fiscal year*.

Select one that apply.

☒ True

☐ False

SUBMIT

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Feedback when correct:

## 1.14 Quiz 2

(Multiple Choice, 10 points, 1 attempt permitted)

Data assessment and other preliminary consideration

Quiz

Q 02

The highest quality level of source data for FBS compilation is that derived through expert estimation.

Select one that apply.

☐ True

☒ False

SUBMIT

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## 1.15 Quiz 3

(Multiple Choice, 10 points, 1 attempt permitted)

Data assessment and other preliminary consideration

Quiz

Q 03

Particularly for staple foods, consumption levels are not likely to fluctuate greatly from just one year to the next, as even in the face of higher prices, households are more likely to cut spending on other goods rather than change their food consumption patterns substantially.

Select one that apply.

☒ True

☐ False

SUBMIT

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## 1.16 Quiz 4

(Multiple Response, 10 points, 2 attempts permitted)

Data assessment and other preliminary consideration

Quiz

Q 04

Based on their quality, data sources that can be used to compile FBS can be grouped as:

Select all that apply.

☒ Official data

☒ Semi-official data

☒ Imputation

☒ Expert estimation

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## 1.17 Quiz 5

(Multiple Response, 10 points, 2 attempts permitted)

Data assessment and other preliminary consideration

Quiz

Q 05

Please select correct statements given below:

Select all that apply.

☒ It is recommended that countries not only keep track of the data sources used, but also publish a flag denoting the data source alongside the final estimates.

☒ Throughout the gathering process, data need to be fully comparable. This comparability includes various levels, including: item, unit of measurement, and reference period.

☒ Quantities of seed needed for the following year are solely a function of planted area and seeding rates.

☐ The marketing year begins in the first month of the calendar (January-December for countries observing the Gregorian calendar)

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SUBMIT

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## 1.18 Conclusion


Data assessment and other preliminary consideration

Conclusion

You have finished lesson 4.

In this lesson, we have discussed:

1. Data sources for FBS compilation;
2. How to ensure data comparability in FBS;
3. System for data search and assessment.



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Notes:

## 1.19 Thank You

Data assessment and other preliminary consideration



Food Balance Sheets (FBS)

Thank You!

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Notes: