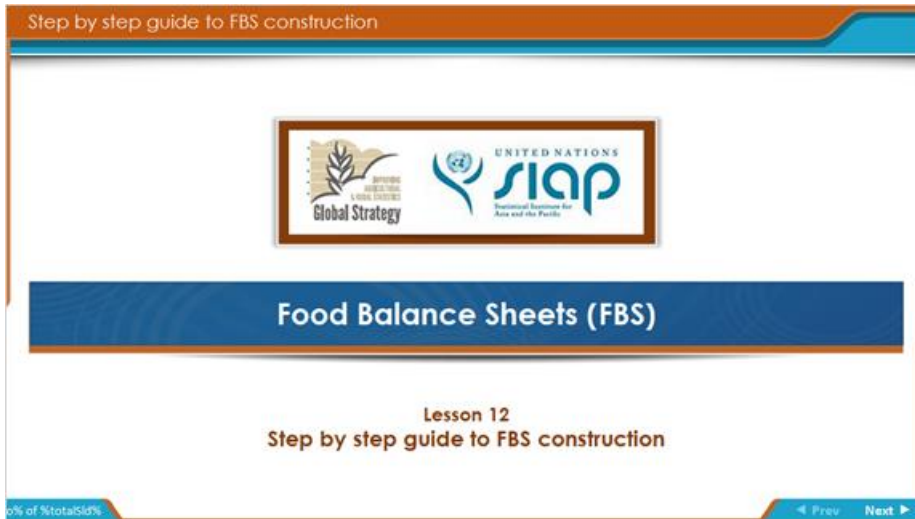


Food Balance Sheets (FBS) - Module12

1. Module12

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

Step by step guide to FBS construction

Lesson objective

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

1. Filling in SUA table;
2. Standardization and aggregation process;
3. Balancing process;
4. Nutrient supplies and calorie estimates.



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Notes:

1.3 Outline

Step by step guide to FBS construction

Outline

- ➔ Filling in a SUA table
- ➔ Balancing SUA accounts for derived commodities
- ➔ Standardization and aggregation
- ➔ Balancing FBS accounts
- ➔ Nutrient supplies and calorie estimates
- ➔ Per capita estimates



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Notes:

1.4 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table


The bulk of the work in compiling country-level FBS takes place in the preparatory stages (data assessment and imputation of values for any missing data).

Once this has been done, the task of compiling the actual supply utilization accounts for commodities should proceed more quickly.

This includes:

1. First filling in the empty SUA tables,
2. Balancing SUA-level commodities,
3. Standardizing and aggregating products in the SUA to primary commodity equivalent level,
4. Balancing the identity at the primary commodity level,
5. Converting food values from volumes to dietary equivalents,
6. Deriving per capita dietary estimates.

This chapter will outline this process by tracing the development of an FBS account for one commodity tree: **oats**.



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Notes:

1.5 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

The process of filling SUA table begins with consulting the relevant commodity tree to ensure the accounting for of the primary commodity and all derived products. For oats, the commodity tree includes the primary product and two derived co-products that result from the milling process: rolled oats and bran of oats.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	-	-	-	-	-	-	-	-	-	-	-
Rolled oats	-	-	-	-	-	-	-	-	-	-	-
Bran of oats	-	-	-	-	-	-	-	-	-	-	-

Note that in this example, the compilers chose to not include a "Residual and other uses" variable in their calculations. As such, it is excluded from the tables.

Each product in the commodity tree has its own row, and the first row is reserved for the primary commodity.

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Notes:

1.6 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

FBS compilers should start by filling in the different supply and utilization variables, beginning from the left-hand side with production.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	-	-	-	-	-	-	-	-	-	-
Rolled oats	54,789	-	-	-	-	-	-	-	-	-	-
Bran of oats	-	-	-	-	-	-	-	-	-	-	-

Compilers should keep in mind that for some derived products, production will be filled only after quantities for amounts sent to processing have been estimated.

In our sample case, the filling in of the SUA table begins with official figures for production for both oats and rolled oats (one coming from an agricultural survey and one from an industrial output survey). Since it is known from the commodity tree that bran of oats and rolled oats are co-products, the production of rolled oats implies that there must also be production of oat bran. However, there is no official figure for oat bran production; therefore, a figure for oat bran production will be derived after a number for food processing has been entered.

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Notes:

1.7 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

Next, official trade data is added. At this stage, analysts should note that there is no harmonized HS6 category for rolled oats or bran of oats. Instead, countries may either have a more detailed breakout at the 8- or 10-digit level for these products, or alternatively, trade data for these two products would be included under another HS6 basket category (most likely covering bran or worked grains for other cereals not elsewhere defined in the HS classification). In the second case, country-level analysts would have to estimate the proportion of the relevant 6-digit basket category that these products represent, and then estimate or impute some value for trade.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	-	-	-	-	-	-	-	-
Rolled oats	54,789	14,074	2,130	-	-	-	-	-	-	-	-
Bran of oats	-	688	1,436	-	-	-	-	-	-	-	-

In this example, however, the hypothetical country in question has a more detailed trade breakout at the HS 8-digit level, such that trade data for rolled oats and bran of oats are collected under specific individual 8-digit codes that can be directly added to the table.

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Notes:

1.8 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

Once trade has been added to the table, stocks changes can be accounted for. Because oats are a grain, they can be stored from one year to the next. The country in our example does not collect data on stock levels, so a value of stock change is imputed using a model. Stocks are not kept (or accounted for) for many derived commodities. This is usually the case for derived grain products like flour and bran, as the shelf-life of flour can be considered to be only a few months, while whole, unprocessed cereal grains can be stored for more than one year.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	-	-	-	-	-	-	-
Rolled oats	54,789	14,074	2,130	0	-	-	-	-	-	-	-
Bran of oats	-	688	1,436	0	-	-	-	-	-	-	-

In the case of oats, however, stocks are kept in the raw, unprocessed form. Reflecting that fact, zeros have been added to the "stock changes" column for both rolled oats and bran of oats.

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Notes:

1.9 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

As with most cereal grains, oats are typically not eaten in their primary form, such that there will be no "food" estimate for the primary good. Instead, the primary product (in this case, oats) is processed into a derived commodity (rolled oats in this example), which are then consumed as food: thus, in lieu of accounting for food at the primary level, there should be some accounting for "food processing" of oats.

Analysts should note that the "food" value for the primary equivalent will come later, once the "food" value for rolled oats is aggregated up to the primary equivalent level. The value for "food processing" will be dropped in the same step. To account for food processing, the production of all derived goods should be converted back to their primary equivalent (if data on their production is available). In this example, since rolled oats and bran of oats are co-products, all that is required is a conversion back of the production of rolled oats into the amount of oats sent to food processing, through an application of the extraction rate using equation. In this case, the extraction rate for rolled oats from unprocessed oats is 0.65. As such, the calculation proceeds as follows:

$$\text{Quantity of input (oats)} = \frac{\text{Quantity of output (rolled oat)}}{\text{Extraction rate}}$$
$$\text{Quantity of input (oats)} = \frac{54\,789\text{ MT}}{0.65}$$
$$\text{Quantity of input (oats)} = 84\,291\text{ MT}$$

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Notes:

1.10 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

Once the value of processed oats has been calculated, it can be added to the SUA table. Since rolled oats and bran of oats are not further processed, it is also possible to add zeros to the table under "food processing" for those products.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	-	84,291	-	-	-	-	-
Rolled oats	54,789	14,074	2,130	0	-	0	-	-	-	-	-
Bran of oats	16,858	688	1,436	0	-	0	-	-	-	-	-

Because we now have a value for amount of oats sent to processing, we can apply that extraction rate and calculate a number for production of bran of oats.

Quantity of output (Bran of oats)=Quantity of input x Extraction rate

Quantity of output (Bran of oats)=84,291 x 0.2

Quantity of output (Bran of oats)=16,858

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Notes:

1.11 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

The only product in the oats tree in this example that is consumed by humans is rolled oats. As such, a value for rolled oats used as food must be filled in this step.

There are two options as to how this can be accomplished. First, food could simply be treated as the balancer in the equation after accounting for all other uses. If this approach is adopted, then the value for food should be left unfilled until the other utilizations have been accounted for, given that this is a derived good produced solely for human consumption. The second option is to independently impute a value for food utilization using a model that is based on historic food availability data, but that takes into account population and income growth.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	0	84,291	-	-	-	-	-
Rolled oats	54,789	14,074	2,130	0	66,700	0	-	-	-	-	-
Bran of oats	16,858	688	1,436	0	0	0	-	-	-	-	-

For the sake of this illustration, it is assumed that the value is imputed. The results of this imputation are then added to the SUA table. It is also possible to add a zero for both regular oats and bran of oats used for food, because neither product is utilized in that way.

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Notes:

1.12 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

It is assumed that the sample country surveys both farmers and animal feeding operations to publish official data on the feed use of oats. This number can be added directly to the table on the line for the primary commodity. With respect to rolled oats, a zero can be added to the table, as this product is not used for feed.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	-	-	-	-
Rolled oats	54,789	14,074	2,130	0	66,700	0	0	-	-	-	-
Bran of oats	16,858	688	1,436	0	0	0	-	-	-	-	-

Considering the feed use of bran of oats, although an estimate of this quantity is unavailable, it is known that the primary utilization of bran of oats is for feed. As such, feed will balance this product's SUA. For this reason, this cell may be left blank for the time being while estimates for the other utilizations are considered.

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Notes:

1.13 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

From feed, the next step is seed. In this scenario, the country does not collect data on seed use. However, an average seeding rate and the value of sown area in the subsequent year are both available, such that imputing a value for seed use is possible. As seed is only relevant for the primary commodity, the rest of the column can be filled with zeros

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	12,300	0	-	-
Rolled oats	54,789	14,074	2,130	0	66,700	0	0	0	750	-	-
Bran of oats	16,858	688	1,436	0	0	0	-	0	0	-	-

Next, net tourist food is considered for every product that is consumed as food. this value can be imputed according to the approach explained before. This imputed value is then added to the. Note that in this case, the positive value for net tourist food indicates that incoming tourists consume more rolled oats than outgoing residents. Again, as with food, since rolled oats are the only product that can be used for food by tourists, zeros are added for the other commodities in the tourist food column

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Notes:

1.14 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

The next component to be filled is industrial use. In this example, FBS compilers in the country know from industry experts that some outgraded oats not used for feed are diverted to industry to be processed into soaps and lotions. This quantity is not known with certainty, and there is no methodology to impute the value; therefore, it is estimated according to the best available information, such as market data from industry organizations. This value is then added to the table, and zeros fill the remaining rows in the column.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	12,300	0	2,500	-
Rolled oats	54,789	14,074	2,130	0	66,700	0	0	0	750	0	-
Bran of oats	16,858	688	1,436	0	0	0	-	0	0	0	-

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Notes:

1.15 Filling in an SUA table

Step by step guide to FBS construction

Filling in an SUA table

The last variable to be filled is loss. Many countries are not yet collecting data on loss of all products. Partly due to this scarcity of data, for now, countries may choose to either use estimations or country-specific econometric models. Failing these options, loss may be imputed at the primary commodity level according to the approach described previously. Once this value has been imputed according to the chosen method, the value is added to the table, and zeros fill the remaining rows.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	12,300	0	2,500	3,940
Rolled oats	54,789	14,074	2,130	0	66,700	0	0	0	750	0	0
Bran of oats	16,858	688	1,436	0	0	0	-	0	0	0	0

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Notes:

1.16 Balancing SUA Accounts

Step by step guide to FBS construction

Balancing SUA Accounts

Once loss has been added to the table, all variables have been accounted for in each of the SUA accounts and standardization and aggregation up to the primary-commodity level can begin. However, FBS analysts must first check that derived product accounts are balanced. To do so, a calculation is made at this step to check that the supply = utilization identity holds for the derived commodities.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss	Imbalance
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	12,300	0	2,500	3,940	
Rolled oats	54,789	14,074	2,130	0	66,700	0	0	0	750	0	0	-717
Bran of oats	16,858	688	1,436	0	0	0	-	0	0	0	0	16,110

Imbalance = (Production + Imports – Exports + Stock Change) - (Food + Food processing + Feed + Seed + Net Tourist Food + Industrial Use + Loss)

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Notes:

1.17 Balancing SUA Accounts

Step by step guide to FBS construction

Balancing SUA Accounts

Balancing the account for bran of oats is straightforward, as it had already been noted that feed should be the primary utilization for this product. For this reason, the imbalance in this line is assigned to feed.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss	Imbalance
Oats	131,259	188,219	3,439	12,350	0	84,291	182,950	12,300	0	2,500	3,940	
Rolled oats	54,789	14,074	2,130	0	65,983	0	0	0	750	0	0	0
Bran of oats	16,858	688	1,436	0	0	0	16,110	0	0	0	0	0

However, the case for rolled oats is slightly different. Because production, imports and exports are all official data that should remain unchanged, the only way that this account can be balanced is if the imbalance is absorbed by either food or net tourist food, which were both imputed using models. Because the accounts may be adjusted again after the standardization process, it is recommended that at this stage the imbalance be absorbed by the largest utilization. In this case, food is by far the largest non-official utilization, such that the adjustment should be made here.

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Notes:

1.18 Standardization and aggregation

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

Residual and other uses

Click on the variables to explore more.

To obtain a single FBS account at the FBS level, the SUA accounts must be standardized, that is, converted back to their primary commodity equivalent, before they can be added together. This is accomplished by dividing by the extraction rate and then adding all the values together.

However, not every variables are added together in the standardization process. In order to avoid double-counting, only one commodity from each transformation process is standardized and aggregated. Because the goal of this process is to produce FBS, this means that the product that is standardized will typically be the one that makes the largest contribution to food.

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Notes:

Tab 1 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food



Industrial use

Loss

Residual and other uses

Production of derived commodities is never standardized to the "production" variable: the production value of the primary commodity remains in this cell for the primary equivalent level. This is because the only commodity that is truly being produced in the balance is the primary good; the "production" of the remaining goods can instead be conceptualized as the conversion of the primary good into other products.

At the same time, FBS compilers should still standardize and aggregate the production of derived goods (though not of co-products from the same transformation process) to ensure that the production of derived goods is equal to the "food processing" variable in the primary commodity's SUA.



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Tab 2 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

Residual and other uses

Both imports and exports are always standardized, but only for the principal derived product (to avoid double-counting, as noted above) or for products that are not themselves part of another balance (in other words, wine trade would not be standardized back up into the grape balance). This standardization is achieved by dividing the import and export quantities for the derived commodities by their extraction rates.

In terms of our example, only rolled oats that will be standardized because bran is only a co-products of the same process of producing rolled oats:

Import

$$\frac{14\,074}{0.65} = 21\,652$$

Export

$$\frac{2\,130}{0.65} = 3\,277$$

Total oats equivalent:

Imports : $188\,219 + 21\,652 = 209\,871$

Export : $3\,439 + 3\,277 = 6\,716$

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Tab 3 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food


Industrial use

Loss

Residual and other uses

In most cases, stocks are only estimated at the primary-commodity level, which would not require any standardization. However, in cases where stocks are reported for derived commodities (such as concentrated orange juice), they will have to be standardized.

In this example for oats, because stocks are only estimated at the primary commodity level, no standardization is necessary.



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Tab 4 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food

Industrial use

Loss

Residual and other uses

Values for food are always standardized and aggregated. This is particularly important because, for many commodities, no food use occurs at the primary commodity level, such that without standardization and aggregation, food values in the final balance would appear as zero.

In this example for oats, the food estimate is standardized by dividing by the extraction rate.

Oats equivalent for food:

$$\frac{65\,983}{0.65} = 101\,512$$



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Tab 5 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production

Imports and Exports

Stocks

Food availability

Food processing

Feed

Seed

Tourist food


Industrial use

Loss

Residual and other uses

In most cases, food processing should not be standardized and aggregated into the final balance for the primary equivalent. Instead, it is dropped altogether to avoid double-counting, as the ultimate use of quantities processed into food commodities is as food. The only exception is in those cases where some processed product is standardized into another primary commodity equivalent of the FBS. For example, food processing of grapes into wine would not be standardized back up in to the grape balance, as there is a separate primary commodity balance for wine. In such cases, a quantity will remain in the grape balance under "food processing".

In the oats example, food processing can be dropped from the balance at this point, as there are no derived products that become separate commodity balances.



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Tab 6 (Slide Layer)


The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

Feed quantities will not be standardized and aggregated for many commodities, as co-products of transformation processes (such as brans, germs or oilcakes) tend to be largely utilized as feed (if it is a useful exercise for countries, these quantities can be added together in a separate feed products balance). However, quantities estimated as feed for commodities that are the primary output of a transformation process should be standardized and aggregated.

In terms of our oats example, this means that the feed quantity for oat bran will not be standardized and aggregated. However, the feed quantity of the primary commodity (oats) will remain as the feed quantity in the primary commodity equivalent balance.



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Tab 7 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

Because seed only comes from the primary commodity, this value will remain unchanged in the FBS primary equivalent balance.



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Tab 8 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

As with food, quantities of food available for consumption by tourists must be standardized by dividing by the extraction rate.




In terms of our oats example, the calculation will be:

$$\frac{750}{0.65} = 1\,154$$

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Tab 9 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

Any quantities of industrial use must also be standardized, provided that they are for the primary output product of a given transformation; the industrial use of co-products like brans or germs would not be standardized. In this example, industrial use is only recorded at the primary commodity level; therefore, no further calculation is necessary.



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Tab 10 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

Quantities allocated to loss need to be standardized. As with industrial use, in our example, loss has only been recorded at the primary level, such that no further calculation is necessary.



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Tab 11 (Slide Layer)

The Basic Identity and Approach

Standardization and aggregation

Production
Imports and Exports
Stocks
Food availability
Food processing
Feed
Seed
Tourist food
Industrial use
Loss
Residual and other uses

Residual and other uses can, in most cases, be defined as the combined imbalance and accumulated error in the supply equals utilization equation. As such, this category is computed ex-post as a balancing item and is not independently estimated

If all of the other utilizations within the equation are accounted for and there is no measurement error, then the residual would be calculated as zero. The decision on whether or not to include a residual and other uses category is up to the compiling country, but the use of such a category is a simple way to acknowledge and account for small measurement errors.

Countries may also choose to utilize this category to account for quantities that are designated for any uses other than those described above. As such, this variable is more appropriately defined by what it is not rather than what it is.

To the extent possible, countries should strive to account for all possible uses of a given product when elaborating a food balance sheet, but countries may wish to utilize this category to capture small amounts of product use that are otherwise unaccounted for.

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1.19 Standardization and aggregation

Step by step guide to FBS construction

Standardization and aggregation

After the process for standardization finished, the unbalanced primary commodity equivalent FBS table can be produced by aggregating all commodities quantity. In this example, the quantities that standardized and aggregated are those for **import, export, food, and tourist food**. At this stage, food processing is dropped to avoid double counting in utilization. For stock, feed, seed, industrial use, and loss, the unbalanced primary commodity equivalent FBS table will be filled by quantities from primary commodity line (oats).

Product	Production	Imports	Exports	Stock change	Food	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940

[Click for more detail](#)

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Notes:

TAB 1 (Slide Layer)

Step by step guide to FBS construction

Standardization and aggregation

Click on each highlighted box for more information.

Product	Production	Imports	Exports	Stock change	Food	Food processing	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats	131,259	188,218	3,439	12,350	0	84,291	182,950	12,300	0	2,500	3,940
Rolled oats	54,789	14,074	2,130	0	65,983	0	0	0	750	0	0
Bran of oats	16,858	688	1,436	0	0	0	16,110	0	0	0	0

$\frac{14,074}{0.65} = 21,652$
 $188,219 + 21,652 = 209,871$

$\frac{2,130}{0.65} = 3,277$
 $3,439 + 3,277 = 6,716$

$\frac{65,983}{0.65} = 101,512$

$\frac{750}{0.65} = 1,154$

Product	Production	Imports	Exports	Stock change	Food	Feed	Seed	Net Tourist Food	Industrial Use	Loss
Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940

Standardization and aggregation

0% of %total/sld% [Click NEXT to continue.](#) [Prev](#) [Next](#)


1.20 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

- 1 Calculate the Imbalance
- 2 Distribute the imbalance
- 3 Check that balanced quantities are within any set bounded

From standardization and aggregation process, an unbalanced primary commodity equivalent FBS table obtained. In order to make this unbalance account balance (supply is equal to utilization), a balancing process is necessary. As explained previously, this process of balancing comprises three steps



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Notes:

1.21 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

- 1 Calculate the imbalance

The imbalance calculation is a simple calculation performed straightforward based on the values in the unbalanced primary commodity equivalent FBS table, regardless of the distribution mechanism chosen.

$$\text{Imbalance} = \text{Production} + \text{Imports} - \text{Exports} - \Delta \text{Stocks} - \text{Food} - \text{Food Processing} - \text{Feed} - \text{Seed} - \text{Tourist Food} - \text{Industrial Use} - \text{Loss} - \text{Residual Use}$$

In this example, the result of calculation is as below:

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)	
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940	
B	Imbalance for A											17,708

0% of 10 total slides Click NEXT to continue. < Prev Next >

Notes:

1.22 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

This example will use the "proportional error" approach as its distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)	
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940	
B	Imbalance for A											17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%	

0% of %total(10%) Click on each Tolerance Interval for more information. < Prev Next >

Notes:

TAB 1 (Slide Layer)

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

This example will use the "proportional error" approach as its distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)	
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940	
B	Imbalance for A											17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%	

0% of %total(10%) Click on each Tolerance Interval for more information. < Prev Next >

Official data were available, compilers in this country had a high degree of confidence in the data and assigned these variables tolerance intervals of zero.

TAB 2 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A		Official data were available, compilers in this country had a high degree of confidence in the data and assigned these variables tolerance intervals of zero.								
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

◀ Prev Next ▶

TAB 3 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A		Official data were available, compilers in this country had a high degree of confidence in the data and assigned these variables tolerance intervals of zero.								
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

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TAB 4 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A	Data for stock changes imputed using models, although these quantities are much more likely to fluctuate. Consequently, compilers assigned this variables a tolerance interval of 30 %.									17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

◀ Prev Next ▶

TAB 5 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A	Data for food was imputed using a model; however, because food availability should change little from one year to the next, a low tolerance level of 10 % was assigned.									17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

◀ Prev Next ▶

TAB 6 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A		Official data were available, compilers in this country had a high degree of confidence in the data and assigned these variables tolerance intervals of zero.								
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/510%

Click on each Tolerance Interval for more information.

◀ Prev Next ▶

TAB 7 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A		Data for seed was imputed using a model; however, as the imputation for seed implies a certain seeding rate, the confidence should be high. 15 % was assigned								
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/510%

Click on each Tolerance Interval for more information.

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TAB 8 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A	Data for net tourist food imputed using models, although these quantities are much more likely to fluctuate. Consequently, compilers assigned this variables a tolerance interval of 30 %.									17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

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TAB 9 (Slide Layer)

Step by step guide to FBS construction											
Balancing FBS Account											
2 Distribute the imbalance											
This example will use the "proportional error" approach as it distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.											
Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A	Data for industrial use were obtained using expert estimation. Compilers had little confidence in this estimate and therefore assigned it a tolerance interval of 40 %.									17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

0% of %total/51d%

Click on each Tolerance Interval for more information.

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TAB 10 (Slide Layer)

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

This example will use the "proportional error" approach as its distribution mechanism. The first step in this process is using tolerance intervals and point estimates to quantify the error of each variable.

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A										17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%

Data for net loss imputed using models, although these quantities are much more likely to fluctuate. Consequently, compilers assigned this variable a tolerance interval of 30 %.

0% of %total/sid% Click on each Tolerance Interval for more information. < Prev Next >

1.23 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A										17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%
D	Error [D=A*C]	0.0	0.0	0.0	3,705.0	10,151.2	0.0	1,845.0	346.2	1,000.0	1,182.0

Once the percentages have been added, the data in line A can be multiplied by the percentages in line C to obtain quantified error estimates in line D. These quantified errors are then summed to one another to obtain an aggregated error, calculated on line E.

0% of %total/sid% Click NEXT to continue. < Prev Next >

Notes:

If the quantity for a given variable should remain fixed because it is an official estimate, a tolerance interval of zero can be assigned.

Negative imbalance indicates that production and import variables must be increased and the remaining variables must be reduced from their pre-balanced values, while the opposite is true for a positive imbalance.

1.24 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

The next step is to calculate the proportion of variables in aggregated error.

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A										17,708
C	Tolerance interval (in %)	±0%	±0%	±0%	±30%	±10%	±0%	±15%	±30%	±40%	±30%
D	Error [D=A*C]	0.0	0.0	0.0	3,705.0	10,151.2	0.0	1,845.0	346.2	1,000.0	1,182.0

0% of %total5d% Click NEXT to continue. < Prev Next >

Notes:

If the quantity for a given variable should remain fixed because it is an official estimate, a tolerance interval of zero can be assigned.

Negative imbalance indicates that production and import variables must be increased and the remaining variables must be reduced from their pre-balanced values, while the opposite is true for a positive imbalance.

1.25 Balancing FBS Account

Step by step guide to FBS construction

Balancing FBS Account

2 Distribute the imbalance

Next, the quantity of adjustment for each variable is calculated by multiplying the proportion of aggregated error calculated in Line F by the equation's imbalance in Line B. Each of the unbalanced quantities from Line A are then adjusted by the quantities in Line G.

Line	Product	Production (1)	Imports (2)	Exports (3)	Stock change (4)	Food (5)	Feed (6)	Seed (7)	Net Tourist Food (8)	Industrial Use (9)	Loss (10)
A	Oats primary equivalent	131,259	209,871	6,716	12,350	101,512	182,950	12,300	1,154	2,500	3,940
B	Imbalance for A										17,708

Note here that the imbalance is positive. This means that there is more supply than there is demand. For this reason, the adjustments in all the demand variables (i.e., everything except production and imports) will be positive. Had there been any adjustments in supply variables, the adjustments there would be negative.

0% of %total5d% Click NEXT to continue. < Prev Next >

Notes:

If the quantity for a given variable should remain fixed because it is an official estimate, a tolerance interval of zero can be assigned.

Negative imbalance indicates that production and import variables must be increased and the remaining variables must be reduced from their pre-balanced values, while the opposite is true for a positive imbalance.

1.26 Balancing FBS Account


Step by step guide to FBS construction

Balancing FBS Account

3 Check that balanced quantities are within any set bounded

This step serves as the final “reality check” on the now-balanced quantities. This step will depend upon the bounds that FBS compilers have set in their analysis of each commodity’s supply and demand situation. The most obvious check is that cumulative stocks are non-negative given the changes. Other hypothetical checks in our example situation could include things such as ensuring that the balanced estimate for seed implies a reasonable seeding rate.

If any value is identified as outside of bounds, that value is set at the bound, assigned a zero tolerance interval, and the process is repeated.



0% of %total\$td%

Click NEXT to continue.

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Notes:

1.27 Nutrient supplies and calorie estimates

Step by step guide to FBS construction

Nutrient supplies and calorie estimates


Nutrient supplies are added for each of the SUA level commodities, based on SUA level food estimates before standardization.

If the food quantity of the FBS primary-equivalent level was adjusted during balancing process, then food quantities for all commodities on SUA-level should first be scaled up by the same percentage, using a scaling factor.

$$\text{Scaling Factor} = \frac{\text{Adjusted FBS Food Value}}{\text{Beginning FBS Food Value}}$$

In our example, the scaling factor will be as follow:

$$\frac{111\,373.3}{101\,512} = 1.09714$$



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Click NEXT to continue.

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Notes:

1.28 Nutrient supplies and calorie estimates

Step by step guide to FBS construction

Nutrient supplies and calorie estimates

Once the scaling factor has been calculated, all food quantities for each commodity in the SUA should be multiplied by this scaling factor.

In the oats example, because the final balanced primary equivalent-level FBS food quantity rose compared to the unbalanced quantity, the food quantity for rolled oats must first be scaled up before the quantity can be converted into its nutrient equivalents.

Product	SUA Food Quantity (A)	Scaling Factor (B)	Scaled Food Quantity (C) (C=A*B)
Rolled oats	65,983	1.09714	72,393

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Click NEXT to continue.

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Notes:

1.29 Nutrient supplies and calorie estimates

Step by step guide to FBS construction

Nutrient supplies and calorie estimates

In the oats example, the nutrient table could be organized as below

Line	Product	Quantity Food (MT) (1)	Quantity Food (g) (2)	kcal energy/g (3)	Protein/g (4)	Fat/g (5)	Energy (kcal/day) [A6=A2*A3/365] (6)	Protein (g/day) [A7=A2*A4/365] (7)	Fat (g/day) [A8=A2*A5/365] (8)
A	Rolled oats	72,393	72,393,000,000	3.84	0.16	0.063	761,614,027	31,733,918	12,495,230

In this example, rolled oats was the sole commodity utilized for food; therefore, it alone is added to the table. Then the scaled-up food quantities are added. For ease of comparison, the quantities in tonnes are first converted to grams. To calculate a country's daily total availability for the different nutrients derived from each commodity, the value in (2) is then multiplied by the nutrient values in (3) through (5) and divided by 365, resulting in the data in (6) through (8).

The nutrient conversion process should pay careful attention to ensure:

1. The units are correct.
2. Whether their nutrient conversion factor take into account inedible parts.

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Notes:

1.30 Nutrient supplies and calorie estimates

Step by step guide to FBS construction

Nutrient supplies and calorie estimates

For many commodity trees, it is likely that several commodities in the tree will be consumed as food. Thus, after food quantities are converted into nutrient values, the next step is to add up the total nutrients for the commodity tree.

In this example, a food quantity was only recorded for rolled oats. Therefore, the total energy, protein and fat for the whole oats tree comes from rolled oats, as can be seen when line B (total nutrients from the oat tree) is compared to line A (nutrients from rolled oats alone).

Line	Product	Quantity Food (MT) (1)	Quantity Food (g) (2)	kcal energy/g (3)	Protein/g (4)	Fat/g (5)	Energy (kcal/day) (6)	Protein (g/day) (7)	Fat (g/day) (8)
A	Rolled oats	72,393	72,393,000,000	3.84	0.16	0.063	761,614,027	31,733,918	12,495,230
B	Total national nutrient availability for oats and products	-	-	-	-	-	761,614,027	31,733,918	12,495,230

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Notes:

1.31 Per capita estimates

Step by step guide to FBS construction

Per capita estimates

The final step is to convert the national aggregate nutrient estimates into per capita equivalents. This is accomplished by dividing the national nutrient totals in Line B by population in Line C to arrive at per capita estimates of nutrient availability in Line D.

Line	Product	Quantity Food (MT) (1)	Quantity Food (g) (2)	kcal energy/g (3)	Protein/g (4)	Fat/g (5)	Energy (kcal/day) (6)	Protein (g/day) (7)	Fat (g/day) (8)
A	Rolled oats	72,393	72,393,000,000	3.84	0.16	0.063	761,614,027	31,733,918	12,495,230
B	Total national nutrient availability for oats and products	-	-	-	-	-	761,614,027	31,733,918	12,495,230
C	Population						38,360,000	38,360,000	38,360,000
D	Per capita average national nutrient availability for oats and products [D=B/C]						19.85	0.83	0.33

0% of %total5d% Click NEXT to continue. < Prev Next >

Notes:

1.32 Per capita estimates

Step by step guide to FBS construction

Per capita estimates

Once these nutrients are calculated, they can be added to the primary commodity equivalent supply and utilization table to arrive at the final food balance for oats and products.

Product	Domestic Supply				Domestic Utilization					Per capita supply			
	Production	Imports	Exports	Stock change	Food	Feed	Seed	Net Tourist Food	Industrial Use	Loss	Energy (kcal/day)	Protein (g/day)	Fat (g/day)
Oats and products	131,259	209,871	6,716	15,949	111,373	182,950	14,092	1,490	3,471	5,088	19.85	0.83	0.33

It should be noted that this is the table for only one primary commodity equivalent. The process outlined above would then have to be repeated for all food commodities, including fisheries commodities, and then combined into one comprehensive national FBS.

When the lines for all commodities have been included, the per capita daily supplies of energy, protein and fat for the individual commodities can then be added up to calculate total daily supplies. The total obtained for energy is the daily dietary energy supply (DES).

0% of %total5d%

Click NEXT to continue.

◀ Prev

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Notes:

1.33 Quiz 1

(Multiple Choice, 10 points, 1 attempt permitted)

Step by step guide to FBS construction

Quiz

Q 01

Production of derived commodities is never standardized to the "production" variable

Select one that apply.

☒ True

☐ False

SUBMIT

0% of %total%id%

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1.34 Quiz 2

(Multiple Choice, 10 points, 1 attempt permitted)

Step by step guide to FBS construction

Quiz

Q 02

Seed only comes from the primary commodity. This value will remain unchanged in the FBS primary equivalent balance (no standardization needed)

Select one that apply.

☒ True

☐ False

SUBMIT

0% of %total%id%

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1.35 Quiz 3

(Multiple Response, 10 points, 2 attempts permitted)

Step by step guide to FBS construction

Quiz

Q 03 One variable on the utilization side will need to be removed after standardization in most cases. This variable is:

Select all that apply.

☐ Stocks

☐ Loss

☒ Food processing

☐ Co-product commodity

SUBMIT

0% of %totalSid%

Prev Next

Step by step guide to FBS construction

Quiz

Q 04 Please select correct statements given below:

Select all that apply.

☒ The nutrient conversion process should pay careful attention to ensure that the units are correct and whether their nutrient conversion factor take into account inedible parts.

☒ The final step of balancing FBS account is checking that balanced quantities are within any set bounded. If any value is identified as outside of bounds, that value is set at the bound, assigned a zero tolerance interval, and the process is repeated.

☒ In most cases, food processing is dropped to avoid double-counting. The only exception is in those cases where some processed product is standardized into another primary commodity equivalent of the FBS.

SUBMIT

0% of %totalSid%

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1.37 Conclusion


Step by step guide to FBS construction

Conclusion

You have finished lesson 12.

In this lesson, we have discussed an example of:

1. Filling in SUA table;
2. Standardization and aggregation process;
3. Balancing process;
4. Nutrient supplies and calorie estimates.



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Notes:

1.38 Thank You

Step by step guide to FBS construction



Food Balance Sheets (FBS)

Thank You!

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Notes: