


Food Balance Sheets (FBS) - Module5

1. Module 5

1.1 Welcome

Suggested Data Sources and Imputation: Production



Food Balance Sheets (FBS)

Lesson 5
Suggested Data Sources and Imputation: Production

0% of %totalbid% [Prev](#) [Next](#)

Notes:

1.2 Lesson objective

Suggested Data Sources and Imputation: Production

Lesson objective

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

1. Different data sources for production;
2. Recommended approach for imputation and estimation of production



0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.3 Outline

Suggested Data Sources and Imputation: Production

Outline

- Official data sources
- Alternative data sources
- Imputation and estimation



0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.4 Official data sources


Suggested Data Sources and Imputation: Production

Official data sources

Data on agricultural production is one of the foundations of the food balance sheet framework

At the same time, it is likely that countries may not collect production data on every single commodity, with minor crops often overlooked in annual surveys because including them may be cost-prohibitive.

For that reason, beside of official data sources, some suggestions on alternative data sources and imputation strategies are provided.



0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:


1.5 Official data sources

Suggested Data Sources and Imputation: Production

Official data sources

The preferred source of data on agricultural production—including the production of crops, livestock, and derived goods—is survey-based official data. It is highly recommended that, at the very least, countries conduct annual production surveys for major commodities, and endeavor to measure all commodities in less frequent agricultural censuses or structural surveys.

It is recommended that official sources collect not only information on production output, but also on activity (sown area, harvested area, number of animals) and productivity (crop yield per unit of harvested area, milk yield per milking animal, meat yield per animal slaughtered, etc.) variables. This information is helpful for validating production data and to assist in imputation of missing data in future years where surveys do not take place.



0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

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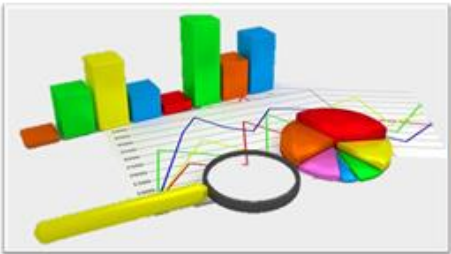
1.6 Official data sources

Suggested Data Sources and Imputation: Production

Official data sources

Outside of surveys, administrative data may be another potential data source for certain products. The most common example of this is likely data from slaughterhouses, which may be required to keep records on the numbers of animals slaughtered and whether or not the carcasses have been inspected.

Data from industrial output surveys may also be useful sources for the production of derived products, such as flour or beer.



0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.7 Alternative data sources


Suggested Data Sources and Imputation: Production

Alternative data sources


Country-level FBS compilers can consult two additional potential data sources in their search for production data: records of private firms, and commodity organizations.

Particularly in cases where crop production is concentrated in a small area, or where production is delivered to a handful of firms for further processing, an aggregated production figure for the country as a whole can be derived from just adding up the individual purchase records of said companies. These records may be accessible through tax authorities, or through an agreement with an industry/commodity organization.

Direct production estimates from commodity organizations could also prove useful if their members represent nearly all production. Some of these commodity organizations are international in scope, and publish data on a variety of countries.



International Sugar Organization



INTERNATIONAL COFFEE ORGANIZATION

Some international organizations examples include the International Coffee Organization, the International Cotton Advisory Committee, the International Sugar Organization, and Oil World.

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.8 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

The suggested imputation strategy for missing production data at the country level depends somewhat on the commodity for which production is to be estimated, with different approaches to imputation suggested for:

- 1 Crops product
- 2 Processed products derived from crops
- 3 Livestock and livestock product

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.9 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

1 Crops product

Imputation of crops production is based upon the following identity:

$$\text{Production (MT)} = \text{Yield} \left(\frac{\text{MT}}{\text{HA}} \right) * \text{Harvested Area (HA)}$$

The suggested imputation approach for production component is a three-step procedure;

Step 1: Measure, impute, or approximate a yield estimate.

Step 2: Measure, impute, or approximate an estimate of harvested area.

Step 3: Multiply yield and harvested area estimates together to arrive at a production estimate.

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.10 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

1 Crops product

Step 1: Measure, impute, or approximate a yield estimate.

In cases where yields are not measured, imputation using time series estimation is recommended. This approach is preferred because although crop yields in any given year can depend upon a host of factors (including temperature, rainfall, pests, diseases, and production management), over time, yields tend to follow trends.

Three principles should guide this estimation process:

Principle 1: Understand the nature of yields for the crop being modeled

Principle 2: Use the appropriate functional form.

Principle 3: Include other relevant explanatory variables in the estimating regression

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.11 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

1 Crops product

Step 2: Measure, impute, or approximate an estimate of harvested area.

If no harvested area estimate has been derived from surveys, then country-level compilers must estimate a likely harvested area.

Harvested area is by definition the quantity of sown area minus any land that has not been harvested (also referred to as "abandoned" area). In this case, all that is needed to calculate a harvested area is the estimate of sown area, and some estimate of the percentage of land that was abandoned (represented by abd).

$$\text{Harvested area}_t = (1 - abd)\text{Sown area}_t$$

Or, if actual abandoned area information available:

$$\text{Harvested area}_t = \text{Sown area}_t - \text{Abandoned area}_t$$

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.12 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

1 Crops product

If sown area is not known, then FBS compilers will need to devise an alternative strategy for estimating harvested area.

Sown area is commonly modeled as a function of either the previous year's sown area or of farmer price expectations at time of planting (or as a combination of the two). Country-level FBS compilers are encouraged to consult the relevant literature for the commodity in question in order to formalize their strategy for estimating sown area.

The last approach that can be adopted is that of basing an area estimate on qualitative reports (as discussed above for yields). For example, early warning system reports often publish estimates of harvested or sown area—either in absolute terms, or else relative to the previous year. Such reports can then be used to estimate harvested area.

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.13 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

1 Crops product

Step 3: Multiply yield and harvested area estimates together to arrive at a production estimate.

With estimates of both harvested area and yield in hand, FBS compilers need only multiply the two together using previously mentioned equation.

Compilers are reminded that, in the case of imputation or estimate of either yield or area, the quality flag assigned to the production estimate should reflect the quality of the yield and harvested area used to derive the production number.

0% of %totalSlide% Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.14 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

2 Processed products derived from crops

Imputation of derived product production differs from imputation of primary product production. Only two pieces of information are necessary for imputing values for derived goods: 1) the amount of the primary good that is being processed (that is, quantities of primary goods assigned to the *food processing* variable), and 2) the extraction rate.

For most products, extraction rates will fluctuate very little over time, so assuming fixed extraction rates is a reasonable approach.

If multiple derived goods stem from the same primary commodity, then analysts will need to make assumptions about what share of the processed use of the primary commodity is being diverted into production of each of the derived goods.

		Mustard seed	Oil of mustard	Cake of mustard seed	Flour of mustard
A	Amount Processed	400,000			
B	Processing Share		80%	80%	20%
C	Amount of Input		320,000	320,000	80,000
D	Extraction Rate		36%	60%	70%
E	Production of derived goods		115,200	192,000	56,000

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Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.15 Imputation and estimation


Suggested Data Sources and Imputation: Production

Imputation and estimation

3 Livestock and livestock product

Imputing data for livestock, derived livestock products like meat, and live animal products (such as dairy and honey) should follow a slightly different rationale than the imputation of missing crop production data. In this process, the objective of FBS compilers should be to synchronize production of all of the various derived products using livestock commodity trees as their guide. This is done by working backward from any official data on production of a given derived commodity [by dividing by extraction rates] in order to impute values for higher levels of derived products.

Compilers can use this synchronization process to impute missing production data. For example, if official data is provided for cheese, country-level FBS compilers can use the inverse of known milk-to-cheese conversion factors to calculate a likely value of the amount of milk used to produce said cheese. Then this same amount can be used to impute a value for production of cheese co-product, whey.



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Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.16 Imputation and estimation

Suggested Data Sources and Imputation: Production

Imputation and estimation

3 Livestock and livestock product

For missing production data on derived processed animal products (such as meat and skins), the lynchpin of the synchronization process is an estimation of the number of animals slaughtered. Using this estimate of animals slaughtered, and applying the appropriate yield conversion factor for the product in question, estimates for production of meat, offals, fat, and hides/skins can be derived, as in equation

$$Production (MT) = Yield \left(\frac{MT}{Animal} \right) \times Animals Slaughtered$$

0% of %totalSlide%

Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.17 Imputation and estimation


Suggested Data Sources and Imputation: Production

Imputation and estimation

3 Livestock and livestock product

If FBS compilers know the number of animals slaughtered, then imputing production of derived goods is simply a matter of applying the appropriate yield factors.

If the number of animals slaughtered is not known, but production of at least one derived product is known, then FBS compilers should start from that number and work backwards to first derive an estimate of the number of animals slaughtered, then use that number of animals to impute production of the remaining slaughtered animal products using yields applied in the previous year.



0% of %totalSlide%

Click NEXT to continue. ◀ Prev Next ▶

Notes:

1.18 Quiz 1

(Multiple Choice, 10 points, 1 attempt permitted)

Sugested Data Sources and Imputation: Production

Quiz

Q 01

The preferred source of data on agricultural production—including the production of crops, livestock, and derived goods—is imputation data.

Select one that apply.

☐ True

☒ False

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0% of %totalSld%

Prev Next

1.19 Quiz 2

(Multiple Choice, 10 points, 1 attempt permitted)

Sugested Data Sources and Imputation: Production

Quiz

Q 02

The suggested imputation strategy for missing production data at the country level depends somewhat on the commodity for which production is to be estimated, with different approaches to imputation suggested for: crops products, processed products, livestock and livestock products.

Select one that apply.

☒ True

☐ False

SUBMIT

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Prev Next

1.20 Quiz 3

(Multiple Choice, 10 points, 1 attempt permitted)

Sugested Data Sources and Imputation: Production

Quiz

Q 03

Harvested area is by definition the quantity of sown area minus any land that has not been harvested (also referred to as "abandoned" area).

Select one that apply.

☒ True

☐ False

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0% of %totalSld%

Prev

Next

1.21 Quiz 4

(Multiple Response, 10 points, 2 attempts permitted)

Sugested Data Sources and Imputation: Production

Quiz

Q 04

Information necessary for imputing values for derived goods are including:

Select all that apply.

☒ The amount of the primary good that is being processed (that is, quantities of primary goods assigned to the *food processing* variable)

☒ Extraction rate

☐ DES

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Prev

Next

1.22 Conclusion

Suggested Data Sources and Imputation: Production

Conclusion

You have finished lesson 5.
In this lesson, we have discussed:

1. Different data sources for production component;
2. Recommended approach for imputation and estimation of production component

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Click NEXT to continue.

◀ Prev Next ▶



Notes:

1.23 Thank You

Suggested Data Sources and Imputation: Production



Food Balance Sheets (FBS)

Thank You!

0% of 10 total slides

◀ Prev Next ▶

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